Health Monitoring System for Senior Citizens

Group Members

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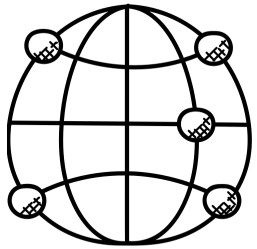
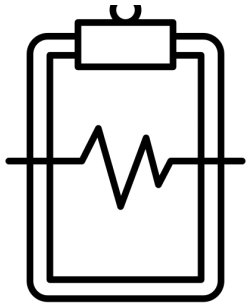
Introduction/ Idea



A World is a Global Village, Right?

Also, Impossible that you are 24/7 Home, Well COVID-19 gone "ALMOST"



Someone at Home, Needs an Attention

Literature Comparison

Literature Reference	Basic Idea	Methodologies	Results	Limitations
Sensor and vision-based HAR [1]	Introduces a classification of HAR methodologies	Compare both approaches by using previous researches	HAR methods are classified into two main groups.	Don't discuss their use
Skeleton-based human activity recognition for Eldery People[2]	Propose a new skeleton-based approach	Use Extremely Randomised Trees algorithm.	Mis-estimate body-poses	Recognize only regular activities

Literature Comparison

Literature Reference	Basic Idea	Methodologies	Results	Limitations
A Smart Health Care Monitor System in IoT Based Human Activities of Daily Living: A Review[3]	Reviewing and compare a prediction accuracy from the data coming from sensors, videos	Study and compare previous methods	Maximum prediction accuracy of 99.89% in Random forest and SVM	Models have been able to predict in offline

Literature Comparison

Literature Reference	Basic Idea	Methodologies	Results	Limitations
Vision-Based Human Activity Recognition System Using Depth Silhouettes[4]	Recognize daily activities of elderly people in indoor environments.	Utilize joints points of the skeleton model and HMMs for activity rec-ognition	Recognizing 84.33% for nine daily routine activities of the elderly	Detecting only normal activity.

Literature Comparison

Literature Reference	Basic Idea	Methodologies	Results	Limitations
Real-Time Elderly Monitoring for Senior Safety [5]	Monitoring eldery people from distance	Use captured skeleton images and indRNN	Able to recognize activities	Just trigger the alarm.

Problem Statement

An eldery people need to be monitored 24/7. If you are at work space and they are alone.

