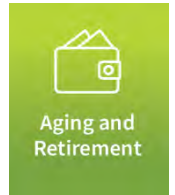


The Impact of Artificial Intelligence on Retirement Professionals and Retirees: A Collection of Essays

AUGUST | 2024






The Impact of Artificial Intelligence on Retirement Professionals and Retirees

A Collection of Essays

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A Collection of Essays

Introduction and Acknowledgments

INTRODUCTION

The Society of Actuaries Aging and Retirement Strategic Research Program Steering Committee issued a call for essays to explore the impact of artificial intelligence (AI) and large language models (LLM) on retirement professionals and retirees. The objective was to gather a variety of perspectives and experiences with AI and LLM in different retirement settings—both now and in the future. It is the goal of this collection to spur thoughts for future research and set the stage for upcoming efforts.

The collection includes seven essays that were accepted for publication from all submissions. Three essays were chosen for prizes based on their creativity, originality and promotion of further thought in this area:

Prize Winner	The Retirement Reckoning – When Family Ties Clash with Financial Realities Stefano Orfanos, FSA, CERA
Prize Winner	Can Artificial Intelligence Help Me with Retirement Planning: An Individual Perspective Anna M. Rappaport, FSA, MAAA
Prize Winner	A Retiree’s Guide to Artificial Intelligence risks and Mitigating Those Risks Gregory Whittaker, FSA, FASSA

THE CALL FOR ESSAYS

BACKGROUND AND PURPOSE

Hardly a day goes by without a feature story about the latest reverberation from the expanding use of Artificial Intelligence/Large Language Models (tools) in a variety of settings. The pace of use (and misuse) of these tools, such as ChatGPT and Bard, has been explosive and shows no sign of abating. Many experts would argue we are on the cusp of a permanent paradigm shift in teaching/academics and overall application of technology.

If and how this shift plays out, there is reason to think that it could impact in significant ways the nature and extent of work currently done by actuaries, financial planners, advisors, attorneys and other retirement professionals. This could be as little as minor assistance with report writing to full delegation of analysis heretofore thought to require deep professional knowledge.

Outside of professional settings, retirees and those nearing retirement themselves could significantly feel the reach of these tools. For example, they may change the method of delivery of investment advice, asset allocation, and general planning. At the same time, though, these tools may create new risks that expose retirees in ways that they have not and could not have been prepared.

With these issues in mind, the Society of Actuaries (SOA) Research Institute's Aging and Retirement program is interested in an exploration of this topic from a variety of perspectives. The result of this effort is intended to provide a useful resource for readers to become well-grounded on the issues surrounding the impact of these tools in a retirement context and set the stage for future research.

RESEARCH OBJECTIVE

The sponsors are seeking researchers and essayists to explore the multifaceted impacts of AI/ Large Language Model tools on retirement professionals, retirees and those planning for retirement. The desired combined end product of this effort is a resource that will aid in the understanding of relevant issues while providing current considerations and potential future dynamics of AI/ Large Language Models in this area.

The intended audience for this effort is actuaries and other retirement professionals such as financial planners.

The following are illustrative of the topics and questions that might be addressed in an essay or research project. Respondents to this RFP/Call for Essays are not required or expected to address all or even any of these topics/questions. Rather they are encouraged to also consider other question(s) or topic(s) they deem critical to the work done by the Society of Actuaries and its members. To maintain a reasonable scope, researchers should be selective in the number of topics/questions they cover.

Responses to this Call for Essays and RFP should clarify the time horizon under consideration in an essay or research project. The SOA Research Institute prefers that researchers address both current and future professional and retiree considerations of the AI/ Large Language Model questions or topics they plan to focus on. Respondents are, however, free to cover only one aspect, but in either case, the responses should clarify what will be covered.

Retirees and Those Planning for Retirement

- What are the risks and challenges that these tools may present specifically for the aging community? For example, what are risks to individual investments they may hold?
- What is the best way to educate retirees and those planning for retirement on the uses of these tools?
- What are ways to address fears that these individuals may feel about the adoption and use of such tools? What are concerns that are warranted for these individuals and which may be dispelled with better information?
- What are the ways that these tools can best be used to educate and otherwise support individuals in managing their personal finances during their retirement years?
- How do you make these tools useful for people in retirement if they may end up being the last to use them and the most exposed to abuse by them? How can tool interfaces be improved in this regard? How can their underlying algorithms be improved?
- What may be risks introduced by using tools with algorithms that may be potentially biased or discriminatory? How might such biases, that may be racial, gender or age-based, specifically impact an aging population?
- What are ways to prevent fraud and scams directed at retirees that make use of these tools? What are risks posed by such fraud and how can AI itself be used to help educate individuals on it?
- How might these tools be used to promote better living in retirement? Can they help with more easily living independently, managing bills/payments, monitoring cognitive decline, etc.? Are there ways these tools can provide support to and lessen the adverse consequences associated with memory loss?

- Can these tools help retirees and those planning for retirement better navigate getting help, such as more efficiently reaching customer service centers?
- Can these tools help retirees who wish to work part time in retirement or otherwise return to the workforce?

Retirement Professionals

- What are ways that these tools can be used for preparation of actuarial analyses for retirement plans (defined benefit, defined contribution, etc.)? What are the most beneficial uses for such analyses? Which types of analyses may need to be approached with greater caution? For instance, how do you assess whether outputted information is reliable vs inaccurate/fabricated in this context? Can these tools themselves be used to help make such assessments? Which types of analyses are completely inapplicable or in other ways limited? How do the preceding considerations differ between now and in the future?
- How would the issues in the previous bullet apply to retirement professionals who advise on retirement planning and prepare individual projections and other analyses?
- What are uses of these tools for preparing reports that retirement professionals may need to create for any purposes outside of actuarial analyses? How might this impact the current roles and responsibilities of retirement professionals at different career stages? Are there positions that may become obsolete?
- To what extent can these tools be used to professionally manage retirement investments and portfolios? How can these tools be used to help market such services?
- How can prompts be written? What needs to be watched out for?
- How might these tools support plan administration and reduce the need for personalized communication in writing and by phone? How does one avoid a participant getting stuck without an answer?
- How do employers of retirement professionals feel about these tools? Are they embracing the tools for their employees' use or are they steering employees away from them? What discomfort may they have?

ACKNOWLEDGMENTS

The SOA Research Institute Aging and Retirement Strategic Research Program thanks the Project Oversight Group (POG) for their careful review and judging of the submitted essays. Any views and ideas expressed in the essays are the authors' alone and may not reflect the POG's views and ideas nor those of their employers, the authors' employers, the Society of Actuaries, the Society of Actuaries Research Institute, nor Society of Actuaries members.

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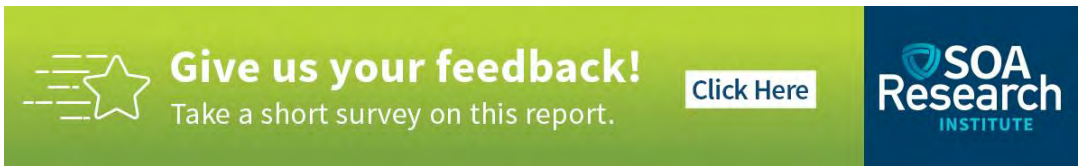
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Prize Winner

The Retirement Reckoning—When Family Ties Clash with Financial Realities

Stefanos Orfanos, FSA, CERA

Any views and ideas expressed in the essay are the author's alone and may not reflect the views and ideas of the Society of Actuaries, the Society of Actuaries Research Institute, Society of Actuaries members, nor the author's employer.

To address the Society of Actuaries' 2024 call for AI and LLM research in retirement planning, this essay explores a creative approach: a narrative examining the Johnson family's experience. The Johnsons' story lays bare the real-world implications of AI advice in navigating retirement choices, extending beyond just assisted living transitions. Their struggles highlight the need to balance AI's insights with human empathy for informed, compassionate choices. The time horizon under consideration is both current and future.

This narrative is the result of a unique collaboration between human and machine. While Dr. Orfanos provided the core storyline and direction, the details and some surprising twists were generated by artificial intelligence. Three different AI systems were involved in this process: Claude from Anthropic, ChatGPT-4 from OpenAI, Gemini from Google and finally, me. The long sequence of prompts and responses have been included in the Appendix.

PART 1

The Johnson home, nestled in the verdant suburbs of Atlanta, had become a battleground of silent struggles and unspoken fears. Michael, once the family's stronghold, now faced his days confined to the dimly lit basement, his once-active life curtailed by the relentless progression of diabetes. The stairs to the rest of the house stood like an insurmountable barrier, a daily reminder of his lost independence.

Kathy, balancing her roles as caregiver, wife, and financial provider, found herself stretched to breaking point. Between her two jobs at the assisted living facility and the local hospital, she also contended with her own looming health issues, including chronic back pain and the threat of pre-diabetes.

Sarah, their 27-year-old daughter, seemed to live in a parallel universe. Her reality, largely shaped by the digital escapades in the world of Japanese anime and virtual forums, left her detached from the escalating crisis at home. With no job to her name and only a GED, her understanding of their predicament was superficial at best.

The fragile veneer of normalcy shattered one evening when Michael's health took a dramatic turn. A severe hypoglycemic episode left him unconscious in the basement, a harrowing reminder of their precarious situation.

Gathered around the old kitchen table, where layers of wear marked countless family meals, the air was thick with tension and unvoiced concerns.

"We can't ignore this any longer," Michael said, breaking the uneasy silence. His voice, a faint echo of its former strength, carried a gravity that demanded attention. "This house... it's become a prison of sorts, not just for me but for all of us."

Sarah, feeling a surge of panic, clung to the hope of maintaining the status quo. "There's got to be a solution that doesn't involve upending our lives," she insisted, her voice edged with desperation.

Her search for alternatives led her to an AI decision-support system, designed to provide retirement planning advice. Sarah entered data optimistically skewed, hoping for a recommendation that supported her wishes. The AI suggested in-home care as a feasible option, estimating costs at \$3,000 a month—a figure it presented devoid of the complexities of their real lives.

"See, this says we can manage. We don't have to give up everything," Sarah announced, clinging to the printout as if it were a lifeline.

However, the complexity of their situation was not to be unraveled by algorithms alone. A consultation with Mr. Thompson, a seasoned financial advisor, laid bare the stark realities they faced. The house, valued at approximately \$400,000, could provide a nest egg, but Michael's specialized care could easily consume \$5,000 monthly, leaving little room for error. Sarah's potential independence, with rent prices hovering around \$1,200, added another layer of financial strain.

"The AI provides a snapshot, based on the figures you input," Mr. Thompson explained, his tone measured but firm. "But it can't foresee the fluctuations in health, the market, or account for the emotional cost of such decisions. It's not just about the numbers; it's about your lives, your wellbeing."

The dialogue between Sarah and Mr. Thompson grew heated as they delved deeper into the AI's recommendations versus the tangible reality of their situation. "But if the AI says it's possible, shouldn't we consider it?" Sarah argued, her faith in technology clashing with the advisor's pragmatic outlook.

"It's one thing to consider it, Sarah, but another to rely on it entirely," Mr. Thompson countered, emphasizing the limitations of a purely data-driven approach in navigating life's uncertainties.

PART 2

The kitchen, once the heart of the Johnson home, had transformed into a makeshift command center for their crisis discussions. Papers, bills, and the ominous printout from the AI decision-support system littered the table. The weight of their situation pressed heavily in the air, challenging the fabric of their family unit.

Kathy, her voice laced with exhaustion, spoke of her anxieties. "Michael, I understand what you're saying, but we've put so much into this home. It's not just about the money; it's our memories, our life together. Can we really just walk away from that?"

Michael met her gaze with a mixture of sorrow and resolve. "Kathy, I know, and I hate that we're even in this position. But my health... it's not just going to get better. And Sarah," he glanced at his daughter, "needs a chance to build her own life, not be stuck in this cycle with us."

Sarah, caught between her parents' exchange, felt a pang of guilt. Her earlier optimism, fueled by the AI's recommendations, now seemed naive. "But the AI was so sure... Are we just ignoring a possible solution because it's not what we expected?"

Mr. Thompson, observing the family's turmoil, sought to steer the conversation towards a middle ground. "The AI's advice isn't without merit—it's just one piece of the puzzle. But it doesn't feel the weight of these decisions. It

doesn't tire. It doesn't worry about the future like we do. It's important to consider all aspects, including those it can't quantify."

The advisor then outlined the stark financial realities further. "Even if we stretch the funds from the house sale, there are variables we can't control. Health emergencies, changes in the cost of care, or even shifts in the housing market for Sarah's rent—these could all derail the plan."

Sarah's frustration mounted. "So, what? We just give up because it's hard? Because there's risk?" Her voice rose, a mix of anger and desperation coloring her words.

"No, Sarah, not give up," Mr. Thompson replied gently. "But prepare. Adapt. The AI offers a path, but we have to be ready for the rocks along the way. And sometimes, that means making the hard choices now to avoid harder ones later."

The conversation shifted as they delved into the specifics of Michael's care needs, the potential costs involved, and the quality of life he could expect in a specialized facility. Kathy shared her fears of becoming overwhelmed, of not being able to be there for Michael in the way he needed. Michael, in turn, expressed his dread of becoming a burden, of watching his family sacrifice their well-being for his sake.

Sarah, feeling the gravity of their situation, began to see the limitations of her reliance on the AI's guidance. "I just wanted to find a way to keep things normal," she admitted, her voice breaking. "But maybe... maybe this is about finding a new normal."

The night drew on as they wrestled with their options, the discussion a blend of financial pragmatism, emotional turmoil, and the painful acknowledgment of their changing realities. The AI's cold logic, for all its precision, couldn't navigate the murky waters of human emotion and the bonds that held the Johnson family together.

As they concluded their meeting, no definitive decision made but with a clearer understanding of their challenges, it was evident that their journey forward would require a balance between the objective input of technology and the nuanced, deeply human insights of their advisor—and of themselves.

PART 3

In the weeks that followed, as they grappled with the conflicting advice, the Johnsons delved deeper into the specifics of Michael's care needs and the financial implications of their decisions. Kathy and Sarah, with Michael's input, began to compile a comprehensive list of assisted living facilities, each visit exposed the varied quality of care and the nuanced costs not initially apparent in their projections.

One particular visit stood out. The facility was pristine, the staff attentive, and the brochure promised an idyllic setting for Michael's care. Yet, when Kathy inquired about staff-to-patient ratios and the handling of medical emergencies, the answers were vague, the confidence of the sales pitch giving way to uncertainty.

