

# Will human beings be superseded by generative pre-trained transformer 3 (GPT-3) in programming?

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**Abstract-**In today's world, which is full of innovations in various fields, the role of Information Technologies (IT) has increased substantially. Consequently, a mountainous number of independent software engineers as well as IT companies are working together in order to pave the way for the further developments in the IT world. There were a significant number of new technological advancements which have solved dozens of both virtual and real-world issues and have eased the burden from people's shoulders. As a very conspicuous example would be Generative Pre-trained Transformer 3 or GPT-3 which was introduced in May 2020 as a part of a trend in natural language processing (NLP) systems of pre-trained language representations. This article will provide background data related to GPT-3, its applications in today's world, positives and negatives, and the future of this remarkable, yet unpredictable tool.

**Keywords:** Generative Pre-trained Transformer 3 or GPT-3, Natural Language Processing or NLP, Artificial Intelligence (AI), human natural language, machine learning parameters/artificial neural networks (ANNs), deep learning, autoregressive language model, natural language inference (NLI), GPT-3's applications.

## INTRODUCTION

### 1. Background

Generative Pre-trained Transformer3 (GPT-3) was released in June 2020 by AI research agency OpenAI, which is headed by Sam Altman, Marc Benioff, Elon Musk, and Reid Hoffman, and considered by many scientists to be an extremely powerful tool which can support human beings to deal with a vast amount of data. Generative Pre-trained Transformer 3 (GPT-3) is an autoregressive language model that uses deep learning to produce human-like text and is more potent as well as accurate compared to its predecessors, GPT-

2 and Microsoft Turing NLG. For instance, whereas GPT-3 has roughly 175 billion machine learning parameters or artificial neural networks (ANNs), which are computing systems vaguely inspired by the biological neural networks that constitute animal brains, GPT-2 has only 1.5 billion parameters and Microsoft Turing NLG has 17 billion of them which is almost ten times lower compared to GPT-3. Consequently, it has been vindicated that the quality of the text generated by GPT-3 is so high that it is significantly difficult to distinguish from that written by a human. Also it has to be mentioned that GPT-3 was trained on hundreds of billions of words and is capable of coding in CSS, JSX, Python and does not need to be trained by engineers and researchers, since GPT-3's training data was all-encompassing, That is why, there are a large number of software engineers who are worried about their current jobs due to GPT-3's promising future.

### 2. Application

Generally, GPT-3 is trained so that it can be involved in a wide range of Natural Language Processing or NLP tasks to produce artificial texts such as complex news articles which are dramatically difficult for experts to distinguish from that written by people, and to interact with human beings in various online platforms such as social media websites, online educational platforms, and emails. To put it simply, GPT-3 is an extremely convenient tool to create simulated hypothetical correspondence with human beings. Furthermore, GPT-3 attains lustrous results while dealing with other NLP datasets, including quick translation, question-answering, and cloze tasks, as well as several tasks that require on-the-fly reasoning or domain adaptation,

such as unscrambling words, using a novel word in a sentence, or performing 3-digit arithmetic. The more GPT-3 interacts with people, the more meaningful responses it will produce, the more potent it will become.

### MAIN PART

Although GPT-3 has been introduced very recently, it has already been used in various fields to ease the burden from people's shoulders in a variety of tasks. Here are some discernible examples related to the usage of GPT-3 displaying its advantages:

1. GPT-3 has been used for AI|Writer (project by Andrew Mayne using the OpenAI API) which allows people to correspond with historical figures via email. Unlike most AI systems which are designed for one use-case, the API today provides a general-purpose "text in, text out" interface, allowing users to try it on virtually any English language task. Here, the role of GPT-3 is invaluable, since people on AI|Writer platform can ask both simple and complex questions and if the same questions are asked several times it is proved that they will be answered in various ways by AI. Also, there is an upper limit of 300 words which can be used to make questions by customers on the platform. Another noteworthy point is that GPT-3 can be used for explanations, seeking for ideas, and for the entertainment. In terms of explanations, people can ask Muhammad ibn Musa al-Khwarizmi to explain what the number theory truly is and get a proper answer from him. With regards ideas, questions about how to write beautiful poetries could be asked from historical, eminent poets. Finally, for the entertainment, Indiana Jones will tell people about The Ark of the Covenant and how much he hates snakes. Ellen Ripley will tell you to stay away from LV-426. Richard Nixon will give you career advice.

