Phase 1: Proposal

Team 25
Noel Kim (862240271)
Solomon Lim (862211962)

Edge Computing System: Home Patient Monitoring System

Case: A problem we are trying to solve through our edge computing system is giving care to patients outside hospitals and medical facilities in their own homes. Patients with serious health conditions or long term health problems that require constant care and monitoring are limited to staying at medical facilities to receive the care they need. This can be quite inconvenient and costly as patients would not have the freedom, privacy, and confirmability they have compared to being at home. Our system works to get rid of these problems by bringing the required medical care into patient's homes. In doing so some challenges we face are related to privacy, security, reliability, and accuracy. We want our system to be private and secure inorder to lower interference in a patient's daily life. We also want our system to be reliable and accurate inorder to provide patients with the same quality of care they would get from medical facilities.

Industry: Healthcare

(a full-scale solution to the problem you are describing, this should be beyond the scope of your demo)

Solution:

Wearable Devices:

- Patients would be equipped with advanced wearable technology that keeps track of vitals. The wearable devices would also have an integrated system that alerts nearby hospitals and emergency services.
- It also would have a real-time communication system that connects you with hospitals or emergency services once an anomaly is detected within the patient's health.

Environmental Sensors:

- The environmental sensors would monitor temperature and air quality to ensure an overall protective and healthy environment for the patient.
- Provide information to the system that'll help the system correlate the patient's health with the environment.

Advanced Learning Monitor:

- The system would also constantly learn from the patient's monitored data and past medical history to adapt the system to best fit the patient's situation.

Demo: The monitoring system would consist of environmental sensors and wearable sensors that would be placed within the patient's home in order to monitor vital signs like heart rate, blood pressure, etc. The edge computing devices would process the data it receives from the sensors in real time in order to immediately detect anomalies or emergencies. The system would then alert nearby hospitals or emergency services to provide immediate care to the patient. In addition to all this, the system would also have a real-time communication system embedded within the sensors which would allow the patients to communicate on real-time.

Task Distribution:

- Edge: The edge layer will be incharge of processing and updating data of the patient. There will be edge devices that will process the data they receive from the monitoring devices of the patients to check for anomalies or any other problems based on the real time data it processes. The edge devices would also function to send an alert when detecting a problem to a healthcare provider.
- Fog: The fog layer will be incharge of collecting and assigning data among the edge devices. It will collect data from the edge devices for a comprehensive analysis inorder to identify health threats. The fog layer can also act as a temporary/short term storage for the patients health data to be stored as a backup for technological issues.
- Cloud: The cloud layer will be incharge of storing data of the patient for access to healthcare providers for further treatment and medical care. The cloud layer would also provide much more in depth medical analysis to provide the best possible monitorization of a patient as well as predicting any potential health threats based on the patients data.