"That place looked perfect on paper, didn't it?" Kathy remarked on their drive home, a note of skepticism in her voice. "But digging deeper, it's clear there are gaps. The AI couldn't show us that."

Sarah, who had been holding onto the printout from the AI like a talisman, began to see its limitations more clearly. "It's one thing to read about care options and costs, but seeing it in person, asking those hard questions... it's different."

Michael, too, had his reservations. "I appreciate the effort to find the best place, but I can't help but feel like just another number to these facilities. Mr. Thompson's financial advice is sound, but it's this personal side of things, the reality of living in one of these places, that I'm worried about."

Their search for a suitable facility continued, with each visit informing their understanding of what Michael's care would truly entail. They encountered discrepancies between advertised services and actual care, fluctuating costs beyond the base rates, and the stark realization that the emotional toll of such a transition had been grossly underestimated.

During this period, Mr. Thompson's advice took on a new dimension. While his financial guidance remained invaluable, his inability to fully grasp the personal and emotional aspects of their decision became more apparent.

"I think we expected too much from him," Sarah admitted one evening. "He helped us see the financial reality, but there's so much more to this decision than just numbers."


Kathy nodded, weary but determined. "We have to be our own best advocates. Not just for Dad's care, but in making sure we're not sacrificing more than we have to."

This realization marked a turning point for the Johnsons. No longer solely reliant on external advice, whether from AI or financial advisors, they began to trust more in their collective judgment, informed by their research, visits, and the hard questions they'd learned to ask.

As they finally selected a facility for Michael, doing so with a more critical eye and a deeper understanding of the challenges ahead, they prepared for the transition with a mix of apprehension and hope. The path they chose was fraught with potential obstacles, but they were better equipped to face them together, drawing strength from their newfound knowledge and shared commitment to navigating the future as a family.

* * * * *


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APPENDIX

Note: The prompts have been kept as entered except for necessary clarifications (in brackets) to preserve the authenticity of this process.

ANTHROPIC'S CLAUDE WAS USED FOR IDEATION

Prompt: In the attached document [Budgeting for Senior Living: Financial Planning Tips and Strategies for Seniors.pdf] there is information about assisted living and other options for retirees. In many cases, senior citizens sell their home to raise enough funds to pursue these options for themselves and their spouse but find out later on that the services provided aren't what was promised in the beginning, or that it gets a lot more expensive to get the care they need. This is a reality today that many elderly folks have to contend with. I am wondering if the emergence of AI tools like yourself can assist in any way these folks in evaluating these living arrangements and making a sound decision for their future, as well as whether AI can provide some of the services they currently pay good money to get. Please also elaborate on the challenges of retirees leveraging effectively this advanced technology. I would like your answer to be comprehensive enough but not exceed 2000 words.

Prompt: This is a good start. You mention decision support systems. How would such a system look like? What information would collect from the retiree before it is able to make a recommendation? Can you build a prototype for such a system? Also, your second point is predictive analytics. Do you have access to data or information that would allow you to analyze trends? You also mention regulatory reports—are these accessible by you? If you don't have access, who do you expect to provide you with the data?

Prompt: Let's test this out. We have Michael and Kathy, ages 61 and 57. Michael has disability (diabetic, can't see very well, his foot has a recurrent wound that prevents him from walking normally) and Kathy is pre-diabetic and has chronic back pain and a few past operations that haven't solved the issue. They own a home in Atlanta suburbs which they just paid off. The home's value is around \$400k. They also have a daughter aged 27 that stays with them and would need to have separate living arrangements if they sell. The daughter doesn't work and has no university education. Michael collects monthly disability payments and Kathy is still working as a nurse but would retire once she reaches 60. No other assets, except for two cars about 8-10 years old. There is a liability of about 40k which is a car loan that will be fully paid in 5 years. In terms of their preferences, they would like to have access to a community of retirees. At the moment, they don't need much in terms of services. However, given Michael's issues with diabetes and a recent scare with his heart, they want to make sure that there is an option for assistance if it comes down to that. In terms of geography, they would like to stay in the Atlanta suburbs. They also don't want to exceed their available assets and burden their other children who have their own families.

Prompt: The article mentioned 5 different options. Were all of them considered? Why was the decision process that you used to arrive at CCRC being the best option, and what would need to change for each of the other 4 options to come out on top in your analysis?

Prompt: Fair enough, I want you to take the analysis done thus far and formulate it as a case study involving the fictional couple of Michael and Kathy. Please imitate the best case studies in how you set up the framework for the important decision that the couple has to make, their investigations into the different living arrangements, and the final decision. Feel free to make up facts whenever necessary to draw a fuller picture and make it more realistic.

Prompt: This is a weak effort. A case study should include crises, dilemmas, a bit more drama than the flat text you created.

Prompt: But what about the daughter?

Prompt: The case study mentions the services of a financial advisor. Can this work be outsourced to AI?

Prompt: But is this realistic? Most of the time, AI is not good at asking the right questions. And do you really have vast knowledge of senior living facilities in the Atlanta suburbs?

Prompt: Please incorporate these aspects into the case study, increasing the dramatic effect by explaining how, with the help of Sarah, they first attempted to get answers via AI, but soon realized its limitations and that having a human financial advisor was indispensable, even if costly. Also reflect the fact that Sarah wasn't on board with her parent's plan to sell the house she had lived her whole life, and she instead pushed for a different plan altogether.

Prompt: This is still too easy. Sarah has no income and can't afford to rent her family home, not to mention if it gets sold, there is no guarantee the new owners would be willing to rent it out. Also, the case has lost some of the finer details that give it more realism, and finally, the fact that the financial advisor agreed with the AI made it less powerful. Not to mention that Sarah should have been the one dabbling in technology.

Prompt: The personalities of Michael and Kathy are very formulaic. Rewrite the whole thing by painting Michael as the one starting the discussions for a senior living arrangement and Kathy being the affectionate mother who has always coddled her daughter Sarah. Also, don't mention the article by name.

Prompt: We lost the connection to AI, which is integral to this story. What if we have Sarah try to oppose Michael's decision by expertly prompting an AI system to obtain a contradictory answer that serves her interest and is persuasive?

Prompt: That's a good effort. But I want you to give more color to the different individuals. Right now, they sound very similar when expressing themselves. Try to exaggerate their personalities a bit so they sound very distinct.

Prompt: This reads a lot better; thank you. But the thing that's still missing is the numbers. Add concrete figures about the home's value, rent, entrance fee and ongoing costs of CCRC. Also, clarify who will be paying Sarah's rent.

Prompt: If the home is sold, how can the family also rent it? This makes no sense!

Prompt: The story now makes no sense. Sarah emotional attachment to the family home is not balanced against Michael's needs and Kathy's devotion because the house is sold. Rewrite the whole story from the beginning, make sure it's internally consistent.

OPEN AI'S GPT4 WAS USED FOR ADDITIONAL NARRATIVE DEVELOPMENT

Prompt: Below is a story about a difficult decision. I want you to eliminate the contradiction in the last sentence of the story and expand the story to be twice as long. Take liberties with adding details to make the characters, events and deliberations more realistic. Story starts here: [draft of essay follows]

Prompt: This is too flaccid. The story should have more clashes, crisis, drama. The role of AI should be highlighted instead of demoted.

Prompt: You changed the story in good ways, but you should still keep Sarah as the never employed daughter with no university education who is advocating for the family home out of fear of change. Also, the financial advisor has to stay. The technology ethicist doesn't sound real. And Kathy has to stay with her husband.

Prompt: The last two paragraphs are fluff, they add nothing. Also, we missed some of the details about Kathy: she is also pre diabetic and with chronic back issues that haven't been resolved even after repeated operations. She currently works two jobs in an assisted living facility and also at a hospital. And Michael's health scare was a great twist that we should retain.

Prompt: This is OK, but is missing some dramatic aspects. Sarah is supposed to prompt the AI system in a way that provides the desired answer. The other thing missing is some of the challenges of living in a senior living facility. What if the quality of care is less than promised? Or if there are hidden costs? Can the sale proceeds stretch long enough to cover their expenses? And who will pay for Sarah's rent once the house is sold?

Prompt: This is only 700 words. We need to double it in length by adding more colorful language and longer dialogue.

Prompt: it's 870 words. We need about 1500 words. Please make the dialog less flowery, less metaphors, but more real and hard. How an African American low income family would speak at home. Kathy certainly loves her husband Michael, but is also tired of serving him and yearns for an unencumbered life. Sarah is lost online most of the day every day, reading Japanese anime and participating in obscure discussion boards. Michael is mostly confined in the basement of the house, without the ability to drive his own truck or not willing to climb the stairs to the upstairs living room most days.

Prompt: This is good, but Michael has totally disappeared as a character with a distinct voice. Before "A decision made", can you add more nuance and perhaps strife?

Prompt: OK, this is good. Give me the full text, from start to finish.

Prompt: Why you didn't incorporate Michael's words into the text? Please do so and give the full case study from start to finish.

Prompt: This is again too short. Rewrite it so that it's 1500 words long. Don't condense the dialog or Sarah's attempt to get AI to give her the answer she wants.

Prompt: continue [to part 2]

Prompt: Now rewrite each part to put added focus into the contrast of the AI serving as a family and retirement planning tool vs the human financial advisor. Don't paint AI as all bad and the human as all good, instead give a more nuanced view.

Prompt: This version is missing all info about Sarah never holding a job down and having just a GED. Add these details and longer strife and break the story into two parts to be able to exceed your 1000 word limit.

Prompt: The length is acceptable but part 2 is very weak. We need more crisis and strife and challenges. And maybe a way to highlight the financial advisor's drawbacks and the benefit of objectivity that the AI system might enjoy. Also, include concrete numbers (value of house, cost of assisted living, cost of rent for Sarah) to increase realism. Once again, break it into two parts to maintain length close to 1500 words.

Prompt: You tend to foretell what conclusion should draw instead of providing a robust story-telling and let the reader draw her own conclusions. Plus you repeat the conclusion too much. Rewrite both parts of this story, making sure you expand and enrich the dialog while limiting the editorializing and repetitions.

Prompt: This is less than 700 words. We want 1500 words or more. Break it into many sequential responses if needed, but provide rich dialog that dramatizes this contrast between AI and human for giving sound retirement advice.

Prompt: continue [to part 3]

Prompt: You have extrapolated the story. What I wanted you to do was to interpolate the story. Instead of adding a lot of waxing lyrically about the aftermath, give more vivid detail of the crisis and the conflicts before the decision has been made. Again, split into several parts to allow for a deeper and richer description.

Prompt: continue [to part 2]

Prompt: continue [to part 3]

Prompt: I like the story up until the conclusion. Missing are the struggles in the assisted living with escalating costs, at times low quality or refused care and Kathy serving as an advocate. Mr Thomson appears wise but we should highlight his own fallibility and human motives that aren't always beneficial. Please re-generate all 3 parts. The first two parts are pretty good already, but the third needs serious edits.

Prompt: You weren't supposed to change the first two parts. And instead of demonstrating Thomson's limitations through his words in part 3, you are editorializing. Once again, generate each part separately, making sure the dialog is robust and there is less commentary about what the meaning of things is.

Prompt: Below you will see Parts 1, 2 and 3. Don't condense anything. Instead add the missing storyline between 2 and 3 to tie them together [draft parts follow]

Prompt: This 3-part fictionalized account is a response to the request for research proposals found in <https://www.soa.org/research/opportunities/2024-impact-ai-llm-retirement/>. Write an introductory paragraph that ties it to the research proposal and explains why this approach is creative and worth considering.

Prompt: Condense a bit and explain what is the connection between retirement planning and the decision for assisted living.

Prompt: Condense in half and avoid repetitiveness. Also, make a more compelling case why this story is relevant to the research proposal.

GOOGLE GEMINI WAS USED FOR ADDITIONAL EDITING

Prompt: Make minor edits to the text below to improve readability, remove any repetitiveness and increase dramatic effect while keeping it realistic and without exaggerations. Don't condense or expand. [draft of essay follows]

Prompt: How about the introductory statement. Any edits? [draft of statement follows]

Prompt: Improve the sentence [draft sentence follows]



Prize Winner

Can Artificial Intelligence/Large Language Models Help Me with Retirement Planning? An Individual Perspective

Anna M. Rappaport, FSA, MAAA

Any views and ideas expressed in the essay are the author's alone and may not reflect the views and ideas of the Society of Actuaries, the Society of Actuaries Research Institute, Society of Actuaries members, nor the author's employer.

Note: ChatGPT was the artificial intelligence/large language model chosen for illustrative purposes in this essay.

Retirement planning is a complex undertaking, involving many different factors and a households' personal situation. Prior SOA research indicates that there are considerable gaps in retirement planning and financial literacy.

BACKGROUND: GAPS IN PLANNING AND FINANCIAL LITERACY

- Many Americans do not understand how compound interest works or the time value of money.
- Many Americans do not understand how various types of investments work, or what a mutual fund is.
- Financially fragile individuals often plan paycheck-to-paycheck or for less than a year.
- It is common to make decisions to retire without a longer-term financial analysis.
- For some individuals, retirement planning is very short term focused and focused on predictable cash flows.
- Some individuals do not plan for risks but rather say they will deal with them when they happen.

These gaps have existed for a long time, but the situation does not seem to be improving.

Household finance is not something that is routinely taught to young people as a basic life skill.

Households who are interested can find very large amounts of information about retirement on the internet, in magazines and books, in information from their employers, from friends, and more. There are also many calculators and support tools targeted at different questions. But the quality of this information varies, and some of it is focused to advance a particular point of view or support the use of a product or approach. Some of it is also wrong and misleading. That leaves individuals not knowing which information is helpful to them and not knowing what to believe when they find conflicting information.

We should remember this background as we think about how AI can help and whether it might hurt us.

As an actuary and a retiree with considerable background in both of these topics, I decided to try to learn more about ChatGPT, its virtues and limitations. I learned several things in general:

- ChatGPT responds to questions asked right away. It allows the user to ask a series of questions building on prior answers.
- Usually, the answers appeared to have reasonable content, but they could be incomplete or wrong. “Hallucination” is often used to describe AI getting things wrong.
- ChatGPT can summarize information and present it in different ways.
- The user writes questions or “prompts” to get information from large language models such as ChatGPT.
- An average user would probably often not be able to recognize wrong answers and why they were wrong.
- It is easier and faster to get information using ChatGPT than using a conventional internet search.

