IOT-BASED PLATFORM

AIR QUALITY (PM2.5) MONITORING SYSTEM

PM2.5

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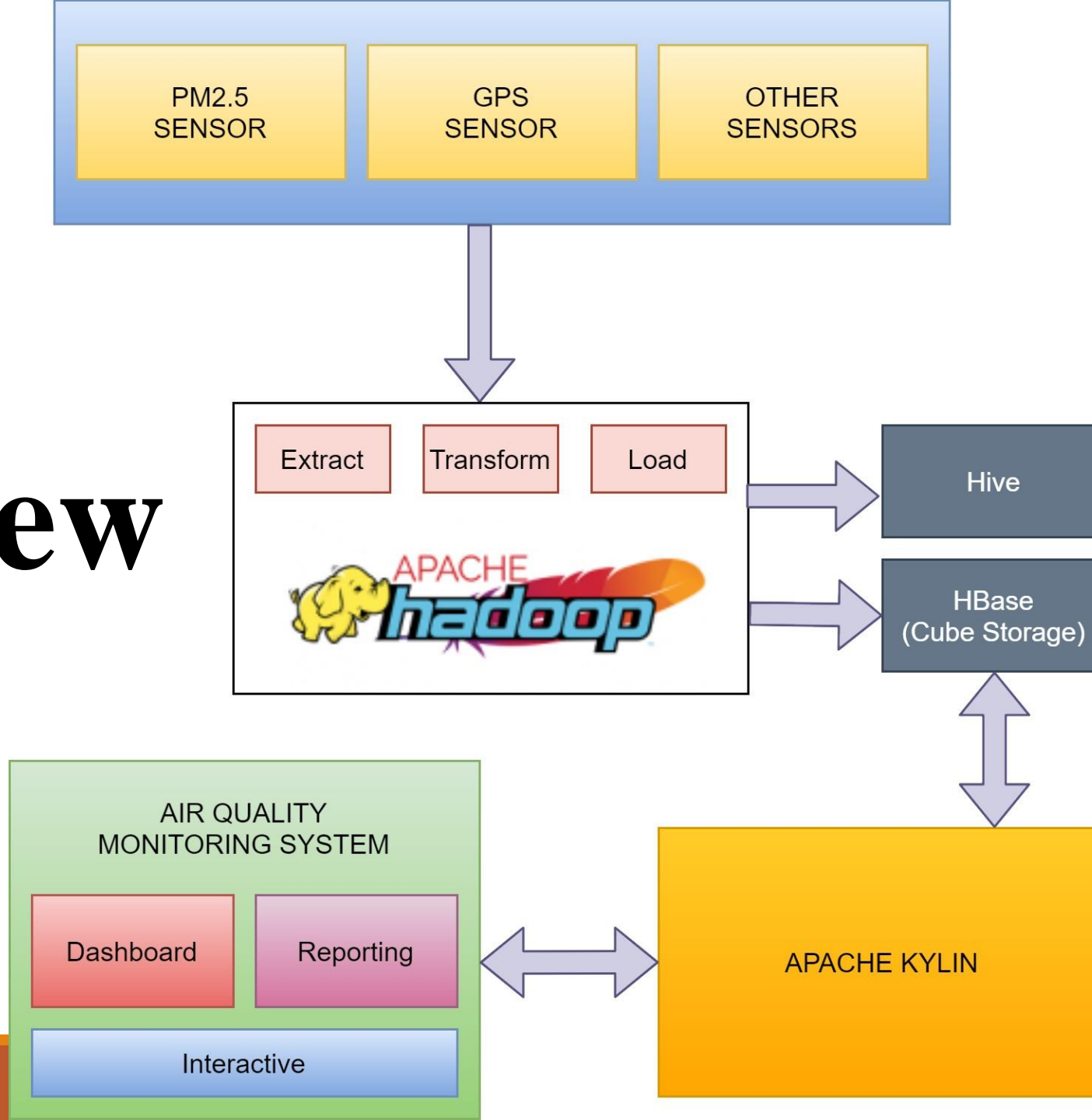
Submitted to :

Dr. Apichon Witayangkurn

AT70.19 Software Development and Quality Improvement

Outlines

Introduction

Overview

PM2.5 SENSOR	GPS SENSOR	OTHER SENSORS

Extract   Transform   Load

APACHE hadoop

Hive

HBase (Cube Storage)

