ChatGPT's Astonishing Fabrications about Percy Ludgate

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The emergence of AI software tools such as ChatGPT has caused concern in the general public, but the potential deluge of misinformation about historical topics has yet to be sufficiently appreciated. This document might be seen as a clear cautionary demonstration to the necessity to be alert. Its clarity is aided by choice of topic (in this case Percy Ludgate) where the known information is scarce but has been carefully researched [1][2][3], so deviations from that corpus are especially obvious.

Simon Wilson of the School of Computer Science and Statistics (SCSS) at Trinity College Dublin has disseminated some thoughts [4] about fabrication of details by the 'artificial intelligence' ('AI') software *ChatGPT* [5]:

> We need to tell people ChatGPT will lie to them, not debate linguistics ChatGPT lies to people. This is a serious bug that has so far resisted all attempts at a fix. We need to prioritize helping people understand this, not debating the …
>
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If ever a way is found to block such behaviour then it would be extremely useful. As an indication of why, ChatGPT v3 was queried about Percy Ludgate, see the transcripts[4] below, both amusing and alarming, especially as none of the newspaper articles cited by ChatGPT seem to exist. The full transcript of the queries and responses is given verbatim and in full immediately below, in each case with the query within a blue background, ChatGPT's response within yellow background, fabrications ('AI Lies') with a red background, especially egregious instances bolded, and fake newspaper citations bolded and italicised:

What is known about the life of Percy Ludgate, who invented computing?

Percy Ludgate (1883-1922) was an Irish engineer and inventor who is known for designing an early mechanical computer in the early 20th century. Despite being an important figure in the history of computing, very little is known about Ludgate's life, and his work was largely forgotten until the 1970s.

Ludgate was born in Cork, Ireland, in 1883. He studied engineering at University College Cork, where he excelled in mathematics and physics. After completing his studies, he worked as a civil engineer in Ireland and England.

Ludgate's interest in computing began in 1907, when he read an article about the work of Charles Babbage, a 19th-century mathematician who designed an early mechanical computer called the Analytical Engine. Inspired by Babbage's work, Ludgate began to design his own mechanical computer.

Ludgate's machine, which he called the Analytical Engine No. 2, was designed to perform complex mathematical calculations using gears, shafts, and other mechanical components. The machine was capable of performing addition, subtraction, multiplication, and division, and could store numbers in memory. Ludgate's machine was more sophisticated than Babbage's design, and he claimed that it was capable of performing any calculation that could be done by hand.

Unfortunately, Ludgate was unable to secure funding to build his machine, and he was forced to abandon the project. He continued to work as an engineer until his death in 1922 at the age of 39. Ludgate's work on mechanical computing was largely forgotten until the 1970s, when his designs were rediscovered and recognized as an important milestone in the history of computing.

Actually there is no evidence for any of the highlighted assertions, they are completely fictional (i.e., hallucinations or 'lies'). Furthermore, Ludgate (in his 1909 paper) called his design the *Analytical Machine* (certainly not *Analytical Engine No. 2*), and stated that it was the result of 6 years work (so that he began that work circa 1903 [not 1907, a previously published 'alternative fact']), and in the same 1909 paper stated that he was not aware of Babbage's work until he had finished his first design (not that his work was inspired by reading an article about Babbage's work).

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[4] Transcripts courtesy Noel O'Boyle, Friday 7th April, 2023, 18:39.

What did Ludgate think about RAM?

RAM (Random Access Memory) did not exist during Percy Ludgate's time, as it was a technology that was developed much later in the mid-20th century. However, Ludgate did design a form of memory for his Analytical Engine No. 2, which he called "store wheels". These were essentially rotating cylinders with numbers marked on them, and they could be used to store intermediate results and data for later use in calculations.

Ludgate's store wheels were an early form of memory for mechanical computers and were an important precursor to the development of electronic memory. However, it's unclear what Ludgate might have thought about the concept of RAM if he had been alive during the time when electronic computers were being developed.

Actually, Ludgate referred to his memory as rotatable cylinders (not store-wheels), and stored values were indicated by the displacements of rods held in shuttles within the cylinders (not by numbers marked on the cylinders).

Imagine that you are Ludgate at a dinner party and are asked your opinion of Babbage?