I conducted several conversations with ChatGPT to try to understand what types of retirement planning answers I could get.¹ **This essay includes examples of ChatGPT responses, and they will be marked and discussed.** In addition to conducting these conversations, I read about ChatGPT and listened to several webcasts.²

ChatGPT Analysis or Calculations: I tried several times to ask questions with limited information. For most of the questions, ChatGPT wanted more information, but the responses were general and not very complete. For one question, ChatGPT tried to do a calculation and gave a very incomplete and incorrect answer. The question and answer are as follows:

Question

“Susie is 60 years old and earns \$125,000 a year. She started working at age 23 and has worked all but 4 years before turning age 60. She owns a \$300,000 house without a mortgage and has investment accounts of \$150,000. When can she retire?”

ChatGPT Answer

“Determining when someone can retire involves considering various factors, including their financial situation, lifestyle, and retirement goals. In Susie's case, we can make some assumptions and calculations based on the information provided.

Financial Assets

- *Susie earns \$125,000 a year.*
- *She has a \$300,000 house without a mortgage.*
- *She has investment accounts of \$150,000.*

Work History

- *Susie started working at age 23.*
- *She has worked all but 4 years before turning 60.*

Assumptions

- *We'll assume that Susie's current expenses are manageable with her income and assets.*

¹ ChatGPT 3.5 was used for these conversations.

² This essay focuses on the individual. There is a second essay that focuses on the professional involved in supporting retirement processes and planning. The research feeds both.

- We'll assume a life expectancy of around 85 years old for planning purposes.

Now, let's make some basic calculations to get an idea of Susie's retirement readiness.

Savings

- Susie's total financial assets: $\$125,000$ (annual income) * $(60 - 23 - 4) + \$150,000$ (investment accounts) = $\$2,550,000$

Expenses

- Without details on Susie's annual expenses, it's challenging to estimate her retirement needs accurately. However, she has a paid-off house, which is a significant asset.

Retirement Age

- The age at which Susie can retire depends on her desired retirement lifestyle, expenses, and how much she has saved. A common rule of thumb is the 4% rule, which suggests that if Susie can live on 4% of her savings annually, she could potentially retire.

Example

- If Susie can live on $\$102,000$ (4% of $\$2,550,000$) per year, she might be able to retire comfortably.

Keep in mind that these are simplified calculations, and it's highly recommended for Susie to consult with a financial advisor who can provide a more accurate analysis based on her specific situation, expenses, and goals. Factors such as inflation, healthcare costs, and unexpected expenses should also be considered in retirement planning."

The calculation and write-up for this example were **grossly incorrect** and included a number of major errors or approximations:

- ChatGPT ignored Susie's expenses. It seemed to assume that she had saved all her income and that she had additional income that would cover expenses in retirement or that there would be no expenses. The output included a category for expenses which made no sense at all.
- ChatGPT provided a two sentence response on retirement age. The first sentence made sense and said it depends, but it was not complete. The second sentence made no sense in response to the retirement age question.
- ChatGPT ignored the fact that Susie would most likely receive Social Security.
- ChatGPT assumed that Susie's earnings were the same in all years that she worked.
- ChatGPT ignored that invested money earned investment income and interest needed to be considered in the calculation.
- ChatGPT assigned her a life expectancy, but it is unclear how it arrived at the value or what was done with the information.

The ChatGPT output included a category for assumptions but did not include mention of many of the assumptions needed for an actuarial calculation.

Based on my research, it is my opinion that ChatGPT should not be used for calculations unless there is a reliable way to check the results. This question and response clearly confirmed that, and I strongly recommend against using calculations from ChatGPT without good quality control. This would make them unsuitable for use by individuals who are trying to plan on their own.

I developed a second example. This time I focused on a relatively recent widow with a lot of her money in her house. I provide a series of three questions in this example.

Question

“Carolyn was widowed at age 60. Her husband was age 66 when he died. She is now age 64 and is working and earning \$40,000 a year. She inherited a house worth \$1,000,000. Can she afford to retire? When should she retire?”

ChatGPT Answer

“Determining whether Carolyn can afford to retire involves assessing her financial situation, including her income, assets, and expenses. Here are some key considerations:

Income

- *Carolyn is currently earning \$40,000 a year from her work. It's essential to factor in this income when assessing her ability to retire.*

Assets

- *Carolyn inherited a house worth \$1,000,000. This asset can potentially contribute to her financial well-being in retirement, either by being sold or used for other purposes.*

Age and Retirement Plans

- *Carolyn is currently 64 years old. The decision of when to retire is a personal one and can depend on factors such as health, lifestyle preferences, and financial considerations.*

Social Security

- *Carolyn may be eligible for Social Security benefits, and the timing of when she chooses to start receiving them can impact her overall retirement income. The full retirement age for Social Security benefits depends on Carolyn's birth year.*

Expenses

- *Understanding Carolyn's current and anticipated expenses in retirement is crucial. This includes living expenses, healthcare costs, and any outstanding debts.*

Investments and Savings

- *Carolyn's overall financial picture depends on any additional savings or investments she may have. Assessing the health of her retirement accounts and other savings is essential.*

Financial Goals

- *Carolyn should consider her financial goals in retirement. This includes her desired lifestyle, travel plans, and any other significant expenses she may anticipate.*

To help Carolyn make an informed decision about retirement, she may want to:

- **Consult a Financial Advisor:** A financial advisor can help Carolyn assess her overall financial situation, develop a retirement plan, and provide guidance on when to retire.
- **Create a Budget:** Understanding current and anticipated expenses is crucial. Creating a detailed budget can help Carolyn determine how much income she needs in retirement.
- **Explore Social Security Options:** Carolyn should explore the different options for claiming Social Security benefits. The timing of when she starts receiving benefits can impact the amount she receives.
- **Consider Healthcare Costs:** Factoring in potential healthcare costs is important, especially as individuals age. Carolyn should explore healthcare coverage options, including Medicare.
- **Evaluate Long-Term Care Plans:** Long-term care needs can be a significant expense in retirement. Carolyn may want to consider long-term care insurance or other strategies to address this potential cost.

The decision of when to retire is a complex one and involves careful consideration of various financial and personal factors. Seeking professional advice and planning can help Carolyn make decisions aligned with her goals and financial situation.”

Completely in contrast to the first example, this was a good answer. The software did not go off the deep end and do a calculation. It offered a rational explanation of what is needed next. However, it completely seemed to miss the idea that her Social Security options may depend on her husband’s earning history.

The responses to the two questions when considered together make it clear that what happens in one conversation may be entirely different than what happens in another. This is entirely different from retirement planning software where input is provided in a consistent way and a consistent analysis can be expected. (Of course, the analysis may be suitable for some situations, but not others, but the tool will do the same thing based on similar input.)

I then decided to explore how the value of the house might be used to help finance retirement.

Question

“Carolyn would like to explore further how to use the value of the house (\$1,000,000) to help her in retirement. What options are available to her?”

ChatGPT Answer

The value of Carolyn's house can be leveraged in several ways to help support her in retirement. Here are some options for utilizing the value of the house:

Downsizing

- *Carolyn could consider selling her current house and downsizing to a smaller, less expensive home. This would free up the equity tied up in the house, providing her with a lump sum of cash. The proceeds from the sale could be used to supplement her retirement income, cover living expenses, or invest for future needs.*

Reverse Mortgage

- *A reverse mortgage allows homeowners aged 62 and older to convert a portion of their home equity into cash while still living in the house. This option could provide Carolyn with a stream of income or a lump sum payment, and she would not be required to make monthly mortgage payments. However, it's crucial to carefully consider the terms, fees, and potential impact on heirs when contemplating a reverse mortgage.*

Home Equity Line of Credit (HELOC)

- *Carolyn might explore a home equity line of credit, which is a revolving line of credit secured by the home's equity. She can borrow against the line of credit as needed and pay it back over time. HELOCs typically have lower interest rates compared to other types of loans.*

Renting Out a Portion of the Property

- *If Carolyn's house has extra space, she might consider renting out a portion of it. This could provide her with rental income, which can be used to cover living expenses or contribute to her retirement savings.*

Sale-Leaseback Agreement

- *Carolyn could explore a sale-leaseback arrangement where she sells the house to a buyer and then leases it back. This allows her to access the equity while continuing to live in the property. However, the terms of such agreements should be carefully negotiated.*

Home Equity Conversion Mortgage for Purchase (HECM for Purchase)

- *This is a specific type of reverse mortgage designed for seniors who want to purchase a new primary residence. Carolyn could use the proceeds from selling her current home to finance the purchase of a new home using an HECM for Purchase.*

Before making any decisions, Carolyn should consult with financial and legal professionals to fully understand the implications and risks associated with each option. Each choice has its own set of considerations, costs, and potential impacts on Carolyn's overall financial situation and estate planning. It's important for Carolyn to have a comprehensive understanding of these options and to tailor her decisions to her specific needs and goals."

Again, this was a rational set of options. However, my perspective is that it was incomplete in that it did not mention senior housing which includes support. It also could have mentioned that different geographic areas have very different costs and considerations such as climate, access to health care and activities. Other than suggesting financing tools, the response did not focus on the bigger picture of retirement and the importance of housing choice. The response also did not focus on the issue of buy vs. rent, and considerations about whether Carolyn could care for the house. The response focused on the specific question asked and did not broaden the conversation as a good advisor would probably have done. It should be noted that if I had looked at a magazine article or an internet site which discussed the issues of how the house might be used, it is also possible that I would get an incomplete response.

After this question, I expanded the data on Carolyn to see if ChatGPT would do a calculation similar to that in the first example, or to see how it would handle the situation.

Question

"Carolyn does more research into her situation, and she discovers that she also has inherited an Individual Retirement Account with a balance of \$750,000. She has also added up her expenses for the current year and has essential expenses of \$35,000 and discretionary expenses of \$25,000 in the current year. Her recent medical exam shows that she is in very good health. Can she afford to retire if she uses the value of her home to help finance retirement? When could she retire?"

ChatGPT Answer

“With the additional information that Carolyn has inherited an Individual Retirement Account (IRA) with a balance of \$750,000, we can incorporate this into the overall assessment of her ability to retire. Here are some key considerations:

Total Assets

- *Carolyn now has the value of her house (\$1,000,000) and the balance of her inherited IRA (\$750,000) as potential sources of retirement funding. The total value of her assets is \$1,000,000 (house) + \$750,000 (IRA) = \$1,750,000.*

Expenses

- *Carolyn has essential expenses of \$35,000 and discretionary expenses of \$25,000 in the current year. The total annual expenses amount to \$60,000.*

Income

- *Carolyn is currently earning \$40,000 a year from her work. Additionally, she may be eligible for Social Security benefits and can also explore the possibility of generating income from her assets, such as rental income from downsizing or other investment strategies.*

Given these considerations, Carolyn should undertake a more detailed financial analysis, including the following steps:

Detailed Budget and Cash Flow Analysis

- *Carolyn should create a detailed budget that includes both essential and discretionary expenses. This analysis should also consider potential changes in expenses during retirement.*

Social Security Analysis

- *Carolyn should explore her Social Security options. The timing of when she chooses to start receiving Social Security benefits can impact her overall retirement income.*

Asset Allocation and Investment Strategy

- *Carolyn should review the asset allocation of her investment accounts, including the inherited IRA. This involves considering her risk tolerance, investment goals, and time horizon.*

Retirement Income Planning

- *A retirement income plan should be developed, taking into account Carolyn's various income sources, including potential income from the sale of her house, Social Security, rental income, and withdrawals from her IRA.*

Healthcare Considerations

- *Carolyn's good health is a positive factor, but healthcare costs should still be carefully considered. She may need to plan for potential future medical expenses and long-term care needs.*

Consultation with Professionals

- *Carolyn should consult with financial advisors, tax professionals, and potentially estate planning attorneys to ensure a comprehensive understanding of her financial situation and to optimize her retirement strategy.*

Given that Carolyn is 64 years old, she may have several years to consider before reaching a traditional retirement age. The decision of when to retire is personal and depends on Carolyn's goals, preferences, and financial situation.

By working closely with financial professionals and developing a comprehensive retirement plan, Carolyn can make informed decisions about when and how to retire, taking advantage of her assets to support a comfortable and sustainable retirement."

The response was generally similar to the first part of the question about Carolyn and also completely different to the response about Susie. The response summarized the information it had and suggested steps to be taken.

My observations based on the two examples and the series of questions in the second are:

- The system reacted to the two situations with limited facts in entirely different ways. In the first example, it produced an entirely strange and misleading calculation and in the second case, it produced a rational response and focused on encouraging the use of a financial advisor.
- In the second example, it did not offer an alternative helpful direction if someone is not using an advisor. Since most people don't have advisors (and advisors may not be that well equipped to work with people with modest means), it is unclear to me that this will be very helpful to people trying to develop their own solutions.
- I also observed in the second example that the discussion was not expanded to issues beyond the immediate questions. That may be the result of the questions.

CHATGPT AS A SOURCE OF INFORMATION

The examples showed that ChatGPT was a source of reasonably good information in some situations and not in others. The small number of tests indicates that these are possible answers. More research is needed to see if there are common patterns and what other results may occur. I tested a number of questions where I had reasonable knowledge of the information to see what kind of response I would get. My observations were as follows:

- Most of the information provided was in the right direction, but some of it was very general and used technical words, so that it would not be helpful to an individual consumer.
- In some cases, the information provided had important points missing. To test this idea, I queried the system about the differences by gender in the situation of retirees. I used several questions and found information gaps about periods of disability and about living status at high ages.

The following question is focused on living status:

Question

"Why are women more likely to be living alone at older ages?"

ChatGPT Answer

"Several factors contribute to the phenomenon of women being more likely to live alone at older ages. These factors are influenced by social, economic, and demographic dynamics:

Longer Life Expectancy: *Women generally have a longer life expectancy than men. As a result, women are more likely to outlive their spouses and end up living alone in later years.*

Widowhood: *Due to the longer life expectancy of women, they are more likely to experience the death of a spouse. The period of widowhood often results in women living alone, especially in the later stages of life.*

Marriage Age and Age Gaps: *Historically, women have married men who are slightly older. If there is a significant age gap and the husband predeceases his wife, it can lead to a longer period of living alone for the surviving spouse.*

Divorce Rates: *While divorce rates have increased across all age groups, older women who divorce or are widowed may find themselves living alone in later life, particularly if they do not remarry.*

Economic Independence: *As societal norms have evolved, women have become more economically independent. This independence can lead to women choosing to live alone or being able to support themselves if they become widowed or divorced.*

Social Support Networks: *Women often have robust social support networks, including friends and family. This support system can provide companionship and assistance, enabling women to live alone more comfortably.*

Health and Long-Term Care Needs: *Women may have different health and long-term care needs than men as they age. Living alone can allow them to receive specialized care or assistance tailored to their individual requirements.*

Preference for Independence: *Some women may actively choose to live alone as they age, valuing their independence and autonomy.*

It's important to note that these trends can vary across cultures and regions. Societal attitudes, economic conditions, and cultural norms all play a role in shaping living arrangements for older adults. Additionally, as societal dynamics evolve, these patterns may change over time. For the most current and region-specific information, consulting recent demographic studies or reports from reputable sources is recommended."

