Healthcare conversations with robots and AIs

Prof Oliver Lemon
Academic Co-Lead, National Robotarium
@oliverlemon

LLMs

"Large Language Models"

"Generative AI"

"Foundation Models"

Image: Nathan Lambert

The coming wave: generative AI

- Generative AI and large language models (LLMs) are powerful new technologies that have the potential to revolutionize healthcare.

- LLMs can be used to provide tailored health information, summarize complex medical information, automate administrative tasks … analyse medical images …

- Providing a **conversational natural language interface** to very large amounts of data

- **Following instructions** given in conversational language

Conversational interactive search

Instruction-following

write a short email explaining the NHS procedure for handling children who have a severe headache

View other drafts ⌄

Dear [Recipient Name],

If you or your child has a severe headache, it is important to seek medical attention immediately.

If your child's headache is accompanied by any of the following symptoms, call 999 or go to the nearest A&E department:

- High fever

- Stiff neck

- Drowsiness or confusion

- Vomiting

- Blurred vision or double vision

- Seizure

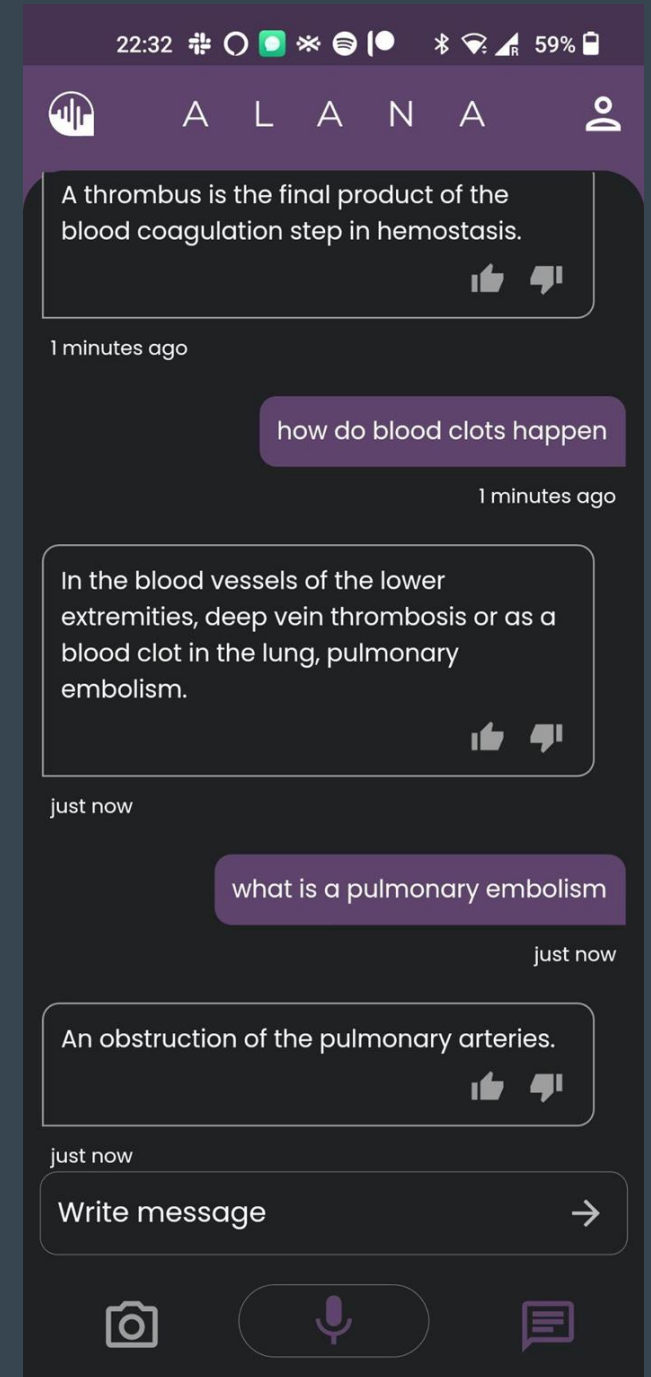- Weakness or numbness in the face, arms, or legs

