

Development of a Model Context Protocol (MCP) layer to use AI Agents in medical imaging data management and discovery



Research Line: Biomedical Imaging Research Infrastructure
Project type: Bachelor or Master Project
Approx. duration: 6 to 9 months

Background Medical imaging research repositories commonly rely on XNAT [1] to store and organize imaging datasets and associated metadata. The amounts of data sometimes make it daunting to interpret the data. An AI agent based on Large Language Models (LLMs) can help answer meaningful questions about the data on an XNAT server and perform curation basic tasks.

However, before AI agents can interact with XNAT, XNAT's functionality must first be exposed through a standardized tool interface. XNAT offers a REST-API for programmatic access to the database. To make it easier for python users we created the XNATpy [2] package. But there is currently no mechanism that exposes XNAT/XNATpy in a manner directly consumable by AI agents. One emerging approach is the Model Context Protocol (MCP) [3,4].

Proposed Solution In this project, we propose to create a MCP layer for XNAT/XNATpy to communicate with an AI agent. To validate functionality, a test agent should be used to answer questions about the data on XNAT the user has access to and help with simple data management tasks.

Objectives

- Create an MCP for XNAT/XNATpy
- Test and validate MCP functionality by connecting to a simple AI agent.
- Enable the AI agent to perform simple data management tasks on the user's behalf.

Who are we looking for? We are looking for a student who enjoys working with modern technology and is not afraid of getting his/her hands dirty with programming. In the project you will have the freedom to design and implement the MCP and AI agents by yourself with supervision from experienced research software engineers. You are a student in a computer science or AI related fields and are in the final stages of your Bachelors or Masters.

References

1. <https://xnat.org/>
2. <https://gitlab.com/radiology/infrastructure/xnatpy>
3. <https://www.anthropic.com/news/model-context-protocol>
4. <https://modelcontextprotocol.io/docs/getting-started/intro>



Interested in this project?

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