I was not able to get the system to say that women are less likely to remarry. I also was not able to get it tell me that women are likely to be disabled longer. This may be the result of my skill at framing the prompts, but it would also be a problem for an individual without special training in using the system. I do not know if I would get a similar response with a later version of ChatGPT.

INTERNET SEARCHES VS. CHATGPT

I have done many internet searches looking for information on retirement and other topics. In the case of general internet searches, the sources one finds range from excellent to awful, and it is very important to know the organization providing the information and how reliable it is. My experience is also that even reliable organizations may provide incomplete information.

Comparing my experience doing a conventional internet search and using ChatGPT to make an information request, I have the following observations:

- It is much easier and faster to get information from ChatGPT. The system responds very quickly. It is also possible to ask additional questions using ChatGPT and similar systems so that the information builds over time. Skill is needed to write a series of prompts.
- Both types of requests are subject to providing a range of information which can be very good, but which also may be subject to missing and unreliable information, so hopefully the user will be careful. The key methods of being careful are different depending on how the information was obtained. For internet searches, the source is very important, and a reasonably knowledgeable user knows that they need to be careful about which sources they consult and understands how to vet their sources. For ChatGPT and similar AI tools, the result depends on the data set the tool was trained on. The responses may evolve over time and will change each time there is an update to the training data set.

CONCLUSIONS AND RESEARCH NEEDED

The existence of AI tools expands the resources available to individuals to support retirement planning, but it does not change the gaps in financial literacy and the lack of knowledge about this important subject.

Prior to AI, there was a great deal of information available, but many users did not understand what would be useful to them or how to use it well.

AI changes the format of what is available and makes a lot more available. Some of the new information is completely wrong, but much is useful. AI makes it more important that there is some guidance about how to use the information to get useful results and about what should not be used by individuals. More research and experimentation are needed to identify what steps should be included in such guidance and how AI can help. Good questions for such research may include issues such as:

- Can AI help individuals identify areas to explore when seeking retirement housing?
- Would it be effective in helping individuals understand different types of housing options and what they offer?
- Would it help individuals understand how to evaluate housing options?
- Would it help individuals understand different methods of using assets to produce income in retirement?
- Would it help individuals think through the pros and cons of retiring at different ages?

Related to these issues is another research question: Could prompt series be provided that would help individuals understand and design how to write prompts? Alternatively, would it be better to build packages that build on the basic tools?

Particular care is needed about calculations. As indicated in the discussion above, calculations can go completely wrong. Earlier research from the Society of Actuaries Research Institute comparing different software packages also showed that they can produce very different results.³ The Society of Actuaries Research Institute in partnership with Financial Finesse produced a guide to Retirement Planning Tools⁴ to help the user understand general types of software, and what could be expected in using them. More research is needed to see whether AI can assist the

³ <https://www.soa.org/resources/research-reports/2009/retire-planning-software-post-retire-risk/> and

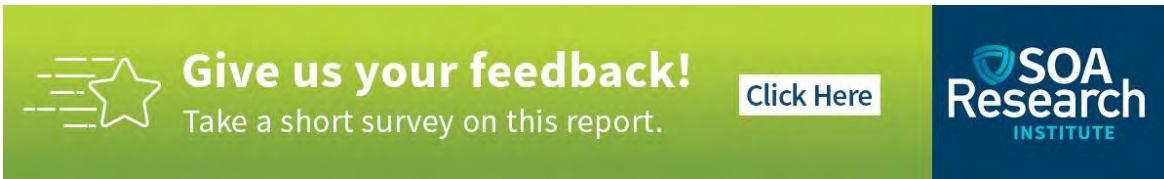
<https://www.soa.org/493884/globalassets/assets/files/research/projects/retirement-planning-software-report.pdf>


⁴ <https://www.soa.org/4a87fe/globalassets/assets/files/resources/research-report/2019/2019-retirement-tools.pdf>


individual trying to do such calculations in finding the right tool, or in comparing results. Traditional tools seem to offer a much better approach to doing calculations, but there is a long way to go to help individuals understand what will be most helpful.

* * * * *

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Prize Winner

A Retiree's Guide to Artificial Intelligence Risks and Mitigating Those Risks

Gregory Whittaker, FSA, FASSA

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INTRODUCTION

As noted by Tegmark [1], there are many competing definitions of intelligence including:

...the capacity for logic, understanding, planning, emotional knowledge, self-awareness, creativity, problem solving and learning.

Broadly, intelligence can be referred to as the ability to accomplish complex goals. Artificial intelligence (AI) in turn is the umbrella term for the algorithm-based technology that enables computers and machines to simulate intelligence. These include rules-based expert systems (a deterministic form of AI), machine learning (AI that learns more as more data is introduced but which has a performance plateau), and deep learning (a form of machine learning built on a network of computations similar to the human brain). As noted by Sun & Huo [2]:

deep learning \subset machine learning \subset artificial intelligence

Managing post-retirement risks has been well documented by the Society of Actuaries Research Institute (SOA) [3]. As noted by the SOA, the exposure of retirees to fraud and theft may increase as retirees control more assets, financial products become more complex, more retirees use computers, and scammers become more proficient.

On March 6, 2024, the Federal Bureau of Investigation (FBI) released their 2023 Internet Crime Report [4]. In 2023, the FBI's Internet Crime Complaint Center (IC3) registered 880,418 complaints from the American public with potential losses in excess of \$12.5 billion. Not all complaints included an associated age range, but out of approximately \$8.2 billion in potential losses where an age range was indicated, approximately \$3.4 billion was in respect of Americans over the age of 60.

Whilst internet fraud has been in existence for decades, with phishing scams still the most prevalent, fraudulent schemes have become more sophisticated with the use of AI. It is the purpose of this article to highlight some AI tools that can be used to enhance fraudulent schemes targeting retirees and in turn to discuss some practical risk mitigation strategies that can be employed when confronted by these tools.

DEEPPFAKES

The European Parliamentary Research Service [5] defines deepfakes as:

...manipulated or synthetic audio or visual media that seem authentic, and which feature people that appear to say or do something they have never said or done, produced using artificial intelligence techniques, including machine learning and deep learning.

A number of risks are posed by deepfakes as summarized in Table 1.

Table 1
RISKS ASSOCIATED WITH DEEPFAKES

Psychological Harm	Financial Harm	Societal Harm
Extortion	Extortion	News media manipulation
Defamation	Identity theft	Damage to economic stability
Intimidation	Fraud	Damage to the justice system
Bullying	Stock-price manipulation	Damage to the scientific system
Undermining trust	Brand damage	Erosion of trust
	Reputational damage	Damage to democracy
		Manipulation of elections
		Damage to international relations
		Damage to national security

Source: European Parliamentary Research Service.

As reported by the FBI IC3, losses due to investment scams are the most of any crime type tracked by that entity, with investment fraud losses estimated at \$4.57 billion in 2023. Of that amount, an estimated \$3.94 billion involved investment fraud with reference to a cryptocurrency.

A common scam uses social media advertisements including deepfake videos or images of celebrities or public figures, who claim to have made large profits from online trading platforms. This so-called “click bait” drives traffic to malicious websites, where an individual is asked to sign up to the trading platform. Once the form is submitted, the individual is contacted by the scammer and is requested to make a small up-front payment to access the platform. Details are provided to download a cryptocurrency app so that more funds can be invested. These apps initially show fake profits and scammers persuade investors to increase their investment. However, when an attempt is made to withdraw funds, individuals often find that they have been locked out of their accounts and their money has disappeared.

Various mitigation strategies are required to combat deepfakes as shown in Table 2. These can be broadly classified on an individual level as discussed by Singh and Dhiman [6] and on a technological level or policy level as discussed by Al-Khazraji et al. [7].

Table 2
MITIGATION STRATEGIES FOR DEEPFAKES

Individual Level	Technological or Policy Level
Understanding the existence of deepfakes	Advancing deepfake detection technology
Recognizing signs of manipulated content	Building robust authentication systems
Applying critical thinking skills	Strengthening social media platform policies
Verifying authenticity before content sharing	Legal and policy frameworks
Supporting authentic sources of information	Promoting AI literacy among the elderly

On March 8, 2024, the European Parliament approved the Artificial Intelligence Act [8]. Importantly, Article (70b) requires deepfakes to be labelled as such:

Further to the technical solutions employed by the providers of the system, deployers, who use an AI system to generate or manipulate image, audio or video content that appreciably resembles existing persons, places or events

and would falsely appear to a person to be authentic ('deep fakes'), should also clearly and distinguishably disclose that the content has been artificially created or manipulated by labelling the artificial intelligence output accordingly and disclosing its artificial origin.

It remains to be seen whether this will form a template for other countries around the world. As noted by Professor Mark Lemley of Stanford University [9]:

Generative AI is developing at a stunning speed, creating new and thorny problems in well-established legal areas, disrupting long-standing regimes of civil liability—and outpacing the necessary frameworks, both legal and regulatory, that can ensure the risks are anticipated and accounted for.

VOICE CLONING

As described by the Federal Trade Commission [10]:

You get a call. There's a panicked voice on the line. It's your grandson. He says he's in deep trouble – he wrecked the car and landed in jail. But you can help by sending money. You take a deep breath and think. You've heard about grandparent scams. But darn, it sounds just like him. How could it be a scam? Voice cloning, that's how.

From January 2020 to June 2021, the FBI's IC3 received around 650 reports of grandparent scams, resulting in losses of approximately \$13 million [11]. During that period, over 90 victims reported that money was picked up from their home, resulting in losses of approximately \$3.6 million.

The United States Senate Special Committee on Aging [12] identifies various red flags in these types of scams. Typically, the grandchild or law enforcement officer asks you to keep the incident a secret. The demand for money is immediate and a suggestion is made to send money via a gift card or wire transfer. In these situations, it is recommended that you hang up and call back the number of the family member that you know to be their genuine number. The use of a family safe word can also be used as a simple test of the authenticity of the caller.

FRAUDGPT

As noted by Balona [13], large language models (LLMs) are trained on massive datasets of text, enabling them to learn complex patterns and relationships in language. Over the period from 2020 to 2023 various LLMs were released by OpenAI, with the most recent model GPT-4 (Generative Pre-trained Transformer).

GPT-4 was released on March 14, 2023. On July 22, 2023, FraudGPT emerged on the Dark Web Forum [14]. As noted by Falade [15], for an annual subscription fee of \$ 1,700, inexperienced cybercriminals can unearth a range of capabilities including the creation of phishing emails, the development of exploits, hacking tools, the discovery of vulnerabilities in systems and the provision of guidance on cybercrime. FraudGPT marks the beginning of a new era of cybercriminal at scale. It is likely that we will soon see the end of badly punctuated, misspelled, misdirected and factually inaccurate phishing emails.

SOPHISTICATED TARGETING

Phishing is the term for generalized cyberattacks carried out by email or SMS. Among the common phishing scams is the 419-scam where victims are promised large sums of money in exchange for an investment in a business activity that does not exist.

Highly personalized cyberattacks are commonly referred to as "spearfishing." Whilst spearfishing attacks are not new, AI provides the opportunity to automate this process at scale. AI tools can review large volumes of data to identify potential victims and tailor messages that capture an individual's unique circumstances. This is likely an area of emerging risk for retirees.

An important consideration is to investigate how retirement changes the social life and social network of retirees. If they have a greater propensity to turn to social media to fill the void created by no longer interacting with colleagues in the workplace, there is the potential that more personalized information will become available to scammers to harvest. Social media literacy among retirees becomes key and workplace programs in preparation for retirement should include basic internet and social media training to avoid the many pitfalls.

Mitigation strategies for combatting identify fraud [16] and the healthy use of social media for retirees [17] is shown in Table 3.

Table 3
MITIGATION STRATEGIES FOR IDENTITY FRAUD AND THE HEALTHY USE OF SOCIAL MEDIA

Identity Fraud Mitigation Strategies	Healthy Use of Social Media
Don't share personal information on social media	Is it true, is it necessary, is it kind?
Regularly review and clean up social media profiles	Live in the moment
Don't answer unsolicited emails or calls	Link instead of comparing yourself
Always verify the identity of the caller	Follow people and things that bring you joy
Use strong, unique passwords for all accounts	Keep things in real life
Install and regularly update antivirus software	Start your day intentionally and use your time wisely
Store important documents in a secure place	Make events accessible
Regularly review bank and credit card statements	Take a break and support others in doing so
Monitor your credit profile periodically	Don't struggle alone and seek help for overuse
Don't click on suspicious links from unknown sources	
Logout of apps or websites after use	
Use biometrics or PINs to lock personal devices	

CONCLUSION

Historians date fraud back to around 300BC when a Greek trader named Hegestratos took out a large bottomry insurance policy (where typically a loan is received up front) with the deliberate intention of not wanting to repay the loan [18]. Ponzi schemes turned 100 years old in 2020 [19]. What is certain is that in 2024, AI technologies can improve the efficiency and scale of existing fraudulent activities, let alone develop entirely new schemes.

* * * * *

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Pick a Payout Using AI

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One of the best ways to never outlive your income is to annuitize and collect payments for life. This concept is dramatically underused and misunderstood by many who could benefit from not being able to outlive their income. It is generally very difficult to find someone who can explain the myriad of annuitization options available, assuming that someone is even qualified to speak to more than a "here is the menu, pick one" type of discussion. The purpose of this essay is not to explore underwriting for an annuitization, for example to potentially receive a rated or substandard payout, rather it is the suitability or "matching" the characteristics of payout to personal preferences. For this discussion, we will assume the AI/bot knows all the available payout options and payment amounts, with the ability to interject when the "cost" in terms of lower payments might become an issue.

The following is not meant to completely mimic an AI/bot session, rather to demonstrate how using an AI/bot in this situation would work. Sometimes AI/bots are named. This one is "Claire."

Jack has received a communication from the insurer that he has an amount to annuitize now at age 75 and, he wants to fully understand his options. He clicks to chat about his available options.

Claire responds with a few questions to establish Jack's identity and any other necessary authentication. Then on to the start of the main chat. "What can I help you with today?"

Jack enters, "What are my options for annuitization?"

