

Know Your Patient with LLMs

Clinical Natural Language Technology for Health Care has been growing at a fast pace, and with the introduction of LLMs, there has been a surge in application of AI to solve problems that need repetitive human effort. This solution focuses on using LLMs to know more about a patient, using data from various sources in the clinical setting. Further, we discuss the use of LLMs in trying to assist clinicians and patients in providing the best care for the patients.

Market Trends, Technologies and Possible Opportunities

LLMs

LLMs are now able to achieve more than human level understanding of languages in some cases (Brown, 2020), thus being very helpful in cases where there are multiple languages, styles, or dialects involved. In a clinical setting, this could mean being able to speed up the understanding of clinical reports and other patient data. Some of the initial concepts from NLP based on *tf-idf* (Ramos, 2003) have now grown into models that can use billions of parameters and understand context better than ever.

Uses

From generating transcripts for audio (Radford, 2023), text from images (OCR), to summarization tools (Pu, 2023), LLMs have changed the playground for AI in the clinical setting. The proposed use case handles textual data, which can be in an unstructured format, and can be converted to a human-readable format, and be used to grab subsets of relevant data.

Fine-tuning and Prompts

With the open-source LLMs being where they are in terms of scale, starting from scratch essentially means rebuilding the wheel. The best approach to handling a specific business case would be to use the open-source pre-trained models, and fine-tune them using the available data

for the business. For example, to generate bills using an LLM, a lot of billing data along with services provided could be used to train how to generate correct bills for the provided services. Similarly, lots of clinical documents could be fed to LLMs for them to understand those better, and be able to generate better summaries. Along with the fine-tuning, prompt engineering plays a major role. Small changes, for example using “Give me a clinical history of the patient” vs “Give me a complete clinical history of the patient” can result in different results, the first one generating more of a summary, and the second one being more detailed.

Possible problems

As with any technology, there is a chance that the tool is misused - either by patients to avoid doctor visits, or by healthcare providers to become completely reliant on the AI model output rather than cross-checking with their previous knowledge. LLMs aren't perfect and sometimes “hallucinate” (Huang, 2023), although in cases of text summarization, it is rare. Generating the relevant risk factors from patient history would be harder and those prompts and models would have to be designed more carefully, along with presenting results as suggestions instead of answers.

Possible actions for Cotiviti

Cotiviti, with their advanced knowledge base of the healthcare system in the US, could pioneer end-user solutions based on fine-tuned LLMs that can provide value to the healthcare providers as well as the patients. The patient tools could be limited to seeking help for symptoms and knowing what to look out for risk-wise. The healthcare provider tools could be more expansive, with options to know specific details about the patient's case without having to go through hundreds of records, as well as being able to get suggestions on risk factors and things to look for, supplementing their expert judgment in some cases.

References

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