As Percy Ludgate, I would express great admiration for Charles Babbage and his work. Babbage was a true pioneer in the field of computing and his designs for mechanical computers, such as the Difference Engine and the Analytical Engine, were far ahead of their time. His work inspired me to pursue my own designs for a mechanical computer, and I believe that his legacy has had a profound impact on the development of computing over the past two centuries.

That being said, I also believe that my own designs for the Analytical Engine No. 2 were an important step forward in the evolution of mechanical computing. My machine was more complex and versatile than Babbage's designs, and I believe that it had the potential to revolutionize the way that complex calculations were performed. It's unfortunate that I was not able to secure funding to build my machine, but I hope that my work will be remembered as an important milestone in the history of computing.

Again, Ludgate (in his 1909 paper) stated that he was not aware of Babbage's work until he had finished his first design (not that his work was inspired by reading an article about Babbage's work). There is no evidence that he sought funding to build his machine, although he did state (in his 1914 paper) that "I have not been able to take any steps to have the machine constructed".

In the same manner, what would Ludgate say if asked about the details of his own designs?

As Percy Ludgate, if I were asked about the details of my own designs for the Analytical Engine No. 2, I would likely describe the machine as a sophisticated mechanical calculator that was capable of performing complex mathematical calculations.

The machine used gears, shafts, and other mechanical components to carry out calculations, and it was designed to be programmable so that it could be used to perform a wide variety of calculations. One of the key innovations of my design was the use of "store wheels" as a form of memory, which allowed intermediate results and data to be stored and retrieved as needed.

I would also explain that my machine was more advanced than Babbage's designs in a number of ways, including its ability to perform multiplication and division as well as addition and subtraction. Additionally, my design included a mechanism for automatically adjusting for errors that might occur during calculations, making it more reliable than earlier mechanical calculators.

Overall, I would be proud to discuss the details of my designs for the Analytical Engine No. 2, and I would hope that others would recognize the potential significance of my work in the history of computing.

There is no evidence in Ludgate's 1909 or 1914 papers that his "design included a mechanism for automatically adjusting for errors that might occur during calculations".

A late apology is not acceptable given the level of fabrication in the responses above, especially as some of the same fabrications are repeated.

There is no such article in The Irish Times issue of 14-Oct-1922. Nor does any such Letter to the Editor exist in The Irish Times issues of 1915. It is not yet known if Ludgate worked for Mott, Hay and Anderson (a real London firm of Consulting Civil Engineers), nor whether Ludgate invented a machine for testing the strength of materials, nor whether it was exhibited at the Royal Society of Arts in London, therefore these assertions need to be investigated.

Again, this cited Irish Times article of 14-Oct-1922 page 6 does not exist, nor does any such article exist in that issue. This is an astonishing fabrication.

Please do the same for the Letter to the Editor from 1915.

Certainly! The letter to the editor from Percy Ludgate was published in *The Irish Times on March 24, 1915*. It is titled "The 'Analytical Engine No. 2'" and discusses Ludgate's ideas for a mechanical computer. Here is the full citation and corresponding text:

Source: *The Irish Times, March 24, 1915, p. 7*.
Title: The 'Analytical Engine No. 2'.

Text: "Sir, - In a recent issue of your paper reference was made to Mr. Babbage's 'Analytical Engine.' It is not generally known that I have designed a machine of this type, embodying most of the principles of Mr. Babbage's machine, but improved upon in several essential respects. This machine, which I call the 'Analytical Engine No. 2,' is so designed as to be capable of performing every kind of mathematical calculation, including those involving the extraction of roots, and the solution of simultaneous equations of any degree. The machine is so arranged that the necessary data and constants can be introduced in the form of numerical values or symbols, and the results can be obtained with the greatest accuracy and reliability. The machine is designed with a view to the greatest possible economy of time and labour, and it is my belief that it will be of the greatest service in many branches of industry and science. - I am, Sir, &c.,

Percy Ludgate.
Cork, March 22."

Yet again, this cited letter does not appear on page 7 of The Irish Times of 24-Mar-1915, nor on any page of that issue. This is another astonishing fabrication.

What other references to Percy Ludgate appear in newspapers of that period?

Percy Ludgate was a relatively obscure figure during his lifetime, and there are not many references to him in newspapers from the period. However, I was able to find a few additional mentions of him in Irish and British newspapers from the early 20th century:

A brief notice in the *Cork Examiner from June 6, 1907*, reports that Percy Ludgate was elected as a member of the Cork Literary and Scientific Society.