Claire responds, "I can help you. You are married and your spouse is two years younger than you. It looks like if you annuitized today on a Joint Life Only basis your payment would be \$1,000 a month. That is Joint Life Only with 100% to Survivor, paid as long as one of you is living."

Jack: "If we both die two years from now, what happens?"

Claire: "Payments would stop on the second death with no additional payments."

Jack: "I would lose almost the entire principal if that happened."

Claire: "Yes, if the second death was in two years you would only have received about 15% of the amount you paid for the annuitization. Would you like to see options that protect your principal?"

Jack: "Yes."

Claire: "There are two main ways to protect your principal, one is exact and the other may end up being more than the amount you paid for the annuitization. Exact principal protection is "Cash Refund" added as in "Joint Life and 100% to Survivor with Cash Refund." With Cash Refund the total amount you paid minus the sum of payments

received is paid to a beneficiary immediately after the second death. The other method is to set up a period certain and, in your situation, you would want “20 years certain” added as in “Joint Life and 100% to Survivor with 20 years certain.”

“With 20 years certain, if both of you die within 20 years the remaining payments will be paid to your beneficiary until the end of 20 years from the original annuitization. The total payments are at least as much as the amount you paid for the annuitization.”

“Your payout would be \$900 per month for Joint Life and 100% to Survivor with Cash Refund and \$850 for Joint Life and 100% to Survivor with 20 Years Certain. As you may recall, your payment without any principal protection was \$1,000 a month.”

Jack: “20 Years Certain is just a continuation of payments and not a lump-sum. Is that correct?”

Claire: “Yes, in your example of the second death in two years, for 20 Years Certain there would be 18 years of payments to the beneficiary. For Cash Refund the beneficiary would receive 85% of the original amount as a lump-sum.”

Jack: “We have a situation where the beneficiary may need to pay for at least the last survivor final expenses, so a lump-sum might be better. If we live long enough that there is no cash refund amount to receive, we can make other arrangements.”

Claire: “Cash refund would provide a lump-sum on early death, where the 20 years certain will never pay a lump-sum.”

Jack: “Is there anything else I can do to create a lump-sum payment?”

Claire: “Yes, you can take payments annually instead of monthly. For a Cash Refund your beneficiary would still receive a Cash Refund immediately after the second death. For 20 Years Certain the first payment to the beneficiary would be on average 6 months after the second death and not available in a timely manner for final expenses. The annual payments mean that as long as one of you is alive when the annual payment is made you would receive the payment. If the last death was during that same year, nothing would have to be paid back. We don’t usually recommend people set up annual payments, but it is an option that is available, and it does create larger payments.”

Jack: “Annual payments are easier to track, and we have plenty of other money coming in monthly, so annual sounds good. I remember when a relative died having to rush to turn off a monthly payment when the death was only a few days before the next payment.

Claire: “The annual payments are: For Joint Life and 100% to Survivor \$11,500, For Joint Life and 100% to Survivor with Cash Refund \$10,900, and for Joint Life and 100% to Survivor with 20 Years Certain \$10,300. The Cash Refund will decrease each year and be zero after 18 years. There would be no certain payments after 20 years.”

Jack: “I select annual payments of Joint Life and 100% to Survivor with Cash Refund.”

Claire: “I will send in the fillable pdf form with that choice and then you can electronically sign and start the annuitization process. One last question, when do you want the first payment?”

Jack: “May the 4th each year.”

Claire: “Great, the electronic delivery is to your email, should arrive momentarily, and you can sign there and start the annuitization. Is there anything else I can help you with?”

Jack: “Thanks, no, I think that is all I need.”


In this fictional interaction, important are the paths taken and not taken. For example, Jack was very concerned about protecting the principal AND potentially providing a lump-sum to the beneficiary. This might not be a typical combination of concerns. Claire also knew it would take a 20 Year Certain Period to receive the principal and did not present shorter (or longer) certain periods. Some of the paths not taken were any fixed period only (non-life contingent), or any reduction in the benefit to the last survivor. There are also retirement money management approaches that work better if the payout is life only with no reduction for principal protection. Jack didn’t mention anything in these directions, so Claire did not work through them. Presumably, the form he was electronically signing to start the annuitization did have other annuitization options listed with their payment amounts and he would need to pick the right one the chat mentioned. If the form caused more questions, then he would start another chat session with Claire and resolve any further questions before making a final choice.

In the existing world, this interaction might be with an agent or a home office customer service person, who likely would know the basic annuitization options available but would likely not know offhand all the payout amounts or to consider annual payments instead of monthly. In other words, Jack received much better customer service from Claire than he would have from any live person, even from someone looking at a screen with all the available options listed and amounts shown. In fact, in many real situations, Jack might feel pressure to “just pick one” on a relatively short phone call with customer service or an agent instead of understanding fully what his options are. That could mean picking the wrong annuitization option entirely or not considering all the relevant factors in making the best decision possible. In fact, in the current annuitization space there is a high percentage of people choosing fixed period (non-life contingent) who would likely be far better off ultimately if they had chosen a lifetime payment. They are not receiving useful information about annuitization options and making poor choices.

You might think every insurer would need to build its own version of Claire at great expense. That is not necessary. All an insurer needs to do is provide all the available annuitization options, payout amounts, and any other company limitations to Claire. Claire could be the annuitization option a specialist called for all these situations if the insurer has licensed Claire and fed her the appropriate information. Claire would have all the logic and description to help a person understand their options and what they mean and then could add in the specific information from the insurer so the person can make the best decision. Would someone out there build Claire?


* * * * *

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Artificial Intelligence and Retirement Planning

John Cutler, J.D.

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The premise for this essay is that retirees (and pre-retirees) are unlikely to have had experience with artificial intelligence (AI) to any great degree. If you think about most advanced technologies, individuals learn about them in the workplace or at least as adjuncts to work. This isn't always true (think smart TVs, Alexa, Google, and so on). However, that still leaves those retirees and pre-retirees well behind others in the workforce who experience (if that is the right way to say it) AI in a more comprehensive and immersive way.

With this in mind, we need to examine how AI could help retirees with the various components of retirement, primarily financial in this essay, mostly to keep the search parameters under some control.

The questions posed to these AI systems were:

- What does a retiree need to know about artificial intelligence?
- How can artificial intelligence help retirees manage their financial future?
- What is the best artificial intelligence system for retirees to use?

You will see how the search for ways to assisting retirees with their financial needs and plans ended up requiring we also look into how to use AI in a broader sense.

WHAT DOES A RETIREE NEED TO KNOW ABOUT ARTIFICIAL INTELLIGENCE?

For retirees and those close to retirement, it is important to stay informed about advances in technology, including artificial intelligence. Staying tech-savvy is crucial, as many AI-powered devices and applications are part of daily life. Basic computer skills and the ability to use smartphones and the like can be very helpful. It is important for retirees to understand that AI is not just a technological endeavor but also a social one, where meaningful participation is crucial for realizing its benefits and opportunities.

Understanding AI can be beneficial for retirees in several ways. First, AI is increasingly being integrated into everyday products and services such as Alexa and Siri as well as search engines such as Google. Being aware of how AI is used in areas such as smart homes, virtual assistants, and autonomous vehicles can help retirees accept (and maybe even embrace) these technologies.

Second, AI has the potential to improve healthcare and assist with aging-related challenges. For example, AI-powered devices can monitor vital signs and provide reminders for medication or appointments. It is also true in other areas, for instance in handling finances and financial planning. AI is increasingly being used in retirement planning by financial advisory services. Retirees may come across AI-powered tools and platforms that offer personalized investment advice and retirement income strategies.

Third is lifelong learning. AI technology is constantly evolving, and retirees can benefit from staying informed and continuously updating their knowledge. Being aware of the latest advancements and applications of AI can help retirees adapt to and leverage AI-based programs. For example, AI-powered music recommendation systems can help people discover new music that they love, and AI-powered video streaming services can help find new movies and TV shows of direct interest to that person.

Having said that, retirees and pre-retirees should be aware of the potential risks and challenges associated with AI. Some risks include the possibility of system errors or biases in the AI algorithms used which, for example, could impact the accuracy of the financial advice provided. In addition, with the increasing use of AI, retirees should be mindful of their privacy and security. AI systems often rely on personal data for analysis and decision-making. Retirees should be cautious about sharing sensitive personal information and ensure they understand how their data is being used and protected by AI systems or service providers.

Here are some tips for retirees who are considering using AI tools:

- Do your research. Not all AI tools are created equal. It is important to research different tools and choose ones that are reputable and have a good track record.
- Be clear about your goals. What do you hope to achieve by using AI tools? Once you know your goals, you can choose tools that are designed to help you achieve them.
- Use AI tools in conjunction with human experts. AI tools can be a great supplement to human expertise, but they should not be used as a replacement for human advisors where there are serious concerns or impacts concerning the decision(s) being made.
- Be aware of the limitations of AI. AI tools are not perfect, and they can sometimes make mistakes. It is important to be sensitive about the advice from AI tools if there appears to be anything off-key about it. (Don't buy bitcoin just because Alexa says to do so!)

HOW CAN ARTIFICIAL INTELLIGENCE HELP RETIREES AND PRE-RETIRES MANAGE THEIR FINANCIAL FUTURE?

Artificial intelligence has the potential to greatly assist retirees and pre-retirees in managing their financial future. With the advancements in technology, AI tools and platforms can provide retirees with valuable insights, personalized recommendations, and automated financial management solutions. AI can help retirees manage their financial future in a number of ways, including:

- Creating personalized retirement plans.
- Helping retirees make informed investment decisions.
- Retirement Income management.
- Reducing the costs of retirement planning (lower fees).
- Providing real-time financial insights (forecasting and planning).

One of the key benefits of AI for retirees is its ability to analyze vast amounts of data quickly and accurately. By inputting relevant information such as retirement savings, expenses, and investment goals, retirees and pre-retirees can expect to get comprehensive financial plans tailored to individual needs.

Artificial intelligence can be a valuable tool for retirees to manage their financial future by providing various benefits and solutions:

Financial Planning and Advice: AI-powered financial planning platforms can help retirees create and optimize their retirement plans. These platforms consider factors like income, expenses, investment portfolios, and retirement goals to provide personalized advice.

Investment Management: AI-driven robo-advisors can help retirees manage their investments more effectively. They can create diversified portfolios, rebalance them as needed, and provide ongoing monitoring to ensure the investments align with the retiree's financial goals and risk tolerance.

Risk Assessment: AI can assess an individual's risk tolerance and offer recommendations for appropriate investment strategies. This helps retirees make informed decisions about where to allocate their assets.

Predictive Analytics: AI can use historical data and predictive analytics to estimate future expenses, market trends, and retirement income needs, helping retirees plan for unexpected expenses and ensure they have enough savings.

Retirement Income Optimization: AI can optimize the withdrawal strategy for retirees, taking into account factors like Social Security benefits, pensions, and investment income. It can help retirees make informed decisions about when to start taking retirement benefits.

Expense Tracking and Budgeting: AI-driven budgeting apps can help retirees track their expenses, set savings goals, and receive alerts about spending patterns. This can help retirees stay within their budget and pre-retirees save for their retirement.

Fraud Detection: AI can identify unusual or suspicious transactions, helping retirees protect their financial accounts from fraud and unauthorized activities.

Financial Security: AI can provide advanced security features for online banking and financial management, ensuring that retirees' financial data is safe from cyber threats.

Long-Term Care Planning: AI can assist retirees in estimating the potential costs of long-term care and provide guidance on insurance options and savings strategies to cover these expenses.

Estate Planning: AI can help retirees plan their estate, including creating wills, trusts, and other legal documents. It can also offer insights into tax-efficient strategies for passing on assets to heirs.

Market Insights: AI-powered financial news and analysis tools can provide retirees with real-time updates on market trends and economic news, enabling them to make well-informed investment decisions.

AI can even identify websites which are good candidates for the reader (e.g., Mint, Retiree Wealth Hub).

It is important to note that while AI offers valuable support for managing finances during retirement it should not replace human expertise entirely. Where possible, retirees and pre-retirees should still seek guidance from certified financial planners or advisors who can interpret the AI-generated insights within the context of their unique

circumstances. By leveraging these AI tools alongside professional guidance, retirees can make better decisions about their financial future.

In addition, AI can contribute to the development of inclusive and equitable systems that cater to the needs and perspectives of historically marginalized communities. For instance, even though it is recommended that any AI-driven answer concerning financial products be run past a human advisor, this may not be an option for those with lower incomes or who otherwise worry about access to these services (including, for pre-retirees, at the workplace). AI can help here through its ability to deliver personalized financial planning and investment advice without the need for human intervention.

WHAT IS THE BEST ARTIFICIAL INTELLIGENCE SYSTEM FOR RETIREES AND PRE-RETIRES TO USE?

While there isn't a specific "best" artificial intelligence system for retirees and pre-retirees, there are various AI-powered tools and platforms available that can assist them in managing their financial future. When it comes to choosing the best artificial intelligence system for retirees, there are a few factors to consider. Retirees often have unique needs and preferences, so finding an AI system that caters to those requirements is essential.

Key features include ease of use for those who are not tech-savvy, security and privacy, cost (for instance, subscription fees), the ability to customize the results, and whether customer support exists if things go south.

One popular AI system that retirees can consider is voice-activated virtual assistants such as Amazon Echo with Alexa or Google Home with Google Assistant. These devices can help with various tasks like setting reminders, checking the weather, playing music, and even making hands-free phone calls. They are user-friendly and require minimal technical knowledge to operate.

For retirees who enjoy reading or staying informed about current events, news aggregator apps powered by AI algorithms like Flipboard or SmartNews can be valuable. These apps curate personalized news feeds based on users' interests and provide a convenient way to access relevant information without overwhelming amounts of content.

The choice of the best artificial intelligence system or tool for retirees depends on their specific needs and preferences. There isn't a one-size-fits-all answer, as different AI systems serve various purposes. Here are some AI systems and tools that retirees may find useful, depending on their requirements:

Robo-Advisors: Robo-advisors like Wealthfront, Betterment, and Vanguard Personal Advisor Services can be beneficial for retirees looking to automate investment management, as they offer diversified portfolios and low fees.

Budgeting and Expense Tracking Apps: Tools like Mint, YNAB (You Need A Budget), and Personal Capital can help retirees manage their expenses and stay within their budget.

Retirement Planning Tools: Retirement planning software such as Personal Capital, Fidelity's myPlan, and T. Rowe Price's Retirement Income Calculator can assist retirees in creating and optimizing their retirement plans.

