Project Background

Qualcomm is the connected processor company for the intelligent edge with leadership in wireless connectivity, RF front-end, high-performance, low-power computing, multimedia, and on-device intelligence. Within the Test Base Station Project we design internal custom, integrated cellular call flow test boxes that rival or exceed capabilities of external third-party solutions. The project has over 200 Engineers worldwide and has deployed over $200 million of equipment for 5G wireless verification. The team supports a product portfolio that includes 3G, 4G, 5G, and V2X products.

Customer support is provided to this product portfolio of over 2000 systems leveraged on a daily basis throughout the global company.

We are excited to invite students to participate in an innovative project aimed at integrating a Generative AI-based chatbot into our cutting-edge GUI application. Our application leverages modern frameworks such as TypeScript, ReactJS, and FastAPI to deliver a seamless and interactive user experience. This project offers a unique opportunity to work with advanced technologies and contribute to the development of a sophisticated AI-driven feature.

Project Description

Objectives:

- **Integrate a Generative AI-based chatbot** into our existing GUI application.
- **Enhance user interaction** by providing intelligent, context-aware responses.
- **Utilize modern frameworks** (TypeScript, ReactJS, FastAPI) to ensure smooth integration and optimal performance.
- **Improve overall user experience** by adding a conversational interface that can assist with various tasks and queries.

Key Responsibilities:

- **Design and implement** the chatbot interface within the existing GUI.
- **Develop and integrate** backend logic using FastAPI to handle chatbot interactions.
- **Ensure compatibility** with TypeScript and ReactJS frameworks.
- **Test and optimize** the chatbot for performance, accuracy, and user satisfaction.
- **Collaborate with the team** to understand requirements and deliver a high-quality solution.

Some examples of Chatbot interactions:

- **Querying about station configuration**: Users can ask the chatbot for details about the current station setup and its capabilities.

- **Installed software packages and compatibility**: The chatbot can provide information on installed software and check compatibility with other packages.
- **Troubleshooting station problems**: Users can describe issues, and the chatbot will offer troubleshooting steps and solutions based on station specific configuration and logs.
- **Combining station-specific knowledge with a larger knowledge base**: The chatbot can leverage both local and broader knowledge base hosted on an internal Qualcomm server to provide comprehensive answers.

Development and product operations will take place on Redhat Linux machines and servers. Code repositories are hosted on local git-based servers.

Development should adhere to best practices, including writing unit tests, following industry coding standards, and suitable internal packaging. Qualcomm uses Gen AI tools for code generation, unit tests, and documentation that improve developer productivity. Developer cycles are coordinated with the Qualcomm team leveraging software sprints and progress tracked in JIRA.

Students will gain hands-on experience with **state-of-the-art technologies**, get to contribute to a **real-world project** with significant impact, and enhance their **portfolio** with a cutting-edge AI feature.

The chosen team will collaborate extensively with Qualcomm Engineers in the Boulder office and at various other sites. The team will review existing documentation to understand the tool, its functionality and APIs. To facilitate support, the team will learn the previous processes for downloading the logs, reviewing them, and use their experiences to improve the functionality of the tool at the direction of the Qualcomm team. Subsequently, they should coordinate with Qualcomm Engineers to establish the scope, outcomes, and timeline. Furthermore, the team is expected to submit a High-Level Design document detailing their approach before starting the development phase. They should suggest suitable technologies for the project's execution. The final product developed must be complete with all the features and ready for immediate use by Qualcomm personnel.

Desired Skill Set

- Web Interface Design Experience
- One or more of the following
    - Proficiency in TypeScript/ReactJS
    - Proficiency in Python3.
    - Experience with FastAPI or similar backend frameworks.
    - Knowledge of Generative AI technologies, Prompt Engineering, RAG, and chatbot development.
- Familiarity with git and working in github environment.
- Strong problem-solving skills and attention to detail.
- Ability to work collaboratively in a team environment.

Preferred Team Size

Initiating with three people is ideal. Availability of additional resources would allow us to broaden the project's reach.

Location

The Qualcomm TBS project will provide support mostly locally from the Qualcomm Boulder and Bridgewater NJ office. Remote work is the expectation with possibilities of on-site for key needs or discussions.

Resources

Qualcomm intends to open a remote development environment with sufficient compute and virtual desktop portables for all required development.

Contact

Email Kevin Wolver at kwolver@qti.qualcomm.com for high level project questions. If selected, other engineers will be made available for guidance, leadership, and mentoring.

Background

TBS = Test Base Station