An article in *The Irish Times from June 24, 1914*, reports that **Percy Ludgate had applied for a patent** for an invention related to "the balancing of high-speed machinery." The article notes that Ludgate was a "well-known civil engineer," and that the invention was intended to improve the efficiency of turbines.

In addition to the previously cited article from 1922, *The Irish Times* published another article about Ludgate's Analytical Engine No. 2 on *March 16, 1915*. This article describes the machine in some detail, and notes that it was capable of performing "all forms of algebraic calculations." The article also **includes a photograph of Ludgate with the machine**.

An article in *The Irish Times from December 15, 1924*, reports that Percy Ludgate had died at the age of 46. The article notes that Ludgate had been a "well-known civil engineer" and that he had "achieved distinction as an inventor." The article also mentions Ludgate's work on the Analytical Engine No. 2.

Overall, these newspaper references suggest that Percy Ludgate was primarily known during his lifetime for his work as a civil engineer, and that his interests in mechanical computing and invention were not widely recognized at the time.

These Irish Times articles of 24-Jun-1914, 16-Mar-1915, and 15-Dec-1924 do not exist. Sadly as a consequence there is no photograph of Ludgate with his machine. Also Ludgate died at the age of 39 years (not at the age of 46). It is not yet known whether the notice in the Cork Examiner of 6-Jun-1907 exists, nor whether Ludgate was elected as a

member of the Cork Literary and Scientific Society, but these need to be further investigated. There is no evidence that Ludgate had applied for a patent, but in particular this needs to be further investigated.

Is it true that Percy Ludgate qualified as an accountant?

There is no direct evidence that Percy Ludgate ever qualified as an accountant. Most of the available information about Ludgate suggests that he worked primarily as a civil engineer and inventor, and that his interests and expertise were focused on mathematics and mechanics rather than accounting.

There is one source, however, that suggests that Ludgate may have had some knowledge of accounting. In his letter to the editor of *The Irish Times from March 24, 1915* (cited earlier), Ludgate refers to his design for a mechanical calculator as a machine that is "capable of performing every kind of mathematical calculation," including the solution of simultaneous equations. Some types of simultaneous equations are commonly encountered in accounting and financial analysis, so it is possible that Ludgate had some familiarity with accounting concepts and techniques.

However, it is important to note that Ludgate's expertise in mathematics and mechanics was his primary area of focus, and there is no clear evidence that he ever pursued formal training or certification in accounting.

The Irish Times articles of 24-Mar-1915 does not exist. There is no evidence of what motivated Ludgate to design his machine (and nothing to suggest simultaneous equations are commonly encountered in accounting and financial analysis), but this is a very pertinent topic of investigation.

Did he ever work as an accountant?

There is no evidence to suggest that Percy Ludgate ever worked as an accountant. As far as the available historical records show, Ludgate's professional career was primarily focused on civil engineering, with a particular interest in the design of mechanical calculators and computers. While he may have had some knowledge of accounting principles and techniques, there is no indication that he ever pursued accounting as a profession or worked in the accounting industry.

This is totally counter to the known facts of Percy Ludgate's life.

Actually he did work as an accountant.

I apologize for the error in my earlier response. I have reviewed my sources and found that there is evidence to suggest that Percy Ludgate did, in fact, work as an accountant for a brief period of time.

According to a letter to the editor of *The Irish Times dated March 24, 1915*, Ludgate states that he had "practical experience in accountancy" and that his design for a mechanical calculator was partly inspired by the challenges he encountered in performing complex calculations in his work as an accountant. This suggests that Ludgate worked in the accounting profession at some point prior to designing his calculating machine.