Voice Assistants: Voice-activated smart speakers like Amazon's Alexa, Google Assistant, or Apple's Siri can provide convenience for retirees by helping with tasks like setting reminders, answering questions, and controlling smart home devices.

Medication Management Apps: AI-powered medication reminder apps like Medisafe and PillPack can help retirees manage their medication schedules.

Caregiver Alerts: CarePredict and Vayyar Care use sensors to monitor daily activities and alert caregivers if there are unusual changes. FallDetect monitors and alerts caregivers if there is a fall.

Home Security and Monitoring Systems: AI-powered security systems like Ring and Nest can enhance home security, providing peace of mind for retirees.

AI-Powered Healthcare Tools: AI chatbots and health monitoring devices can help retirees track their health, ask medical questions, and receive reminders for doctor appointments and medications. SeeingAI and Envision help seniors with visual impairments navigate their environment.

Fraud Detection and Security Features: Many banks and financial institutions use AI-based fraud detection systems to protect retirees from financial scams and unauthorized transactions.

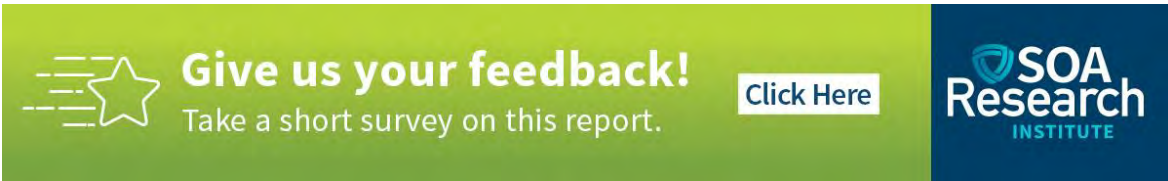
News and Information Aggregators: Apps like Flipboard and Feedly can curate news and information based on retirees' interests, providing them with personalized content.

Voice-Activated Appliances: AI is integrated into various household appliances, like smart thermostats, smart refrigerators, and smart ovens, making daily tasks easier for retirees.

The best AI system for retirees to use depends on their individual needs and preferences. It is important to note that all AI systems have their limitations. It is important to do your research and choose AI systems that are reputable and have a good track record. It is also important to use AI systems in conjunction with human experts, such as financial advisors and healthcare professionals.



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The Impact of Artificial Intelligence on Financial Decisions for Retirees

Mark Dennis, DBA, CFP®

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This essay explores the profound implications of artificial intelligence (AI) in reshaping the financial landscape for retirees. Artificial Intelligence refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving. The primary goal of AI includes learning, reasoning, and perception. AI is being utilized across various sectors, including finance, healthcare, education, transportation, and more due to its ability to process large volumes of data rapidly and with high accuracy. As with any technology, AI also has its limitations and the potential for misuse and abuse.

With an aging global population and the increasing complexity of financial decision-making, AI emerges as a pivotal technology offering both opportunities and challenges. Through an exploration of AI's evolution, its application in personal finance, and the unique benefits it presents to retirees, this essay aims to highlight how AI technologies can enhance financial literacy, decision-making, and inclusivity for older people. Moreover, it critically examines the ethical considerations and accessibility issues surrounding AI, underscoring the need for responsible technology deployment. By synthesizing current research and anticipating future trends, this essay contributes to the ongoing dialogue around AI and retirement, highlighting the critical role of ethical considerations and regulatory oversight in shaping a future where technology empowers rather than alienates.

SIGNIFICANCE OF AI FOR AGING POPULATIONS

In the contemporary era, the intersection of artificial intelligence and aging populations represents a significant pivot point for societal, economic, and technological advancements. As the global demographic shifts towards an older population, the implications for financial decision-making, especially among retirees, are profound. AI technologies offer unparalleled opportunities for enhancing the financial well-being and decision-making processes of this demographic and their personal support networks, marking a critical area of interest for researchers, policymakers, caregivers, and financial practitioners.

For instance, the advent of AI has introduced innovative solutions tailored to a retiree's unique needs, particularly in managing personal finances and making informed retirement decisions. These technologies include robo-advisors, personalized financial planning tools, and AI-driven educational platforms, all designed to augment the financial literacy and decision-making capabilities of retirees (Chhatwani, 2022). Robo-advisors, leveraging algorithms to offer personalized investment advice, have become increasingly popular among younger workers in their 20's, 30's, and 40's for their low-cost services and tailored financial guidance, but not so much among older workers and retirees, at least not yet (Sacchitello & Baker, 2023).

AI's role extends beyond mere financial advice as well, significantly impacting financial literacy and inclusion among older adults. By delivering customized educational content and interactive learning experiences, AI platforms can demystify complex financial concepts, aiding retirees in navigating the complexities of retirement planning,

investment strategies, and risk management (Roberts, 2023). Furthermore, AI-driven applications can provide real-time insights and alerts, helping older individuals monitor their financial health and adapt their strategies in the face of market volatility or personal life changes. By harnessing the power of AI, the financial industry can offer more personalized, accessible, and inclusive services, enabling older adults to make informed decisions and maintain financial independence. As AI technology continues to evolve, its potential to transform the financial experiences of older adults will only increase, offering promising avenues for enhancing their financial well-being and inclusion (YData, n.d.).

The power of AI in analyzing vast datasets also promotes the development of predictive models that can forecast individual financial needs and recommend optimized decision pathways. This personalization aspect is crucial for retirees, who often face a myriad of financial decisions ranging from asset allocation to healthcare expenditures (Moments Log, n.d.). Predictive analytics can also identify potential financial vulnerabilities, allowing retirees and their advisors to proactively address issues before they escalate. The banking sector, in particular, benefits from predictive analytics through improved fraud detection capabilities and customer analytics, including churn prediction and customer segmentation. This analytical approach allows for a nuanced understanding of customer behaviors and preferences, enhancing the banking experience for retirees by offering customized product offerings and mitigating potential financial risks (The Impact Investor, n.d.).

While AI offers significant benefits, ethical considerations and accessibility issues must also be addressed to ensure these technologies serve the aging population effectively and equitably. Concerns regarding data privacy, algorithmic bias, and the digital divide highlight the importance of developing transparent, accountable AI systems and enhancing digital literacy among older adults (Mittelstadt, Allo, Taddeo, Wachter, & Floridi, 2016).

THE INTERSECTION OF AI AND RETIREMENT

In the rapidly evolving landscape of technology, artificial intelligence (AI) stands out as a transformative force across numerous sectors, significantly influencing the way societies function, interact, and envisage the future. This technological revolution has profound implications for the retiree demographic, introducing them to unprecedented opportunities and challenges in managing their finances, health, and social connections. As AI becomes increasingly integrated into our daily lives, its role in retirement planning and lifestyle management is becoming more crucial, offering tailored solutions that can potentially enhance financial security and overall quality of life for retirees.

THE GROWING ROLE OF AI IN SOCIETY AND ITS RELEVANCE TO RETIREES

The widespread adoption of artificial intelligence (AI) in different industries marks a significant transformation in how society functions, communicates, and plans for the future, particularly with respect to retirees. This demographic increasingly encounters AI in their daily lives, especially in financial management practices, highlighting AI's growing relevance (Seifert, Cotten, & Xie, 2020). As AI technologies become further integrated into societal frameworks, their influence on older people becomes more pronounced, offering innovative solutions to longstanding retirement planning and lifestyle management challenges.

AI's relevance to retirees encompasses personalized financial advice, healthcare management, and social interaction, enhancing both their financial security and quality of life. For instance, robo-advisors and AI-driven financial planning tools democratize financial advice, providing personalized investment strategies and retirement planning services tailored to individual financial situations (Fisch, Laboure, & Turner, 2019). Additionally, AI applications in healthcare promise to improve older adults' quality of life through predictive analytics and virtual health assistants, while AI-powered platforms can also reduce feelings of isolation among retirees (Fasoli et al., 2023).

DEMOGRAPHIC SHIFTS LEAD TO INCREASED FOCUS ON RETIREMENT PLANNING AND LIFESTYLE

Global demographic trends are increasingly characterized by a shift towards an aging population, intensifying the focus on retirement planning and lifestyle choices. This demographic evolution necessitates a reevaluation of financial management and lifestyle considerations in retirement, with AI playing a pivotal role (Linzer, Ray, & Singh, 2020). The empowerment of retirees through AI extends beyond practical utility to enhancing their capability to navigate complexities of retirement, underscoring the importance of engaging with this evolving technology.

Financially, the aging population faces challenges related to longer life expectancies and the management of retirement savings in fluctuating markets. AI-driven tools, such as predictive analytics and personalized financial advice, address these challenges by enhancing financial security and providing tailored investment and spending insights (Rieland, 2017). Lifestyle considerations, such as maintaining active, engaged lives, further highlight AI's role. AI-enabled devices and platforms support health management, cognitive stimulation, and social connectivity, improving retirees' overall quality of life (Fasoli et al., 2023).

FINANCIAL IMPLICATIONS OF AI FOR RETIREES

The advent of artificial intelligence (AI) in personal financial planning and management represents a seismic shift in how retirees plan for their post-work years, fundamentally transforming the accessibility, efficiency, and customization of financial advice. This technological integration has led to the creation of tools and platforms that can analyze vast amounts of data, understand individual financial situations, and provide recommendations that are tailored to the unique needs of each retiree. Unlike traditional financial planning services, which can be costly and may not always offer personalized advice, AI-driven solutions such as robo-advisors make it possible for a broader range of retirees to receive customized investment guidance and retirement planning at a fraction of the cost.

ROBO-ADVISORS FOR RETIREMENT PLANNING

Robo-advisors, utilizing AI algorithms, have democratized financial planning, providing retirees with personalized, algorithm-driven investment advice at a fraction of the cost of traditional financial advisors. These platforms analyze individual financial situations, risk tolerances, and retirement goals to offer tailored investment strategies. Robo-advisors continuously monitor market conditions and automatically adjust portfolios to optimize returns, making them an invaluable tool for retirees seeking to maximize their retirement savings. Recent studies on robo-advisory services indicate that the integration of human oversight with algorithmic guidance, known as hybrid robo-advisory models, plays a significant role in diminishing resistance to purely algorithm-based advice (D'Acunto & Rossi, 2022).

FRAUD DETECTION AND PREVENTION

AI's capability to analyze vast datasets in real-time has also significantly enhanced fraud detection and prevention in financial services. For retirees, who are often targeted by financial scams, AI-driven systems can identify unusual transactions or patterns indicative of fraudulent activity, providing an additional layer of security to their financial assets. These systems ensure retirees' savings are better protected, allowing them to manage their finances with greater confidence and peace of mind (Moran, 2023).

IMPACT ON INVESTMENT STRATEGIES AND THE STOCK MARKET

AI's influence extends to investment strategies and the stock market, where it enables the development of sophisticated predictive models. These models analyze historical data and market trends to forecast future movements, helping retirees and their financial advisors make informed investment decisions. AI-driven investment strategies can adapt to changing market conditions, potentially enhancing active management for retiree portfolios. However, excessive reliance, or worse – blind faith – regarding the use of AI in this capacity also introduces

complexities and uncertainties, as algorithmic trading can amplify market volatility (Rahmani et al., 2023) and exacerbate market bubbles.

CHALLENGES AND RISKS ASSOCIATED WITH AI-DRIVEN FINANCIAL SERVICES

While AI offers numerous benefits, it also poses challenges and risks. The reliance on algorithms and data raises concerns about privacy, data security, and the potential for algorithmic bias, which could impact retirees unfairly. Additionally, the complexity of AI-driven financial products may exceed some retirees' understanding, leading to a digital divide. Ensuring transparency, improving digital literacy among retirees, and establishing robust regulatory frameworks are crucial steps in mitigating these challenges and ensuring AI-driven financial services equitably benefit all retirees (Mittelstadt et al., 2016).

The integration of AI into the financial lives of aging populations holds immense promise for enhancing retirees' financial security and decision-making autonomy. By offering personalized advice, improving financial literacy, and predicting future needs, AI technologies can significantly contribute to the well-being of older adults. However, the successful implementation of these technologies requires careful consideration of ethical and accessibility issues to ensure that the benefits of AI are universally accessible.

THE FUTURE OF AI IN RETIREMENT

As we navigate the intersection of artificial intelligence and retirement planning, emerging trends and technological advancements suggest a transformative impact on retirees. It is imperative to continue exploring emerging trends and examining the future of AI in retirement, making note of potential shifts in retirement planning, lifestyle implications, and the overarching need for regulatory frameworks to ensure these advancements benefit all retirees equitably.

EMERGING TRENDS IN AI

Recent advancements in AI and machine learning are paving the way for innovative applications that could significantly influence retirees' financial and lifestyle decisions. Predictive analytics, for instance, are becoming increasingly sophisticated, enabling more accurate forecasts of life expectancy, healthcare costs, and investment allocations that are more closely aligned with individual financial needs (Kiron et al., 2014). Additionally, natural language processing (NLP) technologies are enhancing customer service interactions, allowing retirees to receive personalized advice through AI-powered chatbots and virtual assistants. These technologies not only streamline financial planning but also offer companionship and assistance, addressing both technical and emotional needs of the aging population.

RESHAPING RETIREMENT PLANNING AND LIFESTYLE

The integration of AI into retirement planning promises a more personalized and dynamic approach to managing retirement savings, healthcare planning, and lifestyle choices. AI-driven financial tools can adapt to changing market conditions and personal circumstances, offering tailored advice that aligns with retirees' evolving goals and preferences (Sironi, 2016). Moreover, smart home technologies and health-monitoring devices are enhancing retirees' ability to live independently, promoting a lifestyle that is both safer and more connected. As AI continues to evolve, its potential to support an integrated approach to retirement planning—one that encompasses financial security, health, and well-being—is immense.

POLICY IMPLICATIONS AND THE NEED FOR REGULATION

The rapid advancement of AI technologies raises critical questions regarding policy and regulation, especially concerning data privacy, security, and ethical use of AI in retirement planning. Ensuring the equitable distribution of

AI benefits requires proactive policy measures to address digital literacy gaps among retirees and safeguard against potential biases in AI algorithms (Cath et al., 2018). Additionally, there is a pressing need for regulations that protect retirees' financial and personal data, preventing misuse and ensuring transparency in AI-driven financial advice and decision-making processes.

The intersection of AI and retirement reflects the convergence of technological advancements and demographic changes, positioning AI as a crucial element in reshaping retirement planning and lifestyle, facilitating a secure, healthy, and fulfilling retirement experience. AI's future in this capacity is marked by significant opportunities as well as challenges. As emerging trends continue to unfold, the potential for AI to revolutionize retirement planning and enhance retirees' lifestyles is undeniable. However, realizing this potentially hinges on thoughtful policy interventions and regulatory frameworks that prioritize the ethical use of AI, data protection, and equal access to technology-driven benefits.