AIR QUALITY MONITORING SYSTEM

Dashboard   Reporting

Interactive

APACHE KYLIN
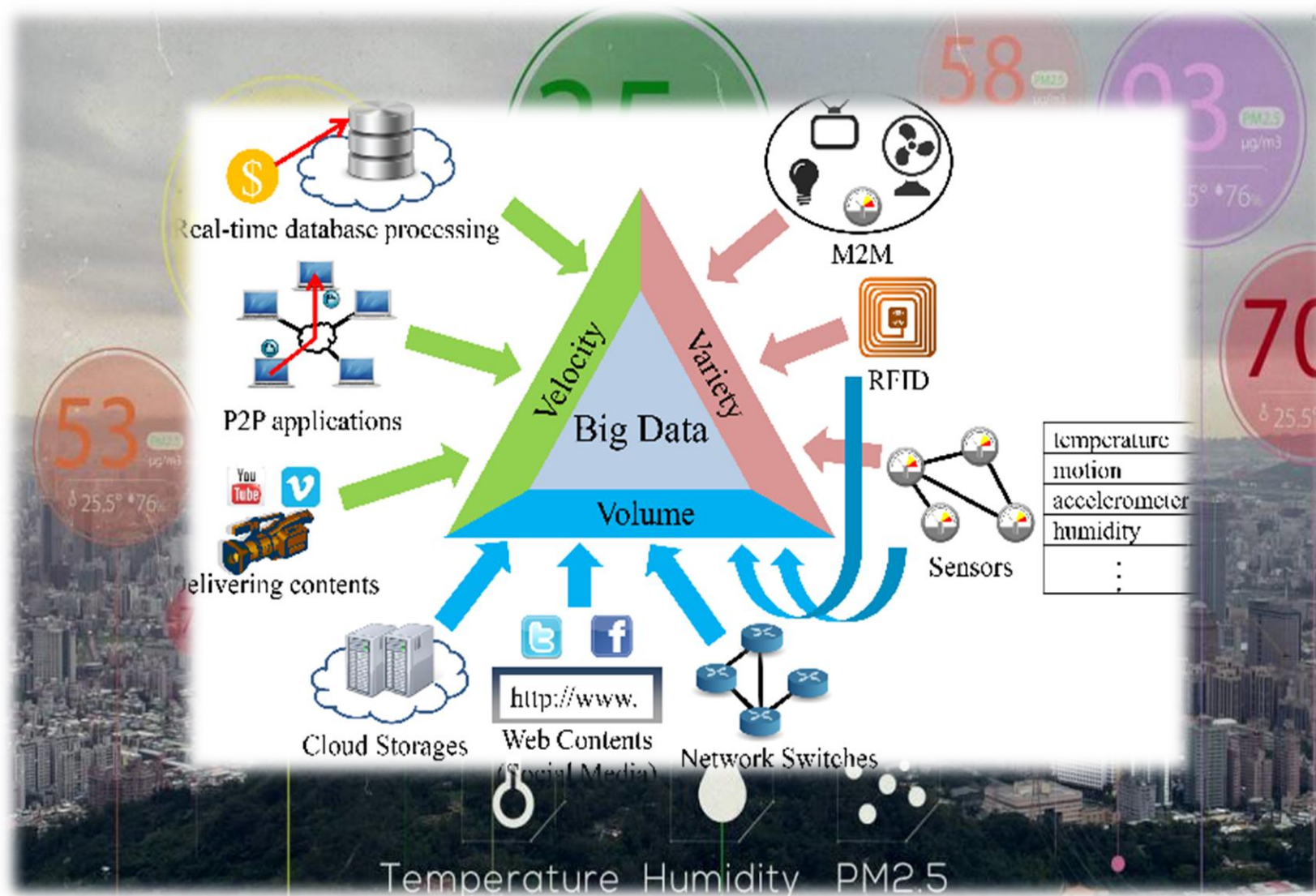
Functional requirements

Visualization Module

❑ The end users should be able to **view** an interactive dashboard of air quality monitoring with different forecasts and insights.

❑ The system should be able to **stream** real-time data from different nodes and stations.

System Admin Module

❑ The admin should be able to **login, logout** to the system and **modify** the system parameters and toggle dashboard controls.

❑ The admin should be able to register new sensors and **manage** the sensors in system.

❑ The admin should be able to **generate** reports of specific time periods and export those in varies formats.

Data Collection Module

❑ Data will be extracted from sensors and stored in **Hadoop** which is acting as data warehouse using Hive.

