
ARTIFICIAL INTELLIGENCE: A NEW INCARNATION IN DIGITAL LINGUISTICS

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Abstract: The great invention ever made in the history of mankind is ‘wheel’. Apart from the discovery of fire, mankind invented a lot of useful and harmful things throughout the history. Wheel opened the gates of mobilization as well as the path of intelligence. But mankind was in need of another tool to construct the intelligence over different platforms. Thus ‘language’ was born. Due to mass migration between continents, a matured level language started to evolve into different families. “Secondly, we must realize that language is (and always has been) evolutionary, not static. Change is constantly going on.” (Wood, *An Outline History of the English Language*. P.2). This statement is being reflected after the arrival of Artificial Intelligence in different sectors. It is not a new one and researches had been made during the world war period by Alan Turing who is the pioneer of computer science. That was the starting point where a human language took a new incarnation as ‘machine language’. Initially, dedicated programming languages were used to construct an operating system as well as application software. Gradually, programmers turned their perspective from the position of coding to generating codes automatically without the interference of a man. At present, the evolution of language in AI is in budding stage. Unlike the theory based evolution of a language, this paper is about to explore the importance of digital linguistic in various platforms such as virtual assistant, medical treatment, customer relationship management, business communication, content creation, news report, and education.

Key words:- Artificial Intelligence, Digital linguistics, Large Language Model, Open AI

Introduction: Alan Turing, the great mathematician, pioneer of computer science was working to break the codes of ‘Enigma’ the cipher machine used by Nazis during the World War II. Unlike the modern computer technology, cryptanalysts had to do a lot of calculation to decrypt the codes of Nazi. This segment is completely related to mathematics, but the concept of this cipher machine was secret communication to pass the message without being detected by enemies. Somehow, a language was constructed in numerical aspect in this case. This would be the best example of early usage of language in machines in a different form.

In the early period of first, second and third generation computers, interference of a human as coder was required to channelize the operation in a proper way. Like common people prediction, machine also can perform miscalculation. Even now it is addressed as a technical error, such error cannot be entertained in medical, banking, auto pilot and conducting online exams. So there has to be a proper evolution in the realm of virtual world to attain a complete maturity like languages of humans. In linguistics, sentence generation is not merely addressed as an AI, it is a way more beyond the thing. So that it is addressed as LLM (Large Language Model). Like human brain neurons, millions of data have been interconnected to operate such language model. This is how they work and answer the questions within a millisecond. The mechanism must be as easy as doing google search. In this case, all LLM must behave like the way human performs in language communication. Unlike mechanical, it has to be as 'natural'. In LLM science it is done by 'Natural Language Processing'. Instead of making calculation, language models are constructed to recognize the speech, perform translation, and finally generating the answers or information such as how a human responds to a speaker. Specialists are working hard to make such generative transformers respond like humans. Since they are built through neural network, they are trained and enhanced by engineers. When they attain a matured level, such bots can be used as AI assistants in the field of health, education, entertainment, tourism, and banking. The need of such digital assistants especially in medical field would be a revolutionary one. In banking, customers do not need to depend the bank employees for transactions. This kind of process is done through 'transformer model'. Under this model, input questions are transformed as patterns to respond against the actual context of the input such as 'noun phrase' and 'verb phrase' instead of zeros and ones. ChatGPT, the product of Open AI company is constructed on this transformer model. At present, this is the famous LLM product used by billions of users over Google's Gemini. This AI transformer is highly liked and used by people because of accurate response and behavior like a normal human. Like an OS, it requires many software components, this LLM also in need of multiple layers of components to generate the output.

A New Incarnation in Digital Linguistics

At present the evolution of AI is moving towards to obtain the level AGI that is Artificial General intelligence. This position will make any mechanism to think and respond like humans in real world. This is like adding emotion and conscious over binary codes. Before achieving this great success, history of technology had to take a long period of progress in NLP research. NLP is nothing but Natural Language Processing. After the development of 'Syntactic structures' introduced by Noam Chomsky, generative grammar concept helped to develop this NLP from early period of 1960s. This researcher prompted a query regarding this and received proper response from Open AI. According to OpenAI,

