PRIORITY BASED TASK SCHEDULING FOR HEALTHCARE IOT USING EDGE COMPUTING

23CSE362 Edge Computing

24_HeartAttack

Edge Team Members:

CB.SC.U4CSE23443: SIDHARTH S NAIR

CB.SC.U4CSE23448: SRIJA K

CB.SC.U4CSE23449: SUHAS NETHI

CB.SC.U4CSE23465: SISTHICK S

CI Team Members:

CB.SC.U4CSE23625: K CHAKRESWAR SIVA KUMAR

CB.SC.U4CSE23635: NANDIGAM PRAKYATH

Referenced Research Paper:

Title: Priority-based task scheduling and resource allocation in edge computing for health monitoring system

Authors: Zubair Sharif, Low Tang Jung, Muhammad Ayaz, Mazlaini Yahya, Shahneela Pitafi

Published in: Journal of King Saud University – Computer and Information Sciences

Queries:

1. What is the use of priority queues in our simulation?

   Currently we are not scheduling the tasks in the edge and cloud device that we created due to some issues in the iFogSim2 modules. So, in order to simulate the tasks in the devices we are using priority queues temporarily

2. Is there some other prioritization among the k value assignment function and the ml model??

   The k value and the m value are the sole prioritization mechanism used by the priority assignment unit and the ML model. The k value acts as the primary priority value based on which scheduling takes place while the m value depends on the parameter causing the k value and acts as a tie breaking mechanism in instances of same k values

3. What exactly is the 'task' being executed?

   A 'task' in the context of the research paper can mean anything from triggering alarms, increasing medicine amounts, allocation of various health devices, etc. Since the research paper focuses on scheduling the tasks properly and reducing latency and execution time instead of allocation of resources, we provide dummy tasks which we simulate and schedule in our edge computing system and calculate execution time based on certain heuristics.

4. Where is the min and max threshold values from?

   All health data ranges are taken from authentic medical websites such as www.heart.org and www.medscape.com.

5. How do we prioritize tasks when two tasks of same priority value are to be processed?

   One of the solutions we came up with is to assign numerical values to the different parameters which affect the priority. For example, heart rate will have a higher value than blood pressure and glucose will have a lower one. Then we can calculate a secondary value m which is based entirely on the parameters which causes the task to have a high priority. This secondary priority value m only comes into play when the above-mentioned situation occurs, essentially acting as a tie breaking mechanism.

6. Why RandomForestRegressor? Why not any other model?

   RandomForestRegressor was explicitly chosen because it offers a practical balance between intelligence, interpretability, and performance, which is ideal for our health monitoring system based on sensor data (heart rate, blood pressure, glucose, etc.).
   It learns automatically from data, adapts to nonlinear health patterns, and produces stable predictions even when patient data varies all of which align with the core goals of Computational Intelligence.

7. What is the training dataset for the ML model?

   The training dataset used for this model is the UCI Heart Disease dataset https://archive.ics.uci.edu/dataset/45/heart+disease.

8. What is the metric you used to select the model?

   The model selection was based on two key performance metrics: Mean Squared Error (MSE) and R^2 Score (Coefficient of Determination). Both metrics were used to evaluate prediction accuracy and generalization capability of the model.