Best Practices for the Development of Generative AI Tools in Healthcare

Large Language Models (LLM)

DESIGN

- Identify the **need** and evaluate the **suitability** of a generative AI tool, by analysing the state of the art and its expected impact
- Incorporate **explainability** features and mechanisms to facilitate **human supervision** of the tool
- Anticipate compliance with **data protection regulatory** (GDPR, ENS, etc.) with impact assessments (DPIA) and mechanisms such as anonymisation or advanced encryption
- Define **measurable goals** and specific functions to prevent deviations from the intended use (*functional creep*)
- Define the **data** to be processed by the tool, determine whether it includes sensitive data, and map its flow through the different system components
- Plan in advance the classification of the tool as a medical device, its risk level and the **necessary certifications** (European AI Regulation, MDR/IVDR, GDPR, etc.)

DEVELOPMENT

- Select the **most suitable model** according to its license type (commercial/open source), degree of specialization (general/customized), size (LLM/SML) and location (local/remote)
- Adopt a **modular structure** that facilitates updating the tool with minimal disruptions
- Apply the most suitable **adaptation techniques** (*prompt engineering, RAG, fine-tuning*), balancing the expected performance and required resources
- Consider using **local models** to simplify data protection
- Consider model **compression techniques** (*distillation, pruning, quantization*) to reduce costs and enable efficiency, scalability and sustainability

EVALUATION

- Combine **objective metrics** with **standardised qualitative assessments** to validate the tool and ensure its quality and security
- Apply techniques to identify and mitigate **biases** and **hallucinations**
- Ensure the **representativeness** and **fairness** of the data to prevent discriminatory bias
- **Compare the tool** with existing procedures to quantify improvements in **performance** and **efficiency**

DEPLOYMENT

- Develop a **training plan** to instruct users on the proper use of the tool
- Define an **update plan** to incorporate technical advances, new medical knowledge, additional data and changes to regulatory standards
- Guarantee **compatibility** and **interoperability** with existing workflows and technological systems
- Establish mechanisms for **monitoring** and **continuous evaluation** to ensure optimal tool performance and alignment with the original objectives

MORE INFORMATION:

Complete guide to Best Practices for the Development of Generative AI Tools in Healthcare – LLM

Website of Health/AI Programme

Generalitat de Catalunya