System Analysis and Design

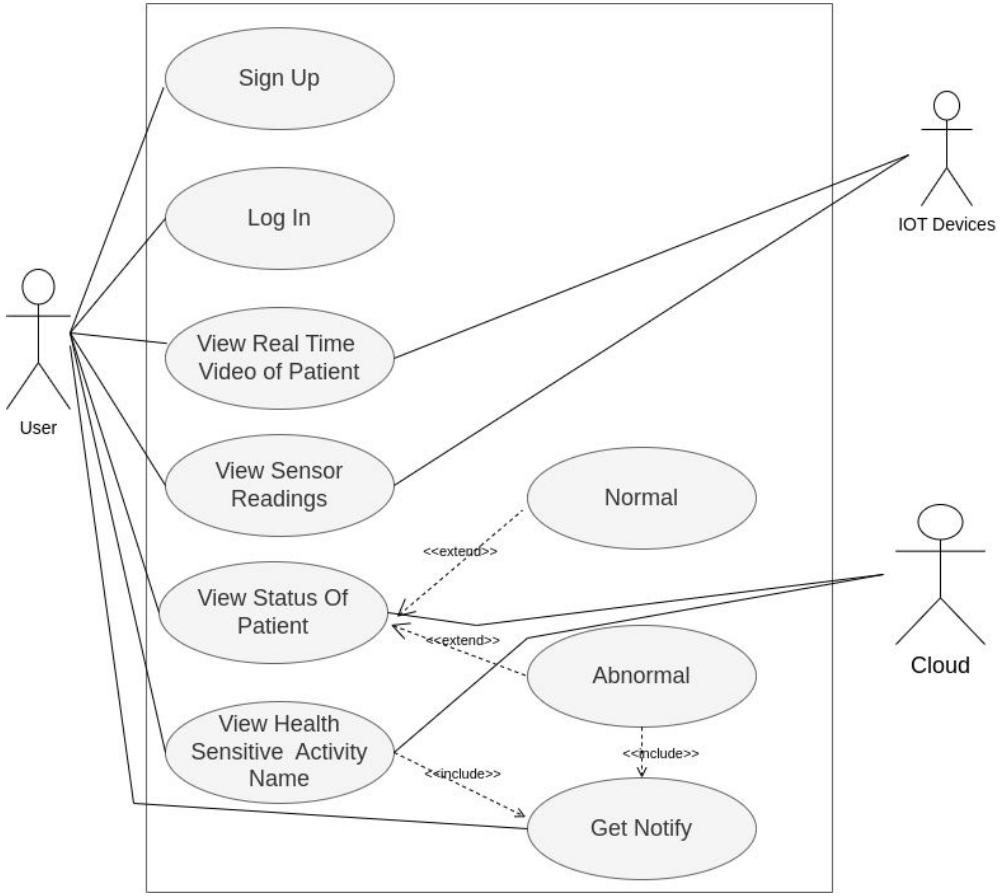


Figure 1: Use Case Diagram

Display Interface

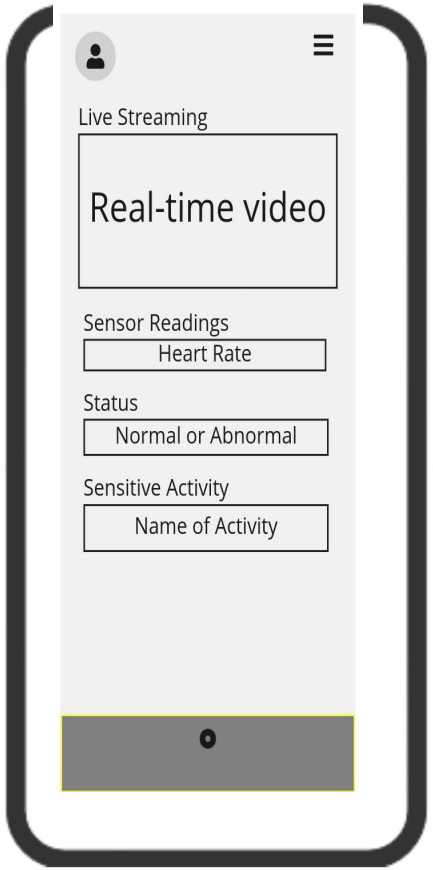


Figure 2:Displaying Main Screen

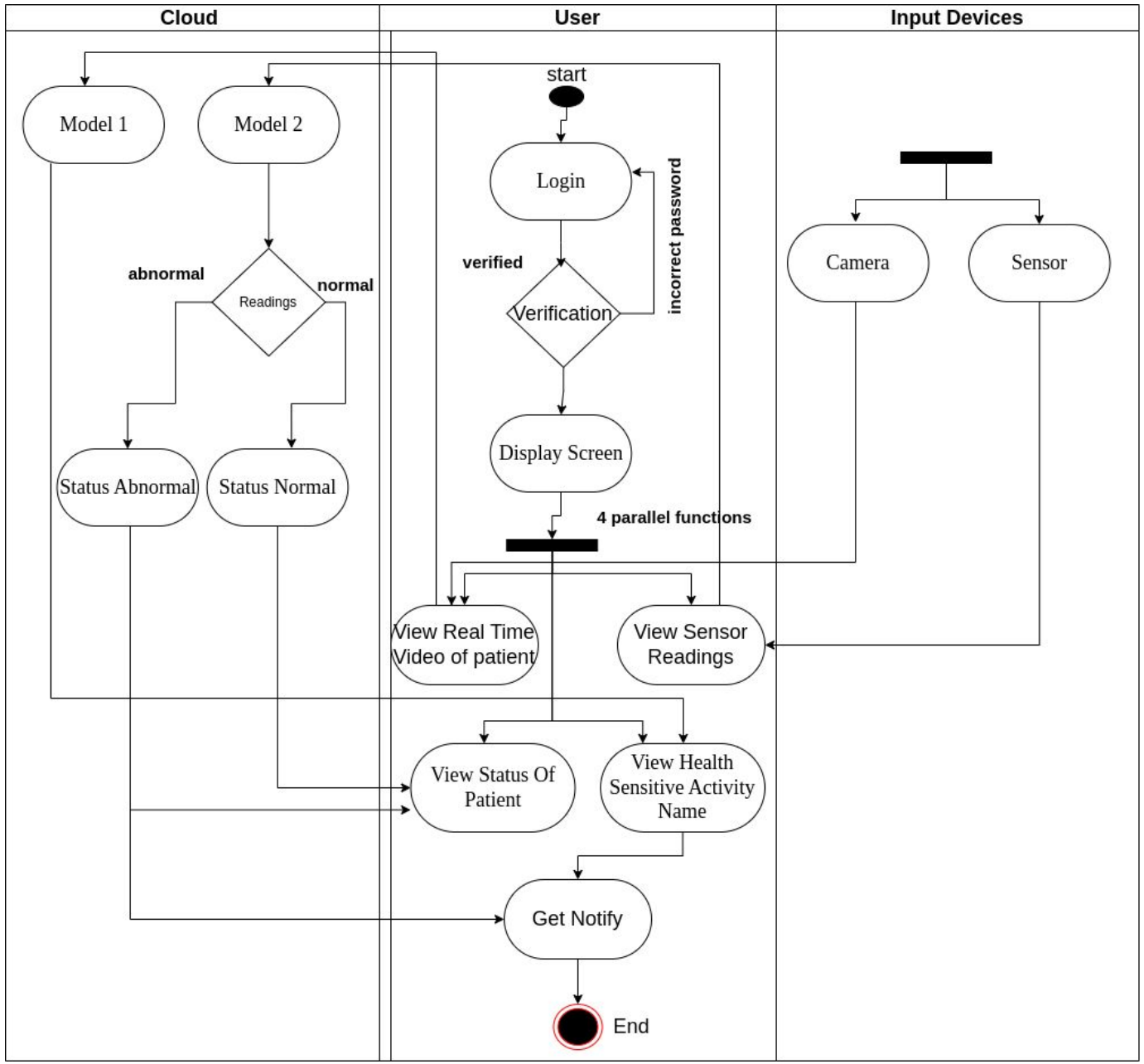


Figure 2: Swimlane Diagram

Health Sensitive Activities

1.  SNEEZE/COUGH
2.  STAGGERING
3.  FALLING DOWN
4.  HEADACHE
5.  CHEST PAIN
6.  BACK PAIN
7.  NECK PAIN
8.  NAUSEA/VOMITING
9.  FAN SELF
10.  YAWN
11.  STRETCH ONESELF
12.  BLOW NOSE