Neural networks are made up of layers of interconnected "neurons" (units), and each connection between neurons has a weight, which determines how strong the

connection is. These weights and neurons are just numbers that are stored in the computer, and at the most fundamental level, they are represented as binary data. (OpenAI, 12 Jan. 2025)

Thus Joseph Weizenbaum created a model ELIZA at MIT. (Liddy, 2001) Initially they used this to run a conversation between a psychiatrist and patient and this ELIZA effect became a milestone of LLP. This process of making an independent AI was continuing over many decades. Like this ELIZA, a company called Creative Labs released a program called Dr. Saitso in 1991. It was a text to speech engine. Like ELIZA this interactive engine was used in psychology by digital psychologist. Unlike modern era transformers, this was merely like primary level text and voice assistant that would work only with limited functionalities. A.L.I.C.E. (Artificial Linguistic Internet Computer Entity) a chat bot based on NLP composed by Richard Wallace in 1995. Almost it was like a predecessor to all modern ai chat bots. It worked well based on interactive methodology with the users. In this line, programmers developed notable AI bots such as SIRI from Apple company, Google assistant from Google and Alexa from Amazon. At present these bots have evolved into many forms for various purposes such as mobiles and laptops are manufactured with AI integrated operating system to smoothen users' productivity and project work. It all happened initially by NLP later by LLM. The mechanism of NLP is fully relying on linguistic structure.

Linguistic Components in Language Processing

The process of developing early stage chat bots were based on Natural Language Processing which can be approached as Natural Language Understanding and Natural Language Generation that are the input methods to train the bots to understand the linguistic components like the way a human child learns. A bot has to be trained with phonology, morphology, pragmatics, syntax and semantics as a scholar learns a structure of a language in university. Apart from sounds and words, a bot must understand the queries from a user in any format of sentence structure like natural conversation. Through syntactic and semantic, a software programme may understand a sentence with proper grammatical structure. The same way it can reproduce answers and scripts without any errors in professional level. This is like a person talks to another one person who share same language. If we ask a human about his breakfast he would share the food name that he had where as if we ask the same to a bot, it has to answer with the awareness that it is not a human but a bot. This is where the concept of understanding starts in their neural links. There are so many components found in the language system such as Phonology, Morphology, Lexical, Syntactic and Semantic. In the process of transferring information from a human user to a bot, proper prompts are required to train them. These practices can be given to these AI bots like the way human share mother tongue to their children. As per the concept of prompting, these transformers are getting data to enrich their language process as human do.

When a child says "I have glass of water", the teacher would correct the error into "I have a glass of water". The more amount of input minimizes the glitches and hallucination error in a chat bot. Its prediction speed would reach the singularity level in future. This is

how indirectly human children learn grammatical structure and rules to deliver error free communication. They learn indirectly about the application of articles, adjective, adverb and so on. In the matured level of training it would connect the concept of common sense like 'bread and butter' not 'bread and curd' to these chat bots. Programmed application softwares are developed by zeros and ones, but that is not suitable in developing a chat bot. It should be constructed based on deep learning that is merely like offering 'consciousness' to non-human things. This is like once God gave life to Adam and let His creation rule the earth. In next level training, chat bots are comparatively trained to distinguish the difference in verbal context like humans. In this level it differentiates the contexts between "My friend is Adam" and "Adam was the first man" that is identifying the word 'Adam' as the name of a human in first sentence and the 'first man' mentioned in the 'Old Testament' in the second sentence. This gift of having consciousness would take these AI chat bots into skeptical level to analyse the problems and the ability of taking decisions without any programmed commands. That's where a man made thing starts to dominate its creators as people crucified Jesus. At present Google Gemini is far better than Apple's SIRI. In the recent updates, Gemini live and Open AI Chatgpt voice chat mode are accurately answer the questions to the users like a normal human. Users are not able to feel that they are making a conversation with a non-human thing. ELSA, Loora like AI based apps are made for spoken English without any human trainers to train the students. There are many controversies around the rapid growth of such technologies, but the way of implementation of these technologies would justify them as human friendly or not.