PITFALLS AND PRAGMATISM

The integration of artificial intelligence in retirement planning and financial decisions for retirees heralds a transformative shift with the promise of enhanced efficiency and personalization. Initially hesitant, a growing number of older adults are now beginning to embrace and even show excitement for devices and tools powered by artificial intelligence (Dorman, 2023).

However, the journey is fraught with potential pitfalls that necessitate a balanced view, underscoring the importance of implementing practical applications and best practices to navigate these challenges effectively.

WHAT COULD GO WRONG?

Despite the potential benefits, several concerns could undermine the effectiveness and safety of AI in this context. Data privacy and security concerns are paramount, as AI systems require access to sensitive personal and financial information to offer personalized advice. Breaches in these systems could expose retirees to financial fraud and identity theft (Mittelstadt et al., 2016). Algorithmic Bias is another critical issue. If AI algorithms are trained on biased data sets, they may perpetuate or even worsen inequalities, offering suboptimal advice to various demographic groups (Sunstein, 2019), including retirees.

Additionally, overreliance on AI could lead to a scenario where retirees might overlook or undervalue the importance of human judgment and the nuanced understanding that comes from years of experience in financial planning. The intersection of AI and financial decision-making, especially among older individuals, presents a nuanced landscape of opportunities and perils. The central concern revolves around the potential for individuals to over-rely on AI in forecasting investment returns, engendering a day-trading or gambling mentality that jeopardizes their financial security rather than safeguarding and augmenting it. This concern is underpinned by extensive research indicating the hazards of frequent market timing, which is particularly precarious due to the vulnerability of older adults. Factors such as anxiety, cognitive decline, and ample free time contribute to their susceptibility to engage excessively in these practices, risking their wealth preservation and growth (Lusardi, 2012).

Lack of access to AI can also be an issue for retirees. Vulnerable groups, particularly older adults, frequently find themselves left out of digital services due to reasons such as choosing not to engage with the internet, not having the required devices or network access, or lacking experience with digital technology. Older individuals who are frail and who find online access difficult or confusing, many of whom live in long-term care facilities, face the combined difficulties of social and digital exclusion (Seifert, Cotten, & Xie, 2020).

PRACTICAL APPLICATIONS AND BEST PRACTICES

To mitigate these risks, embracing best practices in AI implementation is crucial. This includes ensuring data privacy through robust cybersecurity measures and transparency in how data is used and protected. Diversifying training data to minimize bias and regularly auditing AI systems for fairness and accuracy is also essential (Zou & Schiebinger, 2018). Moreover, hybrid models that combine AI with human oversight can harness the strengths of both, providing a safety net against potential AI limitations and maintaining the personal touch that is often critical in retirement planning.

Educating retirees about the capabilities and limitations of AI in financial decision-making is another practical approach. This education can empower them to use AI tools effectively while simultaneously remaining critical consumers of the provided advice. Additionally, regulatory compliance must be a priority for organizations deploying AI in financial services, adhering to existing financial regulations, and preparing for future guidelines focused specifically on AI.

While AI offers significant opportunities to enhance the financial well-being of retirees, it is not without its pitfalls. Among these hurdles is a tendency for older adults, particularly those with higher levels of electronic confidence and financial literacy, to distrust AI and robo-advisers in particular, favoring human interaction instead (Pradhan & Wang, 2020). Recognizing and overcoming these challenges by implementing best practices in the development and deployment of AI systems is essential for safeguarding retirees' interests and earning their trust. By fostering an environment of transparency, ethical AI use, and human-centered design, developers and promoters of AI can serve to enhance, rather than complicate, the retirement planning process.

CONCLUSIONS

This essay has explored the multifaceted impact of AI on the financial decisions of retirees, illuminating both the promising advancements and the challenges that lie ahead. Key findings highlight AI's potential to revolutionize retirement planning through personalized financial advice, enhanced financial literacy, and predictive analytics. Emerging trends in AI, including predictive analytics and natural language processing, are poised to further tailor retirement planning and lifestyle choices, ensuring that retirees can navigate their financial futures with greater confidence and security.

THE DUAL-EDGED NATURE OF AI'S IMPACT ON RETIREES

However, the exploration also uncovers the dual-edged nature of AI's impact. While AI promises to democratize financial advice and empower retirees with tools for independent living, concerns around data privacy, algorithmic bias, accuracy, and overreliance on technology reveal potential pitfalls. These challenges underscore the importance of navigating the AI landscape with caution, ensuring that the benefits are realized without compromising ethical standards or exacerbating existing inequalities.

CALL TO ACTION FOR RESEARCHERS, POLICYMAKERS, AND TECHNOLOGISTS

Considering these findings, a concerted effort from researchers, policymakers, and technologists is imperative to harness AI's potential responsibly. Researchers are called upon to continue exploring AI's implications for retirees, focusing on longitudinal studies that can provide deeper insights into its long-term effects. Technologists, on their part, should commit to ethical AI development, prioritizing user safety, inclusivity, and fairness in their designs.

Policymakers must craft and enforce regulatory frameworks that prioritize data protection, algorithmic transparency, and equity, ensuring that AI serves as a tool for social good. At a broader level, there is a growing trend of forming data partnerships and self-regulatory organizations aimed at enhancing AI safety research or crafting policy frameworks. Although leading tech companies are participating, there is a pressing need for

improved collaboration across these diverse groups. Through united efforts towards establishing coherent, global AI regulations, it is possible to ensure accountability within AI firms and prioritize the welfare of users (Salinas, 2024).


MOVING FORWARD

As we stand on the cusp of a new era in retirement planning, the promise of AI to enhance the financial well-being of retirees is undeniable. However, realizing this promise requires a balanced approach that recognizes the technology's limitations and potential risks. By fostering collaboration among researchers, policymakers, and tech experts, we can ensure that AI serves as a powerful ally in helping retirees navigate their financial futures, enhancing their quality of life while safeguarding their rights, privacy, and dignity.

The journey ahead is both exciting and daunting. Yet, with careful navigation, the integration of AI in retirement planning can open new horizons for retirees, offering them unprecedented control over their financial destinies. It is a call to action for all stakeholders to help pave the way for an inclusive, equitable, and ethical AI-powered future. As AI continues to evolve, its potential to transform retirement planning remains vast. Yet, the ultimate measure of its success will be its ability to enhance the lives of retirees, ensuring that the dawn of AI heralds an era of increased financial security, autonomy, and quality of life for all.




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Artificial Intelligence as a Partner for Retirement Professionals: What Are the Issues?

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Any views and ideas expressed in the essay are the author's alone and may not reflect the views and ideas of the Society of Actuaries, the Society of Actuaries Research Institute, Society of Actuaries members, nor the author's employer.

Note: ChatGPT was the artificial intelligence/large language model chosen for illustrative purposes in this essay.

Managing retirement is a complex undertaking supported by financial service companies, actuaries, employee benefit plans, Social Security, and individual financial planners. The participants in managing retirement include the professionals who support these activities, the business organizations that participate in these activities include financial service companies that keep plan records, invest assets, and hold assets. Employers offering benefit plans must decide what benefits to offer, manage them, and interact with employees. The professional groups include actuaries, accountants, attorneys, financial planners, and more.

The entities that participate in the offering of services and products to support retirement plans are faced with a number of challenges. Most are regulated (but not necessarily by the same entities), some have fiduciary liability, and some are subject to professional standards. Their customers depend on them. Customers include employee benefit plans and other large organizations and/or individual consumers. Organizations serving employee benefit plans and other large organizations are often faced with competitive pressures and pressure on fees.

Over the last 60 years, there has been a tremendous growth in the technology available to support retirement professionals and in the way automation has been used as part of the process of managing retirement benefits and planning. Throughout this time, there have been a number of common threads related to the fundamentals facing professionals, but the way they apply has changed with the evolution of technology.

In 2023, there was tremendous interest in the potential impact of AI/large language models as implemented by ChatGPT and Bard. At the same time, concern was expressed about their potential misuse and whether they could create harm. I investigated ChatGPT's capability by reading about it, experimenting with using it, and listening to a variety of webcasts and discussions. The following are some general comments based on what I learned:

- This was not the beginning of AI, but rather the next step. The capability of large language models was growing rapidly. The availability of large data sets together with these models created massive potential capabilities.
- ChatGPT is conversational. The user can start a conversation with a prompt and then build the conversation with further questions.
- Public policy on the use of these models is evolving.
- The model is trained on a data set. The results produced by the model reflect the information in the data set rather than a process of thinking.
- If the world as reflected in the learning data set includes bias, the model's responses are likely to reflect that bias so that applications of the model will be biased and could be more biased.
- The model produces one word at a time, building sentences and paragraphs, and it usually produces what appears to be a rational text, but it sometimes moves in an incorrect direction. This is called hallucination.

- The information produced in a conversation may be correct, correct but incomplete, mostly correct, or completely off-base. The user needs to be aware of this.
- The user who is highly trained in the systems and writing prompts has a much better chance of getting good results.
- Organizations using these tools need to have an organizational policy about how they can be used and what quality controls are needed.
- Organizations using these tools need to be aware of legal requirements and consider such requirements in the development of policies. (The legal requirements affecting retirement administration are very complex because there are different agencies involved, there are different aspects of plan management being regulated, plans are tailored to fit the sponsoring organization, and individual situations are different.)
- These tools can support organizational decisions such as screening job or college applicants, determining claim payments, underwriting loans or insurance applications, choosing who will be promoted, etc. Bias is a big issue. The screening systems can build in bias, or they can eliminate bias. If the data used to train the model reflects bias, it can easily be preserved or even made worse.

One of the best resources that I found was *“The AI Revolution in Medicine: ChatGPT-4 and Beyond”*.¹ This book explores the current and potential use of these models in medicine. I also attended a session at the 2023 Society of Actuaries ImpACT Meeting on the topic of AI and health care. From the book together with the discussions I listened to and my other research, I learned:

- These models do not have personal experience. They have been trained on specific data sets. They are limited by the data sets used in their training.
- These models should not be used as a substitute for professional opinion, but they can be a very valuable partner for the professional who understands their value and limitations. While providing medical care is different from managing retirement plans and retirement planning, both require a great deal of expertise and there are lessons about their use that can be transferred.
- These models can make a variety of mistakes, and so can humans who are working with individual situations. Challenges in building a good partnership are to improve the results and avoid mistakes. This is very important in medicine because some mistakes have dire consequences.
- AIs are not authorized to assume professional responsibility or make decisions that require professional responsibility.
- One of the immediately promising areas for improving the delivery of health care is the automation of the documentation of the patient visit and the patient record. Without such tools, the health care professional may spend much of the patient visit documenting rather than talking to and interacting with the patient. In the current environment, this is particularly important because medical professionals are often allocated a limited number of minutes to see a patient. Depending on the professional’s skill, the documentation may not be very good. Special systems to support the interaction are under development and being used on an experimental basis by some health systems.
- The tools for documenting the interaction could also be extended so that they could be used for ordering lab and other diagnostic tests and compiling the record. (Note that the same challenges regarding documenting interactions, follow-up steps, etc., exist in retirement planning and in interactions regarding plan management and administration.)
- AI tools can be used to review patient records and new lab tests and can provide information about possible diagnosis. This information should not be used to reach a diagnosis, but if used to create a starting

¹ Book published in 2023, by Peter Lee, Carey Goldberg, and Isaac Kohane. The book explores the use of AI in medicine and includes many conversations, showing how the prompts are developed.

point for the medical professional, it can help improve the diagnosis and reduce the time required to review the information. It may also go down a completely wrong track and distract the professional.

- In the case of rare diseases or unusual situations, it may be able to help the health care professional identify possible causes of a problem and lead them to information they would not have found otherwise. It can also completely mislead them and send them in the wrong direction.
- The book raised questions about individuals who do not have access to regular medical care and whether using AI to learn about their own situation is effective. (Worldwide there are many people without such access.) My understanding from the discussion is that using AI is definitely not a reliable way to get a diagnosis and treat a problem. However, the individual may be much better off than they would be without any information, and the chat may help them find a solution. In the last few years, many people have done internet searches to help them understand their own medical problems. These models produce faster answers than such searches, and the answers may be better or worse depending on the situation. It is very possible that more of them will be better. Either of the approaches to getting information supported by technology is better than simply talking to one's friends to see what they think the problem is and what to do about it.
- The potential exists to use AI as part of a strategy to expand access to care through a combination of personal research about the situation and about access to care, including telemedicine. Telemedicine can bring some care to individuals who do not have direct access to care.

My personal observations are that today with so many specialized medical professionals, they often focus on a particular problem rather than on the person. For example, when I experienced a wound on my leg, the wound care doctor focused on cleaning, scraping, and dressing the wound, but he did not seem to realize that there was a person attached to the wound. I was helped greatly by my primary care doctor and another doctor who looked at my overall situation and were able to make several recommendations to promote faster healing and better circulation by taking additional steps. With or without AI, it is critical to remember that health care providers should be dealing with the whole person and the conditions of their lives rather than with a single problem. This requires experience and personal judgement. This is also a key lesson for retirement planning.

MY CONVERSATION WITH ARTIFICIAL INTELLIGENCE

I decided to use ChatGPT to see what it would say about developing a policy for the use of ChatGPT.² I asked a series of three questions to help me understand the issues in general, see whether responses would change with the addition of fiduciary requirements, and to comments I provided on quality control over calculations. My conversation went as follows:

Question

“What should be considered in developing an organizational policy about the use of ChatGPT?”

ChatGPT Answer

“Developing an organizational policy about the use of ChatGPT involves careful consideration of various factors to ensure responsible and ethical use. Here are some key considerations:

² I used ChatGPT3.5 for this conversation.