Methodology

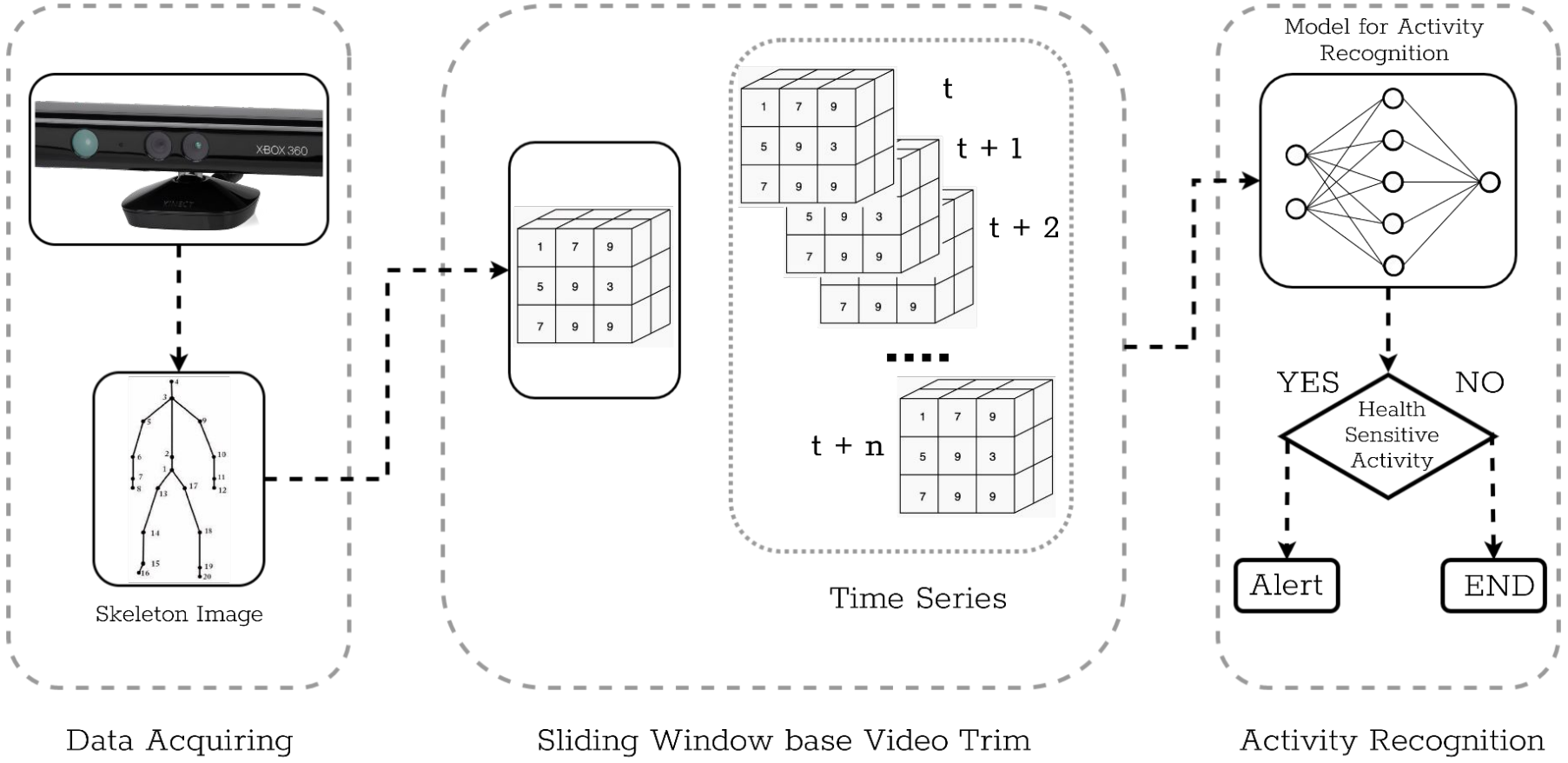
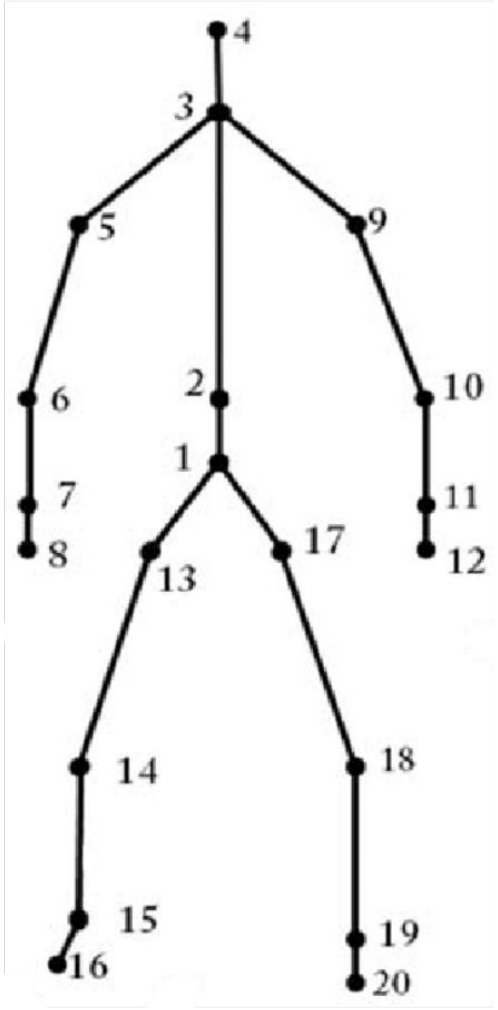


Figure 3: Methodology

Methodology

Skeleton Image:

1. **Hip center**
2. **Middle-spine**
3. **Shoulder center**
4. **Head**
5. **Left Shoulder**
6. **Left-elbow**
7. **Left-wrist**
8. **Left-hand**
9. **Right-shoulder**
10. **Right Elbow**



11. **Right-wrist**
12. **Right-hand**
13. **Left-hip**
14. **Left-knee**
15. **Left Ankle**
16. **Left-root**
17. **Right-hip**
18. **Right-knee**
19. **Right-ankle**
20. **Rightfoot**

Figure 4: Skeleton Representation

Methodology

3D Matrix Representation:

$$P(x, y, z))$$

$$f = pn - phip$$
$$(n = 2, 3, \ldots N).$$

x = abscissa
y = ordinate
z = Distance from the human body to the camera

pn = other nodes except the hip joint
phip = the hip-center joint.