Rise of Digital Assistance in Industry 4.0

The founder of Tesla, Inc., SpaceX, Neuralink, and many more companies is Elon Reeve Musk. His BCI that is 'Brain-Computer Interface' chip is the first successful foreign body material implanted inside human brain and produced reliable results. If this chip achieves its full potential, it can be a gate way to offer vision power to visually challenged people who was born as blind. This can happen in future and it should not be registered as a miracle as described in Holy Scriptures. Such technologies are like the offering of 'fire' from Prometheus. Their applications can become potentially useful when they eliminate the problems of mankind. In this modern era, gradually various platforms start to embrace such artificial intelligence technology to overcome their obstacles. In the name of endeavour, LLM takes the role of digital assistance in the field of medical, finance, defence, space research, IT and education. From the paper "Analysis of large-language model versus human performance for genetics questions," *medRxiv* by D. Duong and B. D. Solomon, questions were set and asked to ChatGPT in the field of genetics. "as we noticed that ChatGPT would typically answer ~10-15 questions prior to ceasing to respond further. Each question was accompanied by four possible answers, only one of which was correct" (p.4). But the response level from ChatGPT does not make any major level difference from the answers of a human expert. There is a distance to surpass the experience of a human expert for such bots. They received best answers from the questions based on memory related not from critical thinking. Apart from any other fields, the use of LLM and its applications in education industries are found in large level. In research paper writing such AI tools are used

to generate the content as well as to identify plagiarisms. “Chat PDF allows the uploading of PDFs to its website, where you can then ask it questions about the content and conduct a semantic research” (p. 10 Nguyen-Trung et al.).

In the year March 2023, Chat GPT-4 from Open AI was released. In the process of developing this product, the company gave access of their product to notable Edtech companies. They are ‘Duolingo’ and the famous ‘Khan Academy’. This is a considerable initiative towards AI driven education system in future Indian higher education. The first company ‘Duolingo’ applied this LLM under content creation like generating questions for online tests. They tried other types of LLMs also such as BERT, BART and T5. Each model performed well in different tasks like filling the gaps between the texts, translation, error correction, and summarisation. The dawn of LLM has opened innovative industries as well as shut down many roles like content writer, copy writer in Industry 4.0. In engineering, present era students prefer ‘Data Science’ ‘Artificial Intelligence’ and ‘Prompt engineering’ over traditional engineering courses. Behind the creation of LLM, the contribution of prompt engineering is inevitable. In future, the role of prompt engineers will be more important to take the AI into AGI. The concept prompt is not about training the bot but developing the bot to talk and respond as a fellow human. In this case, users can experience various results blended with issues like a child commit errors in language delivery. Present users use ‘prompts’ by asking questions through text based prompts. It is evolved as performing prompts to generate images, lengthy videos, PPTs and many more non-verbal outputs. All such things can be performed by simple texts. It is not necessary to upload a picture or any other file to make the same file format output. Digital AI tools like Adobe Firefly, Canva, Leonardo AI, Midjourney, and Dall-E have reduced the burdens of educators from making PPT slides, study materials and question and answers by spending hours. However these digital linguistic AI tools must not be considered as a replacement to a research scholar. To avoid this issue, some institutions banned using AI tools in their campus. In Edtech industry, these tools are like a boon for educators who can make hassle free course contents.

Current Limitations of LLM

Human race evolved from sign language to text based language through thousands of years. This evolution took millions of years to reach the perfection level. The same way, engineers developed LLM from scratch level to matured level. In this process, like a child, these language models are trained through trial and error method. Such downsides are considered as limitations in this category such as misunderstanding, hallucination and glitches. A book in physical format, news paper, recorded tv shows may have mistakes and errors. These issues can be resolved by humans since they have control over them. But, in LLM case, no one has the control over the live text generation. If there is a wrong answer in suggesting a medicine that would take the life of a patient, a wrong word about marginalized people would confuse and make a child misunderstand about the society. If two children are watching the play *Romeo and Juliet*, they can describe the genre of the movie is fictional and romance. But it will take years to them to understand the concept of love in actual context. They cannot express the right context of love since there is no heart to them. They can

distinguish the difference between tragedy and comedy based on the volumes of stored data, but they could have never experienced pity, sorrow, agony and pain as human experienced. However, developers could stop these issues but it reflects the harsh realities of the poor society that practices discrimination. When the users are not genuine, these tools are like a knife that can be used to cut fruits as well as to destroy the life of a person. It is important to learn how and why such hallucination occurs in LLM. When a user raises a question, ChatGPT -4 uses its data base to offer right answers and generate own sentences like writing paragraphs. Sometimes, there would be some gaps in its database due to some restrictions from developers' side. In this case, LLM generate answers based on assumptions and misleading database. Every invention was treated as a threat initially by the common people as they were not aware of how to use them in effective way. Like this, these digital assistances would be treated in friendly manner rather than a threat in future.

