COMP39/9900 Computer Science/IT Capstone Project
School of Computer Science and Engineering, UNSW

Project Number: P26

Project Title: Health software for managing disease, rehabilitation and controlling medical devices

Project Clients: Professor Nigel Lovell

Project Specializations: Software development; Web application development; Mobile application development; Artificial Intelligence (Machine/Deep Learning, NLP);Big data analytics and visualization; Robotics; Bioinformatics/Biomedical; Cloud computing.

Number of groups: 2

Background:

As part of the Tyree Institute of Health Engineering (IHealthE) we have been developing web apps and backend clinical portals and databases for numerous health applications. This description is meant to broadly describe the scope for >3 such health projects.

You would be supported by our IHealthE software foundry that has two post-docs (Dr Peter Brown and Dr Reza Argha) working in it, along with half a dozen front and backend software developers, some with decades of experience developing medical software.

Requirements and Scope:

Project functional requirements would be co-designed with the student groups, clinicians, other stakeholders and the IHealthE software foundry team. At this stage we have potentially four projects around:

- use of React for development of a full featured app to control soft biorobotic devices with one application being for control of a compressive sleeve for people with painful lymphoedema.
- use of React and deep learning approaches to develop an app for human pose estimation for virtual remote rehabilitation.
- full-stack development to integrate a system called StandingTall (comprising a suite of over 6000 rehabilitation exercises) with our current telehealth system that is being used for monitoring chronic disease in SE Sydney Local Health District
- use of Unity for development of AR/VR systems for haptic control of soft biotic devices and for surgical training and exploration
- development using node.JS of a comprehensive clinical portal and database for managing people with artificial heart pumps including capturing and display of data from patients implanted with such pumps.

Required Knowledge and skills:

Those working on front end mobile apps would require skills in React /React Native.

Most of our backend development work would be in Python/Django but some projects may use node/JS or other tools. Typically, we would deploy our systems on the Microsoft Azure Cloud.

Expected outcomes/deliverables:

Source code on our repository with appropriate documentation.

Some projects that would involve working with our existing code bases and industry/health partners may require the students to sign non-disclosure agreements and relinquish any ownership to intellectual property and code as a requirement of working on the project.

Supervision:

Dr Peter Brown and Dr Reza Argha

Additional resources:

TBC