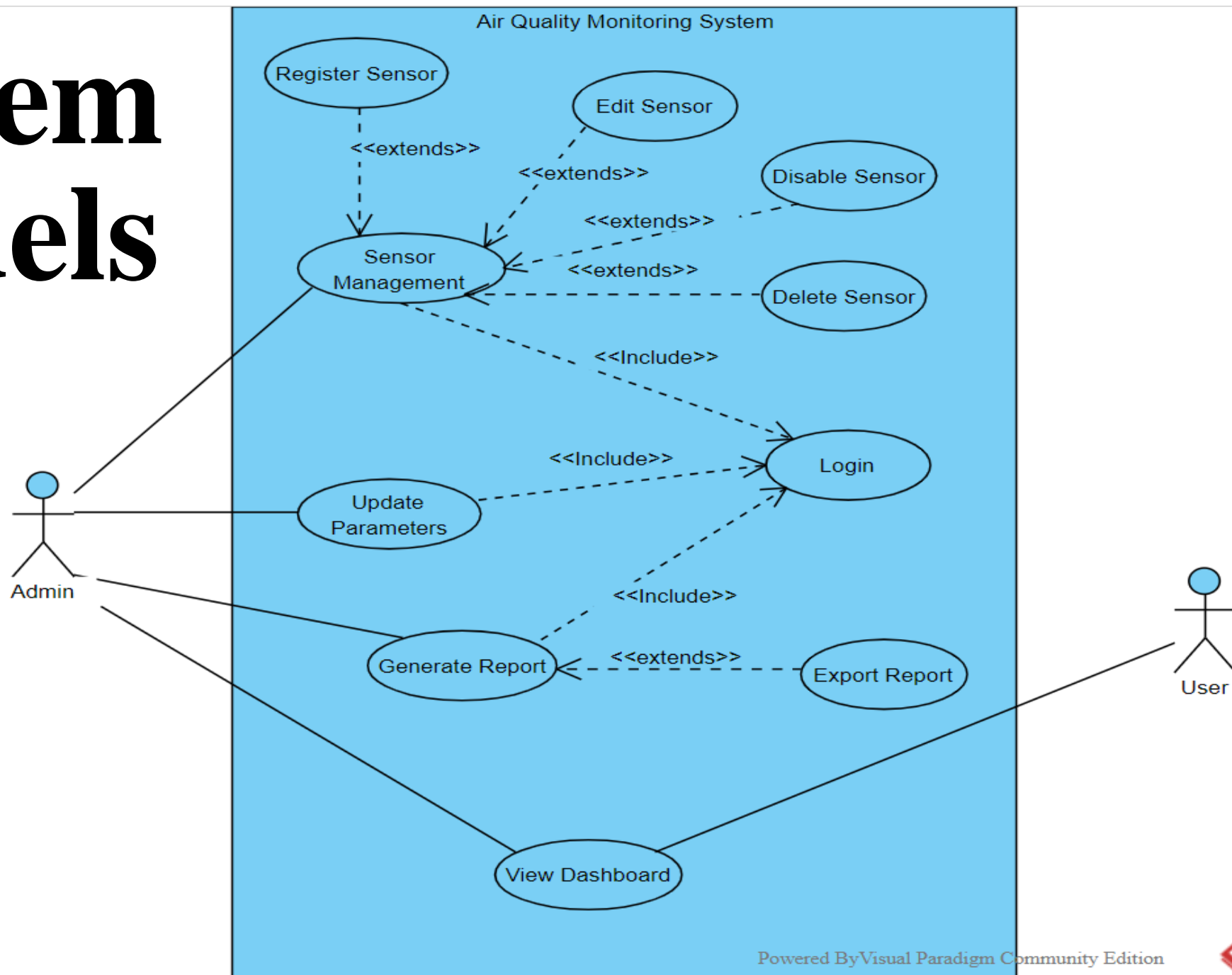❑ **Kylin** does aggregation functions on cube (HBase) and provide the required parameters to the system.