Methodology

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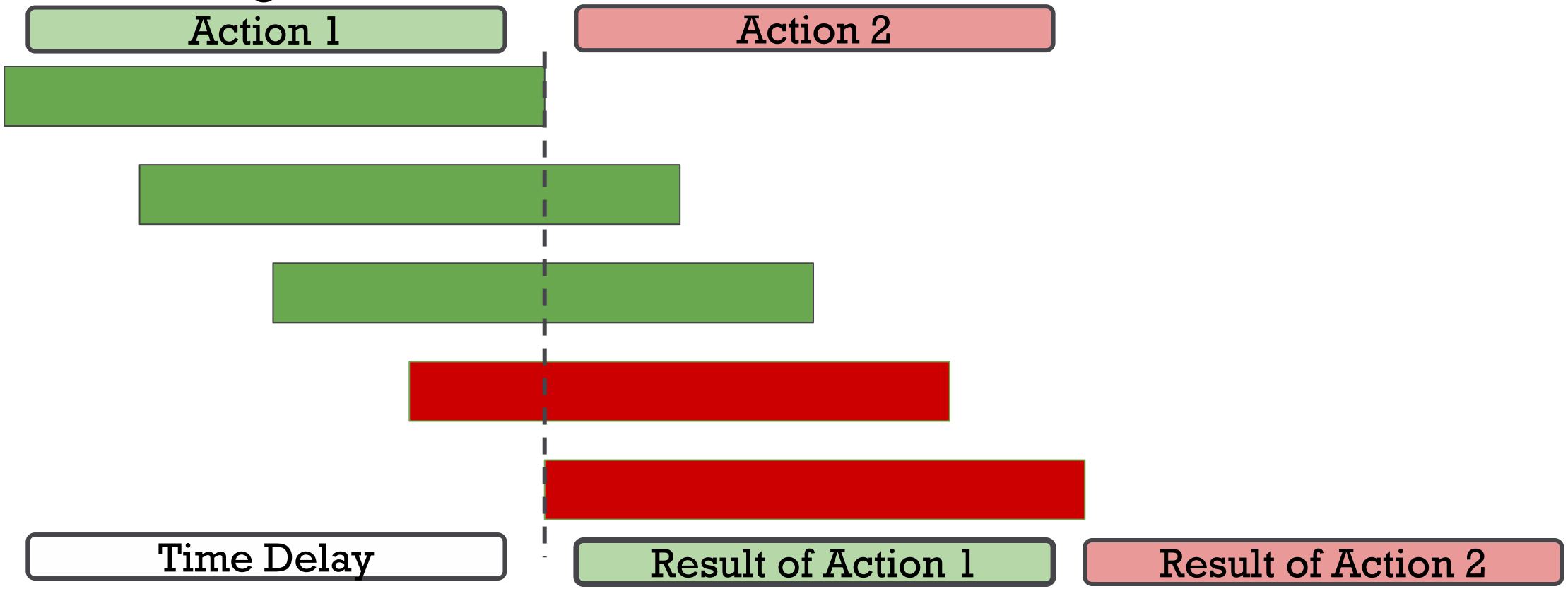
Methodology

Sliding Window:



DATASET

DATASET

11412

A041
SNEEZE/COUGH
948

A042
STAGGERING
948

A043
FALLING DOWN
948

A044
HEADACHE
948

A045
CHEST PAIN
948

A046
BACK PAIN
948

A047
NECK PAIN
948

A048
NAUSEA/VOMITING
948

A049
FAN SELF
948

A103
YAWN
960

A104
STRETCH ONESELF
960

A105
BLOW NOSE
960

DATASET

Sample Videos from NTU-RGB-D and NTU-RGB-D 120 Dataset[6]

