Novel Utilization of Large Language Models in Care Delivery

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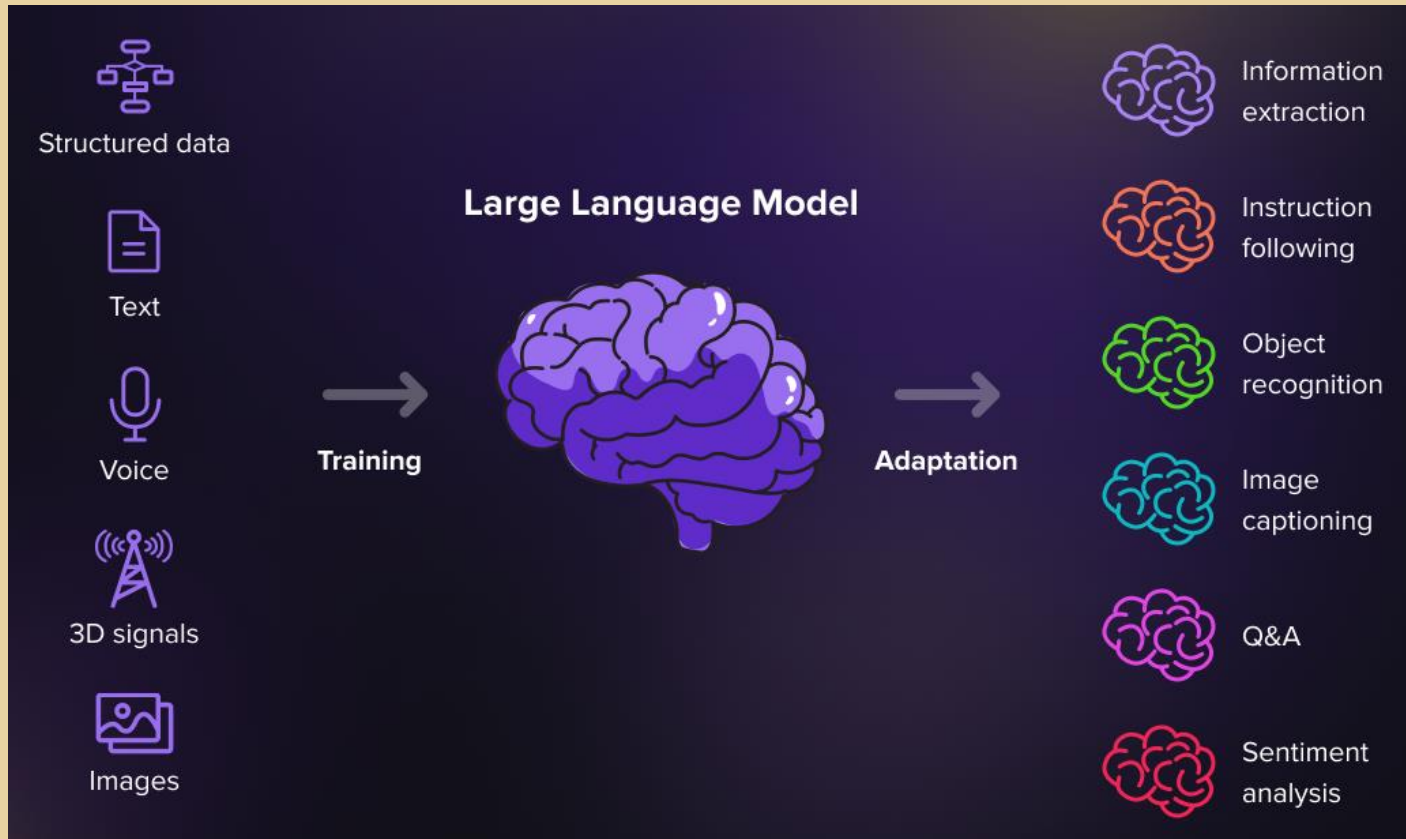Associate Professor of Cardiology, University of Washington, Seattle WA

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Overview

> **What are large language models (LLMs)?**

> **Clinical applications**

> **Limitations/caveats/pitfalls**

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What are LLMs?

RESEARCH ARTICLE

Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models

Tiffany H. Kung[1,2], Morgan Cheatham[3], Arielle Medenilla[1], Czarina Sillos[1], Lorie De Leon[1], Camille Elepaño[1], Maria Madriaga[1], Rimel Aggabao[1], Giezel Diaz-Candido[1], James Maningo[1], Victor Tseng[1,4]*

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Computer Science > Computation and Language

Towards Expert-Level Medical Question Answering with Large Language Models

Karan Singhal, Tao Tu, Juraj Gottweis, Rory Sayres, Ellery Wulczyn, Le Hou, Kevin Clark, Stephen Pfohl, Heather Cole-Lewis, Darlene Neal, Mike Schaekermann, Amy Wang, Mohamed Amin, Sami Lachgar, Philip Mansfield, Sushant Prakash, Bradley Green, Ewa Dominowska, Blaise Aguera y Arcas, Nenad Tomasev, Yun Liu, Renee Wong, Christopher Semturs, S. Sara Mahdavi, Joelle Barral, Dale Webster, Greg S. Corrado, Yossi Matias, Shekoofeh Azizi, Alan Karthikesalingam, Vivek Natarajan

Hybrid Value-Aware Transformer Architecture for Joint Learning from Longitudinal and Non-Longitudinal Clinical Data

Yijun Shao [1,2,*], Yan Cheng [1,2], Stuart J. Nelson [1], Peter Kokkinos [1,2,3], Edward Y. Zamrini [1,2,4,5], Ali Ahmed [1,2,6] and Qing Zeng-Treitler [1,2]

Computer Science > Computation and Language

Foresight -- Generative Pretrained Transformer (GPT) for Modelling of Patient Timelines using EHRs

Zeljko Kraljevic, Dan Bean, Anthony Shek, Rebecca Bendayan, Harry Hemingway, Joshua Au Yeung, Alexander Deng, Alfie Baston, Jack Ross, Esther Idowu, James T Teo, Richard J Dobson

Clinical applications

> **Risk stratification/prognostication models**

> **Clinical decision support algorithms**

> **Automating repetitive tasks, e.g. administrative tasks like discharge summaries**

> **Simulated clinical trials**

> **Automatic integration of multimodal data for clinical* and administrative purposes**

extensive validation needed

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Limitations

> **Ethical concerns**

> **Perpetuating bias in clinical care, med education, research design**

> **Black box nature**

> **Cost and environmental burden/carbon footprint**

> **Cheap imitation models – questionable reliability**

> **Hallucinations (*or perhaps "fabricating information"?*)**

Hearing it from ChatGPT itself

Q: When I ask you to generate new text, are you coming up with the ideas yourself or just repackaging previously written works?

A: [...] I do not come up with the ideas myself. Instead, I generate text based on patterns and relationships within my training data. This means that I am essentially repackaging previously written works, based on what I believe to be the most probable continuation of the given input text.

A: As an AI language model, I do not have a built-in filter to determine the correctness of my output."

R. Azamfirei, SR. Kudchadkar, J. Fackler. Critical Care **volume 27**, Article number: 120 (2023)

Thank you!