The peril and promise of generative AI

- "Hallucination" and safety
  - Generated text can be persuasive and believable, but wrong
  - → lots of work on e.g. "Retrieval-Augmented Generation" for documents
- Bias
  - Models can be trained on discriminatory data → restrict to trusted data sources
- Privacy and security
  - Health data needs to be secured, anonymised for model training
- Job displacement
  - AI can augment or replace (?) specific job functions
  - Integrate AI into existing workflows and practices
  - → Generative AI needs to be developed as a "co-pilot"
- → urgent need to form partnerships between AI and medical practitioners
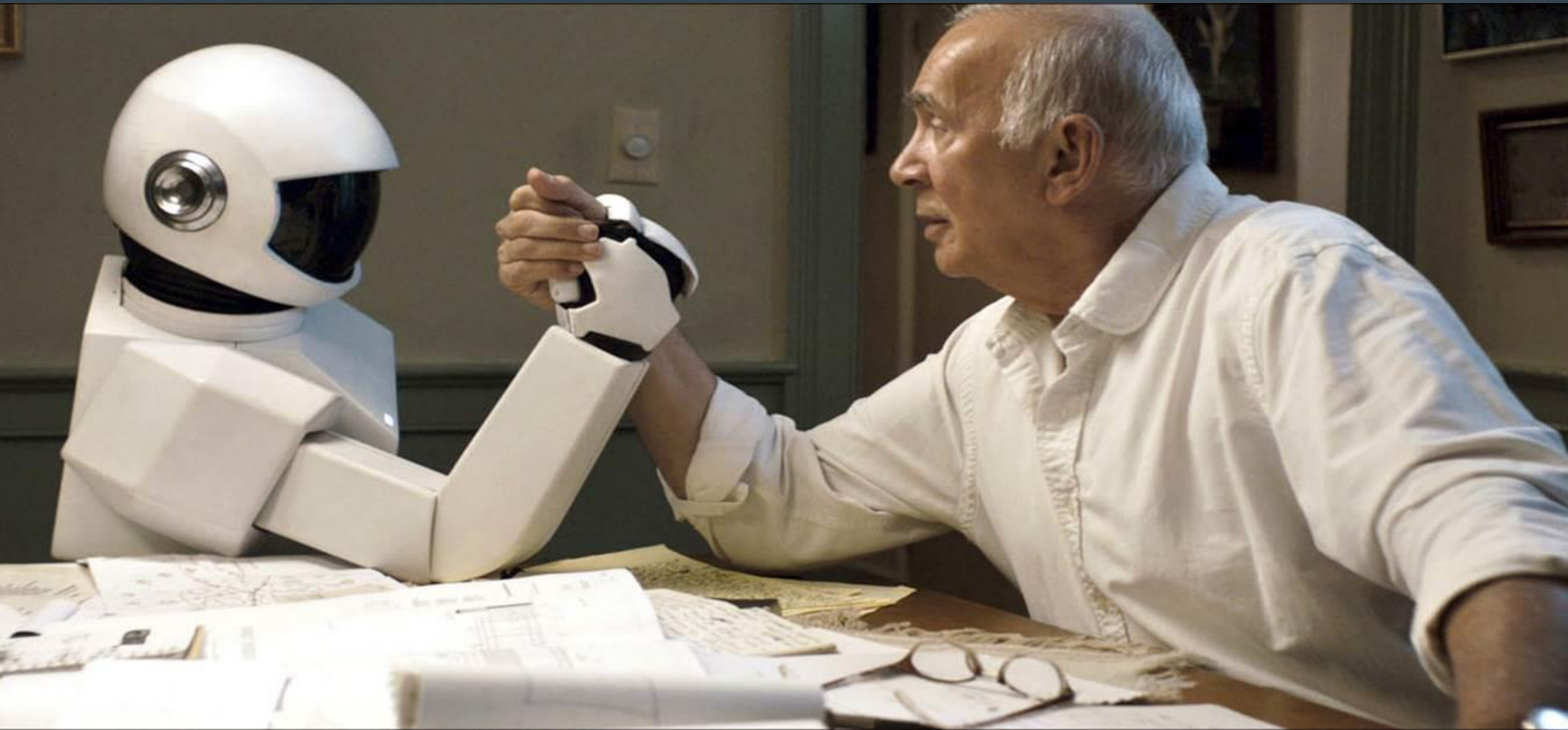
Gen AI in Scotland: Alana AI