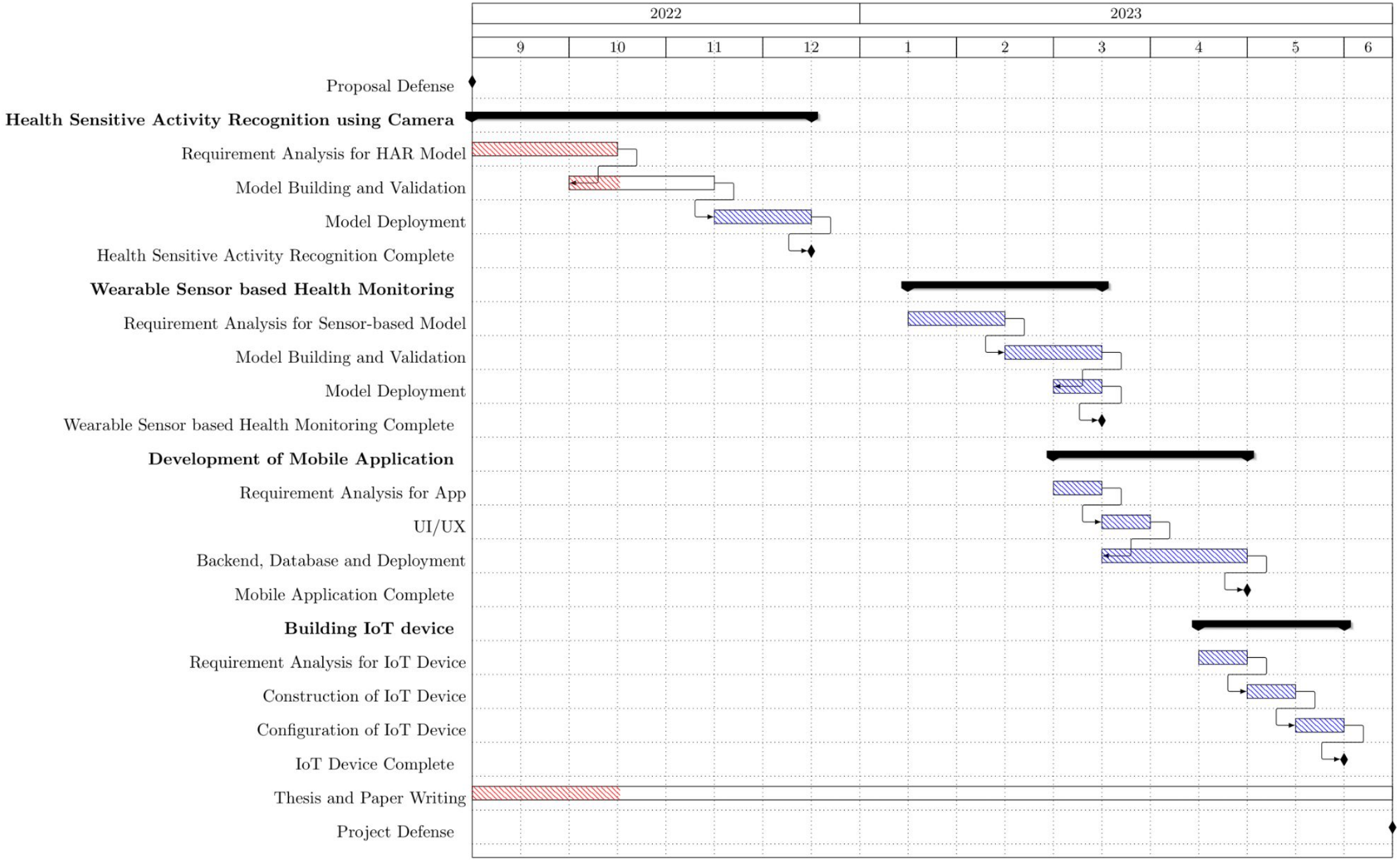


Figure 4:Gantt chart

Testing

Teamwork

- **Javairia Rehman**

  UML Diagrams

References

[1] Beddiar, D.R., Nini, B., Sabokrou, M. et al. Vision-based human activity recognition: a survey. Multimed Tools Appl 79, 30509–30555 (2020). https://doi.org/10.1007/s11042-020-09004-3

[2] Hbali, Y., Hbali, S., Ballihi, L., & Sadgal, M. (2018). Skeleton‐based human activity recognition for elderly monitoring systems. IET Computer Vision, 12(1), 16-26.

[3] Reena, J. K., & Parameswari, R. (2019, February). A smart health care monitor system in IoT based human activities of daily living: a review. In 2019 International Conference on Machine Learning, Big Data, Cloud and Parallel Computing (COMITCon) (pp. 446-448). IEEE.

[4] Kim, K., Jalal, A., & Mahmood, M. (2019). Vision-based human activity recognition system using depth silhouettes: A smart home system for monitoring the residents. Journal of Electrical Engineering & Technology, 14(6), 2567-2573.

[5] Sun, H., & Chen, Y. (2022, May). Real-Time Elderly Monitoring for Senior Safety by Lightweight Human Action Recognition. In 2022 IEEE 16th International Symposium on Medical Information and Communication Technology (ISMICT) (pp. 1-6). IEEE.

[6] https://rose1.ntu.edu.sg/dataset/actionRecognition/