Multi-layer Healthcare System

University of California, Irvine March 2020

1 Project Description:

Internet of Things enabled healthcare providers a connection between things (i.e., wearable and environmental objects) to enhance healthcare services and subsequently the quality of life. Heterogeneous medical and environmental data (e.g., vital signs, physical activity, and environment data) can be collected continuously via various sensors. Lifelogging and event monitoring provides an additional source of context to the collected data that can be used in various analysis. These sets of projects aims to collect data from different populations (Pregnant women, College students, etc.) and provide health benefits to them using ubiquitous monitoring and micro intervention.

Backend is responsible for all data storage, processing, and control of the data flow. The backend is developed with Python in Flask platform. It also uses technologies like Celery and MongoEngine for task scheduling and hibernate.

The webapp serves us as a gateway between the devices we have and the server. Also, it is a platform for us to communicate to the participants about their well being and interventions. The Web Application is developed using Angular platform and later it was adopted to a mobile application using Cordova.

Admin dashboard is the place that researchers, health providers, care givers, and doctors can use to view participants data, analyse them, and choose the proper intervention method to enhance their input or help the participants.

We use a Samsung Gear Sport watch for our data collection. The watch can collect raw and processed data for us. In this project we use our own app to collect data from the watch. This app needs to be efficient in terms of energy and also needs to be smart on collecting more useful data.

2 Learning Objectives:

1. Study:
    - Internet application engineering
    - Enterprise application development
    - Data optimization
2. Implementation:
    - Full-stack front-end and back-end development
    - Database monitoring and optimizationn
    - Machine-Learning and data analysis for recommendation system

3 Design tool used (include but are not limited to):

- Python / Flask
- JavaScript / Typescript / Angular / HTML / CSS
- C / C++ / Tizen

- MongoDB