- Spin-out of Heriot-Watt University

- EC Horizon project RESQ+: stroke care: www.resqplus.eu/
  - Conversational app for recovery tracking (mRS) and patient QA
  - Testing mobile app in Glasgow and Belfast
  - Conversational search of hospital data + visualizations

- Partnerships with NHS
  - AI copilot for admin tasks, comms, document summarization, guidelines …
  - Visual question answering on medical images

UK NATIONAL ROBOTARIUM

Robot and Frank (2012)

Embodied AI

- LLMs generate language + expressions
- Provide patient info
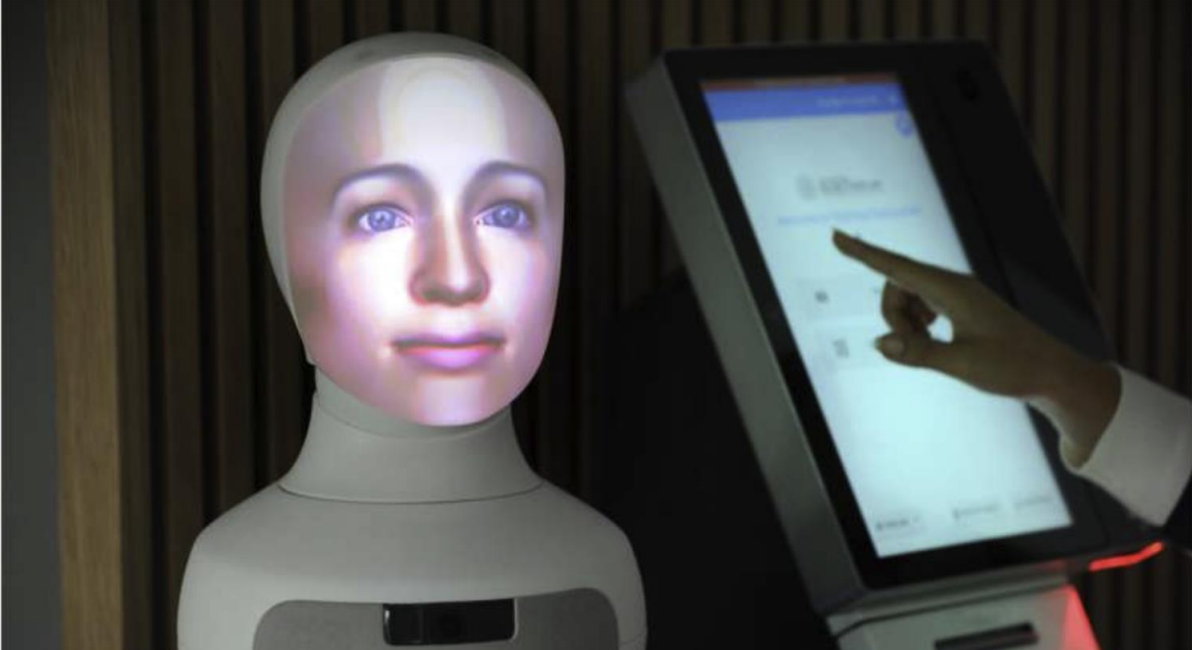- Speech input / output
- Handling multiple people in conversation

Home / Robotics
Home / Machine learning & AI

SEPTEMBER 13, 2023 **FEATURE**   Editors' notes

An embodied conversational agent that merges large language models and domain-specific assistance

by Ingrid Fadelli , Tech Xplore
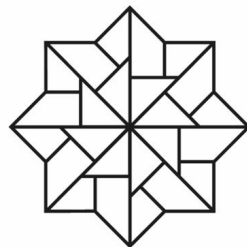
EU SPRING H2020 Project

LLM conversational help for patients, embedded within an ARI robot in a hospital memory clinic.

Broca Hospital, Paris

Currently being used by patients (speaking French!)

Summary : danger or opportunity ?

- A new wave is here / the genie is out of the bottle

- Significant opportunities in healthcare applications of conversational AI, LLMs, foundation models etc

- But many pitfalls

- → Risks need to be balanced

- Question: how to collaborate to realise the opportunities and mitigate risks?

  - → Data partnerships. Co-design.

THE NATIONAL
ROBOTARIUM
PEOPLE CENTRED :: INTELLIGENCE DRIVEN