Conclusion: The process of nature is to create, control and destroy. Same way our mankind's nature is also creates a life or a thing to reach their level of knowledge as a creator. It took many years to reach from steam engine to petrol and diesel operated engines. It took few years to produce nuclear power engines. But in the age of Industry 4.0, it takes few months or weeks to attain the next level improvement in the field of AI. Few years back, SIRI from Apple, Inc. was one of the notable AI assistant for their users. But now users have plenty of options to choose such as Chat GPT, Google Gemini, Microsoft Copilot, Meta AI and many more. In the current era, humans are essential for determining 'what' needs to be done, while machines can assist with the concept 'how' provided people remain in control. Those who can effectively balance knowledge and the skills can utilize the technological inventions effectively in any level of demand. Historically, technological advancements have replaced or removed the role of workers at first but ultimately led to the creation of new job opportunities. Among these situational changes there are things to consider such as layoffs in major tech companies. During the Covid-19 pandemic, number of edtech and OTT companies hired thousands of developers and they were fired nearly at the end of 2023. As technology continues to evolve, we can expect the emergence of new jobs that we can't yet imagine. In the past, highly valued things and tasks become valueless and simple nowadays. People do not need to memorize the phone numbers in their contacts. There is no need to read hundreds of books to win in a quiz or competitive exam. A student can use a bot to pick out important points from a text book and summarize them. Moreover automated MCQs can be generated for continuous practice to crack any exams. Competence is now measured by critical thinking, creativity, and the ability to argue. As technology advances, we will have to keep adjusting our understanding of what makes us competent.

In a world of intense competition, it's crucial to recognize that every individual has unique talents. Career decisions should be chosen based on the personal strengths and instincts rather than societal expectations. This alignment will not only help to love the chosen work, but it may also distinguish humans from AI tools like ChatGPT. There is an old story about Albert Einstein's chauffeur who was once asked to give lecture instead of his boss. When audience raised deep level of questions, chauffer made an option that his driver

was enough to reply to such questions. Like that chauffeur, large language models (LLMs) process information derived from human thought but lack the hands-on experience of an expert who created that knowledge. However, no individuals can hold the vast scope of knowledge that gives resources to tools like ChatGPT. The future lies in finding ways for machines to meet human capabilities rather than making a replacement to them. The younger generation who are not influenced by traditional and outdated ideas of technology could soon learn and utilize these innovative technologies in their day to day life. Soon in education, beyond the need of content creation, lesson planning, these technologies would ease the process of setting question papers, conducting flawless examinations and also doing evaluation. However, they cannot be considered as a replacement for teachers, because the practice of moral values over unethical things can be taught and guided by teachers only.

Works Cited:

- Desk, Education. "Will We Lose Jobs to AI? Are Such Fears Well Founded? IIT Madras Professor Explains." *The Indian Express*, 28 Apr. 2023, indianexpress.com/article/education/a-lesson-from-iit-will-we-lose-jobs-to-artificial-intelligence-are-such-fears-well-founded-iit-madras-professor-explains-jee-main-2023-8578288.
- Duong, Dat, and Benjamin D. Solomon. "Analysis of Large-language Model Versus Human Performance for Genetics Questions." *medRxiv (Cold Spring Harbor Laboratory)*, Jan. 2023, doi:10.1101/2023.01.27.23285115.
- Liddy, E.D. "Natural Language Processing." *Encyclopedia of Library and Information Science*, 2nd ed., Marcel Decker, Inc., 2001.
- Nguyen-Trung, Kien, et al. "Applying ChatGPT and AI-Powered Tools to Accelerate Evidence Reviews." *Human Behavior and Emerging Technologies*, vol. 2024, no. 1, Jan. 2024, doi:10.1155/2024/8815424.
- OpenAI. *ChatGPT*, 12 Jan. 2025, www.openai.com/chatgpt.
- Wood, Frederick Thomas. *An Outline History of the English Language*. 1954.