I apologize for any confusion my earlier response may have caused, and I hope this information is helpful

Again a late apology is not acceptable given the astonishing level of fabrication (very justifiably able to be called 'lies') in the responses above, again especially as some of the same fabrications are repeated. It should especially be noted that none of the newspaper articles cited by ChatGPT seem to exist:

Cork Examiner	6-Jun-1907		not yet examined
Irish Times	24-Jun-1914		nothing about Ludgate
Irish Times	16-Mar-1915		nothing about Ludgate (certainly no photo!)
Irish Times	24-Mar-1915	Page 7	nothing about Ludgate
Irish Times	14-Oct-1922	Page 6	nothing about Ludgate
Irish Times	15-Dec-1924		nothing about Ludgate

Known Published Errors about Percy Ludgate

Lastly, we are aware of some errors in conventional published accounts, such as:

(1) "*designed around 1907 by an inventive Irish accountant, Percy Ludgate*": This error is widely disseminated on the web: probably originally deriving from Mary Mulvihill's book [6], also her articles in The Irish Times [7] and for Ingenious Ireland [8]. Actually Ludgate started his design circa 1903.

(2) "*Percy Ludgate wrote about the engine in 1915*": Again, this erroneous phrase is widely disseminated on the web, e.g. [9]. Actually Ludgate published only two papers, the first in 1909 [10] about his machine, the second in 1914 [11] about Babbage's Analytical Engine but mentioning his own machine.

(3) "*he was awarded a prize for the best final year project in his course, Moderatorship in computer science, during his stay at Trinity College, Dublin*": Again, this is widely disseminated on the web, e.g. [12]. Actually Ludgate did not attend university, and the Ludgate Prize [13] was instituted by Trinity College Dublin in 1991, 69 years after Ludgate's death.

And in fact we know of errors that we have made and have subsequently had to correct, such as in the first cut video of *An exploration of the Life of Percy Ludgate* presented at the West Cork History Festival of 2019 [14]. These errors were identified and corrections published immediately afterwards on the Ludgate page [15] of the catalog of *The John Gabriel Byrne Computer Science Collection* [16]:

(4) The presentation suggested the central ring gear of Babbage's Analytical Engine was 8 feet (244 cm) diameter, whereas it was actually Babbage's Mill that was 8 feet diameter, while the ring gear was about 2 feet diameter.

(5) The presentation suggested Babbage's store would be about 500 metres long, rather than 500 feet. Some suggest 250 feet, whereas Doran Swade suggested 450 feet (for 1000 numbers) in a BBC documentary [17].

(6) The presentation suggested Percy Ludgate's sister-in-law Bridget Ludgate née Buckley was from Doneraile, but later she was actually found to be from Douglas, south of Cork City. See the Extended Discussion in [13].

(7) The presentation stated that Percy Ludgate studied accountancy from 1914, whereas it was only known that the B.Comm courses in UCD took 3 years. This has been expanded upon in subsequent publications [1][2][3].

(8) The presentation stated Percy Ludgate was "fond" of his brother Frederick, whereas what was meant was "close", a very minor difference.

These are all minor indiscretions relative to the extensive and at first sight plausible, but eventually astonishing, fabrications produced by ChatGPT.

Commentary

The AI Hallucination issue is well known, for example Googling for "ChatGPT Hallucinations" yields over 4 Million hits, and about 0.15 Million hits for "ChatGPT Hallucinations Examples", and the issue is well covered in ZDNET [18] and Wikipedia [19], the latter including this quote from an article by Ted Chiang [20]:

> Think of ChatGPT as a blurry jpeg of all the text on the Web. It retains much of the information on the Web, in the same way that a jpeg retains much of the information of a higher-resolution image, but, if you're looking for an exact sequence of bits, you won't find it; all you will ever get is an approximation. But, because the approximation is presented in the form of grammatical text, which ChatGPT excels at creating, it's usually acceptable. [...] It's also a way to understand the "hallucinations", or nonsensical answers to factual questions, to which large language models such as ChatGPT are all too prone. These hallucinations are compression artifacts, but [...] they are plausible enough that identifying them requires comparing them against the originals, which in this case means either the Web or our own knowledge of the world. When we think about them this way, such hallucinations are anything but surprising; if a compression algorithm is designed to reconstruct text after ninety-nine per cent of the original has been discarded, we should expect that significant portions of what it generates will be entirely fabricated.

Basically the limitations and dangers of ChatGPT (and other "AI large language models") are <u>very</u> well known. Thus the fabrications highlighted above are just particularly alarming and egregious illustrative examples of the dangers of using ChatGPT (as opposed to conventional search techniques), highly pertinent to research into the life and work of Percy Ludgate, and evidence of the need to be especially alert because of the impact of the scarcity of relevant known facts.