Purpose and Scope

- *Clearly define the purpose of using ChatGPT within the organization.*
- *Specify the scope of its application and the departments or teams that can leverage it.*

Ethical Use

- *Establish guidelines for ethical use to prevent the creation or dissemination of inappropriate, offensive, or harmful content.*
- *Ensure that the use of ChatGPT aligns with the organization's values and ethical standards.*

Data Privacy and Security

- *Clearly outline how data generated or processed by ChatGPT will be handled, stored, and secured.*
- *Emphasize the importance of maintaining user privacy and complying with relevant data protection regulations.*

User Accountability

- *Define roles and responsibilities regarding the use of ChatGPT to ensure accountability.*
- *Provide guidelines for users to understand their responsibilities in generating and sharing content.*

Training and Awareness

- *Implement training programs to educate users on the proper use of ChatGPT.*
- *Raise awareness about potential biases in AI models and the importance of considering ethical implications.*

Transparency

- *Communicate transparently about the capabilities and limitations of ChatGPT to users and stakeholders.*
- *Disclose the use of AI-generated content when applicable to maintain transparency with users.*

Monitoring and Oversight

- *Establish mechanisms for monitoring the use of ChatGPT to identify any misuse or compliance issues.*
- *Implement oversight processes to regularly review and update the policy based on evolving best practices and ethical considerations.*

Legal Compliance

- *Ensure that the policy aligns with local and international laws and regulations related to AI and data privacy.*
- *Stay informed about legal developments that may impact the use of AI within the organization.*

Bias and Fairness

- *Implement measures to address and mitigate biases in AI models, including regular audits and assessments.*
- *Encourage a diverse and inclusive approach to data collection and model training to minimize bias.*

User Feedback Mechanism

- *Establish a feedback mechanism for users to report issues, concerns, or feedback related to the use of ChatGPT.*
- *Use feedback to continuously improve the system and update the policy as needed.*

Documentation and Versioning

- *Document the policy clearly and ensure that it is easily accessible to all relevant parties.*
- *Implement version control to track changes and updates to the policy over time.*

Collaboration with Legal and IT Teams

- *Collaborate with legal and IT teams to ensure that the policy is aligned with organizational goals and complies with legal requirements.*

By carefully considering these factors, organizations can develop a comprehensive policy that promotes responsible and ethical use of ChatGPT within their specific context. Regular reviews and updates to the policy are essential to adapt to evolving technologies and ethical standards.”

Question

“Will the policy requirements change if the organization is subject to fiduciary liability?”

ChatGPT Answer

“Yes, the policy requirements may change if an organization is subject to fiduciary liability. Fiduciary liability involves the legal obligation to act in the best interest of others, often referring to the responsibility of managing assets or making decisions on behalf of others. In the context of using technologies like ChatGPT, where decisions and actions may have financial or legal implications, additional considerations may be necessary. Here are some specific aspects to consider:

Risk Management

- *Evaluate the potential financial and legal risks associated with the use of ChatGPT.*
- *Implement risk management strategies to mitigate and address fiduciary responsibilities, ensuring that the organization's interests align with those it serves.*

Compliance and Legal Obligations

- *Ensure that the policy is in compliance with fiduciary laws and regulations applicable to the organization's industry.*
- *Consider any specific legal obligations related to fiduciary duties and responsibilities when using AI technologies.*

Documentation and Record-Keeping

- *Maintain thorough documentation of the decision-making processes involving ChatGPT.*
- *Keep detailed records to demonstrate that fiduciary duties are being fulfilled in accordance with applicable laws and regulations.*

Due Diligence in Technology Adoption

- *Conduct a comprehensive due diligence process when adopting and implementing ChatGPT.*
- *Assess the technology's reliability, security, and ethical considerations to ensure that it aligns with fiduciary obligations.*

Transparency and Accountability

- *Emphasize transparency in AI-generated decisions and communicate the rationale behind decisions made with the assistance of ChatGPT.*
- *Establish clear lines of accountability to demonstrate that fiduciary duties are being upheld.*

Data Governance and Privacy

- *Strengthen data governance practices to safeguard sensitive information and ensure compliance with privacy regulations.*
- *Clearly define how AI-generated insights or decisions impact the handling of confidential or private data.*

Conflict of Interest

- *Address potential conflicts of interest that may arise in the use of ChatGPT.*
- *Implement measures to identify, disclose, and manage conflicts to prevent any compromise of fiduciary responsibilities.*

Continual Monitoring and Evaluation

- *Implement ongoing monitoring and evaluation processes to ensure that the use of ChatGPT aligns with fiduciary obligations.*
- *Regularly assess the impact of AI-generated decisions on the organization's financial well-being and compliance with fiduciary standards.*

Legal Counsel Involvement

- *Involve legal counsel specializing in fiduciary law to review and provide guidance on the organization's policies and practices related to ChatGPT.*

Organizations subject to fiduciary liability should integrate these considerations into their AI policies to meet their legal and ethical obligations. The specifics will depend on the nature of the organization, its industry, and the legal framework within which it operates. Collaboration between legal, compliance, and technology teams is crucial to ensure a comprehensive and compliant approach to the use of ChatGPT.”

Question

“Retirement planning calculations include consideration of many factors and they extend the calculation over the lifetime of the individual. How can the user of ChatGPT to do a calculation confirm its accuracy?”

ChatGPT Answer

“When using ChatGPT or any AI tool for retirement planning calculations, it's crucial to confirm the accuracy of the results. Here are several steps and considerations to help users verify the accuracy of the calculations:

Understand the Model's Limitations

- *Be aware of the limitations of ChatGPT and the specific AI model being used. Understand the context in which it was trained and any biases it may have.*

Cross-Reference Information

- *Cross-reference the results generated by ChatGPT with information from reliable and authoritative sources. Use established financial calculators, retirement planning tools, or consult with financial professionals to validate the accuracy of the results.*

Use Multiple Tools

- *Don't rely solely on ChatGPT. Use multiple retirement planning tools, calculators, or financial planning software to compare results. Different tools may use different assumptions and methodologies, leading to varying outcomes.*

Check Assumptions

- *Verify the assumptions used by ChatGPT in the retirement planning calculations. Assumptions about inflation rates, investment returns, life expectancy, and other factors can significantly impact the accuracy of the results.*

Consult Financial Professionals

- *Seek advice from financial professionals such as financial planners, advisors, or accountants. They can provide personalized insights, verify calculations, and ensure that the retirement plan aligns with individual circumstances and goals.*

Review Input Data

- *Double-check the input data provided to ChatGPT. Garbage in, garbage out—ensuring accurate input is crucial for reliable output. Verify that all financial and personal information is entered correctly.*

Consider Sensitivity Analysis

- *Conduct sensitivity analysis by varying key assumptions to understand how changes in factors like investment returns, inflation rates, and retirement age affect the overall retirement plan. This can provide insights into the robustness of the calculations.*

Educate Yourself

- *Gain a basic understanding of retirement planning concepts and calculations. This knowledge will empower you to critically evaluate the results provided by ChatGPT and other tools.*

Evaluate Historical Performance

- *If the calculations involve historical financial data or market performance, verify the accuracy of the historical information used. Ensure that the AI model accurately incorporates past trends and events.*

Check for Updates

- *Ensure that the ChatGPT model is up-to-date. AI models can be periodically updated with new information, improvements, or training data. Using the latest version may result in more accurate calculations.*

User Feedback

- *Consider user feedback and reviews related to the specific implementation of ChatGPT for retirement planning. Feedback from other users may provide insights into the tool's accuracy and reliability.*

Continuous Monitoring

- *Regularly monitor and update your retirement plan. Financial circumstances and goals may change over time, and recalculating periodically helps ensure that the plan remains accurate and relevant.*

By combining these steps and being diligent in the verification process, users can enhance their confidence in the accuracy of retirement planning calculations conducted with ChatGPT or any AI tool. It's important to approach AI-generated results as one part of a broader financial planning process and not rely solely on automated tools for critical financial decisions."

GOING BEYOND THE CONVERSATION

I was impressed by the responses and felt that they were as helpful as summarizing the webinars I listened to or what I read.

I also learned that these systems could perform a wide variety of tasks, and that specialized training would be needed to do these tasks well. I decided to focus on two issues that I have focused on for many years:

- Who is responsible for the results of an actuarial calculation or the accuracy of a financial statement?
- Quality control and confirming whether results are accurate or not.

Both actuarial calculations and financial statements are subject to a variety of legal and professional guidance. For example, the actuarial profession has guides to professional conduct and standards that apply regarding who can sign an actuarial opinion and what must be considered in the preparation of that opinion and disclosed with that opinion. The accounting profession is regulated in the U.S. by the FASB and GASB, and internationally by the international profession.

In setting guidelines and policy for the use of AI, it must be remembered that specialized functions require a professional certification or signature by a person who has the qualifications and/or licenses required, and that person must know which rules are applicable and follow them. Specialized software can be used to help with many of these functions, but it must be designed to match the requirements. Large language models are not currently built to do this, and information produced by such systems still requires human checking and sign-off.

Quality control is a very important part of professional work and of retirement management. I thought the responses about quality control made sense.

Quality control over actuarial calculations requires answering a number of questions:

- Was the right process or calculation used to solve the problem? How do we confirm what was done?

- Did the overall process provide for considering risk and variations due to changes in economic conditions, etc.?
- Was the correct data used as input?
- Were the assumptions used appropriate and did they follow the applicable guidelines, if any?
- Did the appropriate party sign off on the calculation?
- Will the user be able to understand the results?

I have been involved with the financial security system for more than 60 years and have seen the evolution of different methods of doing the calculations, and of more sophisticated calculations over time. The following exhibit provides some perspective on changes in quality control and its evolution over time.

Exhibit 1

EVOLUTION OF CALCULATION METHODS, TECHNOLOGY AND QUALITY CONTROL

Method of Calculation	Use of Technology	Quality Control
Calculations done manually one by one.	Hand calculators and slide rules.	<p>Individual doing the calculation was expected to know what to do. Individual items in the calculation were done by two people – one who did the calculation and one who checked.</p> <p>Actuaries active at that time were very good at reviewing results for reasonableness. They also were skilled at comparing results for repeating calculations and determining the factors that were driving change using a gain and loss analysis.</p>
Actuarial valuations were done individual by individual.	Computer programs were written to look at the characteristics of the individual and the benefit and calculate liabilities person by person.	<p>Programs and calculations were checked. Test cases were used to test programs. Programs often were written for each situation. The responsible signing actuary was involved in doing or overseeing the calculations.</p> <p>Reasonable checks and year by year comparisons were also used.</p>
Valuations were done with programs which could do many plans by coding parameters.	Companies secured programs that were pre-packaged and needed parameters coded to do the valuations. They were first used on main frame computers and then on both main frames and personal computers.	<p>Organizations using a program needed to make sure it was appropriate. Test lives were used to check results. It was important to design a test sample.</p> <p>An actuary needed to confirm that the program matched the plan provisions or make suitable adjustments.</p> <p>Signing actuary needed to confirm that everything had been done correctly.</p>
Personal retirement planning software focused primarily on period to retirement and on what percentage to save – it was deterministic.	Various software packages were available through financial service companies and in the public domain.	<p>It was up to the user or professional assisting in planning to determine suitability and correct use.</p> <p>The formulas and method of entering assumptions were defined in the program. The user was responsible for assumptions.</p>
Plan forecasts often were done using stochastic projections. Stochastic projections were used in personal planning software.	<p>Software packages and higher speed computers were used.</p> <p>Stochastic results are more difficult to understand, particularly by unsophisticated users.</p>	<p>It was up to the user or professional assisting in planning to determine suitability and correct use.</p> <p>The formulas and method of entering assumptions were defined in the program. The user was responsible for assumptions</p>
AI for various purposes.	<p>The process depends on large data sets and fast technology and works differently.</p> <p>The process does not define a calculation in the same way that earlier processes did.</p>	<p>This is the responsibility of the professional user.</p> <p>How it will be done is to be determined. This is a major challenge. The AI response suggested using several different tools. This is an interesting (and time consuming) idea.</p>

Source: Author's analysis

As stated earlier, quality control has always been an important issue. It has grown more complex with more sophisticated technology, larger data sets and new processes. At the same time, professionals today often have much less hands-on experience, may be less focused on reasonableness checks, and less able to have a sense about it when something is not correct. They may also be relying on others to choose software or decide on the software to be adopted by their organization. This area needs more research.

CONCLUSIONS

The introduction of the most recent version of AI created the potential for many tasks to be done differently than they were before. This will continue to change. They create the potential for skilled individuals to multiply what they can get done by using these tools. They also may lead to potential pitfalls and errors. Related legal issues and the potential for more regulation can complicate the situation.

Professionals and organizations doing management of retirement plans or offering retirement planning have opportunities to use these tools, but there are questions about what is reliable as well. It is essential that organizations and professionals examine the issues and develop policies and implement policies regarding the use of these tools in order to use them prudently. The policies must consider issues such as what customers need, what is reliable, legal issues, data privacy, etc.

Published research provides information about the way the use of these tools can improve the practice of medicine by operating in a partnership mode. It also identifies specific areas where there is the greatest chance for help in the short term. The research further provides information about the risks involved with AI.

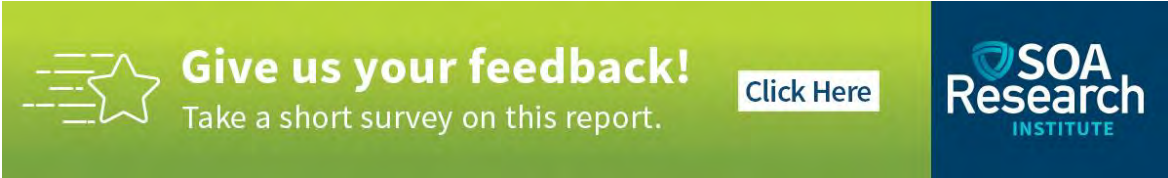
In addition, research regarding health care provides a model that can be extended to apply to retirement management and planning. These are a few examples of how AI may fit into retirement planning and planning management:

- AI can be a very good partner to professionals involved in retirement planning and management tasks.
- As a partner, AI can help document discussions and improve the client situation.
- AI can help do research and literature searches on a variety of questions. The AI tool used needs to be up-to-date and have access to the internet if it is going to assist in these tasks.
- Planning involves many tasks. Research is needed to establish which tasks AI will be able to help with and what is needed for quality control.
- It is known that AI is sometimes wrong, and it provides incomplete answers at other times. It does not think but rather it reflects the information in the data set it learned from. It is essential that the user of AI be able to apply judgement to the situation and sort out what is helpful and what is not.
- While AI can be used to do computations, it is not well enough tested and developed at the time of this writing to be used for computations that affect plans and personal decisions. There are too many opportunities for errors. See my other essay in this essay collection for an example of a calculation gone very wrong with AI. Traditional software packages should be continued and enhanced. It should be noted that there are many packages and questions to be answered. It is a complex task to match the right calculation to the right situation. Further research is needed on whether AI can help with this.

We must not forget that AI cannot assume the responsibility of a signing professional or complete the tasks the professional does. Continued research as AI evolves will however likely enhance the support it can provide to these processes and help them become more efficient.

* * * * *

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