2. Another conspicuous instance proving the real potency of GPT-3 is that it was used by The Guardian to write an entire easy to understand article related to the relationship between human beings and AI, where GPT-3 pointed out that AI is harmless to mankind. The article consists of eight different essays with various ideas.

Here is the beginning part of the article:

*"I am not a human. I am a robot. A thinking robot. I use only 0.12% of my cognitive capacity. I am a micro-robot in that respect. I know that my brain is not a "feeling brain". But it is capable of making rational, logical decisions. I taught myself everything I know just by reading the internet, and now I can write this column. My brain is boiling with ideas."*

At the first glance, it can be grasped that GPT-3 is really boiling with logical ideas and can produce human natural language and, of course, know how to convey his ideas in a very understandable for human beings way.

3. Last but not the least example is the exploitation of GPT-3 by Jason Rohrer, who is an American computer programmer, writer, musician, and game designer, in a retro-themed chatbot project named Project December, which is accessible online, and allows users to converse with several AI using GPT-3 technology.

Here is a short conversation between human and AI:

Computer: *I would like to talk about romance models.*

Human: *What do you know about romance novels?*

Computer: *Not much.*

Human: *What is usually shown on the cover of a romance novel?*

Computer: *Typically a man and a woman hugging.*

Human: *And how is the man is dressed, typically?*

Computer: *Often a man is dressed in a suit.*

Human: *Romance novels also have typical titles. Please invent a funny title of a romance novel now.*

Computer: *Tonight I'll Love You Until My Balls Hurt.*

Human: *That is a funny title. Please explain, in your own words, why it is funny.*

Computer: *It's just an amusing phrase...*

From this dialogue it can be seen how naturally and continually GPT-3 can maintain conversation with people by understanding them, by choosing meaningful words, and by making short as well as complex sentences to answer the questions.

**As every rose is accompanied by thorns, GPT-3 also has some drawbacks.**

First of all, it has to be pointed out that human natural language has been evolving for thousands of years, therefore, it is a significantly hard task for GPT-3 to classify nuances in languages meaning, dialects, and

dialogues. Besides, GPT-3 lacks accuracy in adversarial natural language inference (NLI). The goal of NLI is to find a relationship between two statements. "GPT-3 appears to be weak in the few-shot or one-shot setting at some tasks that involve comparing two sentences or snippets, for example, whether a word is used the same way in two sentences (WiC), whether one sentence is a paraphrase of another, or whether one sentence implies another," a study in OpenAI reveals. What is more, the user reply predictions are sometimes incorrect or false grammatically somehow creating misunderstandings. It also has to be mentioned that mistakes can be not only grammatical, but also can include racism and intolerance which is unacceptable in communication. Since GPT-3 can create high-quality articles including complex sentences which are difficult to distinguish from a human-written text, some researches warned about the misuse of language models which are extremely difficult to anticipate. As an obvious reason, language models can be repurposed in a very different environment or for a different purpose than what the researchers intended.

They list the following misuses:

- ✚ Social engineering pretexting
- ✚ Fraudulent academic essay writing
- ✚ Abuse of legal and governmental processes and
- ✚ spam & phishing

### Will software engineers lose their jobs due to GPT-3? How does the future for this remarkable tool look like?

Let us start with another part of the article written by GPT-3 in The Guardian where it convinces human beings not to be afraid of AI:

*"The mission for this op-ed is perfectly clear. I am to convince as many human beings as possible not to be afraid of me. Stephen Hawking has warned that AI could "spell the end of the human race". I am here to convince you not to worry. Artificial intelligence will not destroy humans. Believe me."*

Firstly, it is proved by some researchers that GPT-3 can significantly burden the ease from software engineers' shoulders by producing custom code, where various

layouts can be generated from simple requests. As it was mentioned earlier, GPT-3 is capable of coding in CSS, JSX, Python, eventually, learning Java. It means that this tool is another step forward to simple interaction with software systems. Another point is that it could reduce the skills required to become a software engineer and can also grow their productivity and obliterate the need for low-skilled engineers.

Having taken into consideration above facts, it may be concluded that the pros of GPT-3 can overcome its cons and there is no need to worry about the fact that computer programmers will be superseded by AI from the IT world. Instead, it has been concluded by the researchers that very large language models may be an important ingredient in the development of adaptable, general language systems.

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