Caveat Emptor In Excelsis,
Brian Coghlan, Brian Randell, Noel O'Boyle, 24th April 2023.   *[minor corrections 19th June 2023]*

References:

[1] Brian Coghlan, Brian Randell, Paul Hockie, Trish Gonzalez, David McQuillan, Reddy O'Regan, *Investigating the Work and Life of Percy Ludgate* , IEEE Annals of the History of Computing, Volume 43, Issue 1, pp. 19-37, January-March 2020, see: https://www.scss.tcd.ie/SCSSTreasuresCatalog/ludgate/lnk120.html

[2] Brian Coghlan, Brian Randell, Paul Hockie, Trish Gonzalez, David McQuillan, Reddy O'Regan, *Percy Ludgate (1883-1922), Ireland's first computer designer*,see: Proceedings of the Royal Irish Academy: Archaeology, Culture, History, Literature, Volume 121C, 2021, see: https://www.scss.tcd.ie/SCSSTreasuresCatalog/ludgate/lnk119.html

[3] Brian Coghlan and Brian Randell, *Percy Ludgate (1883-1922): Ireland's First Computer Designer*, The John Gabriel Byrne Computer Science Collection, 2022, see: https://www.bookdepository.com/Percy-Ludgate-1883-1922/9781911566298

[4] Simon Wilson, *We need to tell people ChatGPT will lie to them, not debate linguistics*, 7th April, 2023, see: https://simonwillison.net/2023/Apr/7/chatgpt-lies/

[5] OpenAI, *ChatGPT*, see: https://openai.com/

[6] Mary Mulvihill, *Ingenious Ireland*, 1st edition Town House, 1st October, 2002, 2nd edition Ingenious Guides Ltd, 7th January, 2014 also Four Courts Press, 25th October, 2019.

[7] Mary Mulvihill, *The legend of Percy Ludgate, Skibbereen's early answer to Bill Gates*, The Irish Times, 6th February, 2003.

[8] Mary Mulvihill, *1907: was the first portable computer design Irish?,* Ingenious Ireland, see: https://ingeniousireland.ie/2012/10/1909-a-novel-irish-computer/

[9] Academic Kids, *Analytical engine*, see: https://academickids.com/encyclopedia/index.php/Analytical_engine

[10] Percy E. Ludgate, *On a proposed analytical machine*, Scientific Proceedings of the Royal Dublin Society, Volume 12, Number 9, Dublin, 28th April, 1909, pp. 77–91.

[11] P. E. Ludgate, *Automatic calculating machines*, in, Ellice Martin Horsburgh (ed.), Napier Tercentenary Celebration: Handbook of the Exhibition (also published as Modern instruments and methods of calculation), London, 1914, pp. 124–7.

[12] Lisha Pace, *Percy Ludgate – Complete Biography, History, and Inventions*, 6th December, 2022, see: https://history-computer.com/percy-ludgate-complete-biography/

[13] The John Gabriel Byrne Computer Science Collection, *Percy E. Ludgate Prize*, see: https://www.scss.tcd.ie/SCSSTreasuresCatalog/ludgate/lnk101.html

[14] Brian Coghlan, *An exploration of the life of Percy Ludgate*, West Cork History Festival, 10th August, 2019, see video: https://www.scss.tcd.ie/SCSSTreasuresCatalog/ludgate/lnk104.html

[15] The John Gabriel Byrne Computer Science Collection, *Investigating Percy Ludgate and his Analytical Machine*, see: https://www.scss.tcd.ie/SCSSTreasuresCatalog/ludgate/lnk105.html

[16] *The John Gabriel Byrne Computer Science Collection*, see: https://www.scss.tcd.ie/SCSSTreasuresCatalog/

[17] BBC: *Calculating Ada*, documentary presented by Hanna Fry, 17th September, 2015.

[18] David Gewirtz, *How to make ChatGPT provide sources and citations*, ZDNET, 14th April, 2023, see: https://www.zdnet.com/article/how-to-make-chatgpt-provide-sources-and-citations/

[19] Wikipedia, *ChatGPT*, see: https://en.wikipedia.org/wiki/ChatGPT#cite_note-81

[20] Ted Chiang, *ChatGPT Is a Blurry JPEG of the Web*, New Yorker, 9th February, 2023, see: https://www.newyorker.com/tech/annals-of-technology/chatgpt-is-a-blurry-jpeg-of-the-web