Nonfunctional requirements

- Performance
- Reliability
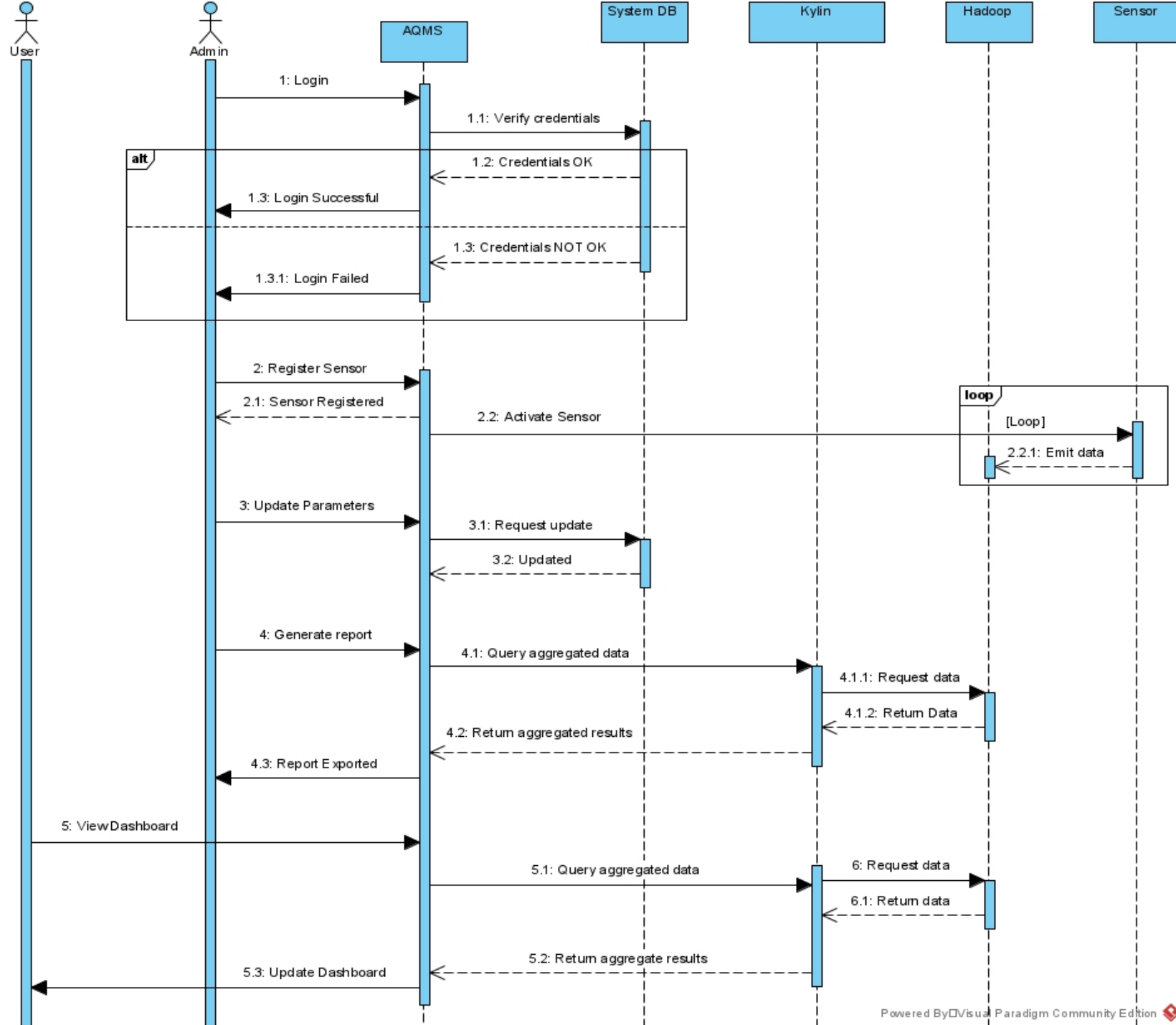- Interoperability
- Portability
- Scalability
- Reusability

Schedule

Epic	FEB	MAR	APR
⌄ ⚡ AQMS-1 Project Planning ✅	🟪		
☑ AQMS-3 Project topic, problem statement and System scope ✅	YOUNTEN TSHERING DONE		
☑ AQMS-6 Functional and Non-Functional Requirements ✅	DONE		
☑ AQMS-5 Project Kick off Delivery ✅	DONE		
☑ AQMS-4 Setting up project git repo ✅	SHUBHANGINI GONTIA DONE		
⌄ ⚡ AQMS-7 Project requirements ✅	🟦		
☑ AQMS-8 Determining and analysis of system requirements ✅	DONE		
☑ AQMS-9 Use Case Model ✅	SUYOGYA RATNA TAMRAKAR DONE		
☑ AQMS-10 Analysis Object Model and Dynamic Models ✅	DONE		
⌄ ⚡ AQMS-13 Project Design ✅	🟧		
☑ AQMS-11 System Design and Object Design ✅	DONE		
☑ AQMS-12 User interface navigational paths and screen mock ups ✅	SMRITY BARAL DONE		
☑ AQMS-14 Software Requirements Specification Document ✅	DONE		
⌄ ⚡ AQMS-15 Project Implementation	🟥		
☑ AQMS-31 Research on Apache Kylin and Data storage	YOUNTEN TSHERING IN PROGRESS		
☑ AQMS-33 Research on Cloud Storage	SUYOGYA RATNA TAMRAKAR IN PROGRESS		
☑ AQMS-32 Research on APIs	SHUBHANGINI GONTIA IN PROGRESS		
☑ AQMS-34 Research on dashboard and integration to web app	SMRITY BARAL IN PROGRESS		
☑ AQMS-16 Coding	BACKLOG		
☑ AQMS-17 Integration with database	BACKLOG		
⌄ ⚡ AQMS-18 Project Testing	🟩		
☑ AQMS-19 Unit testing	BACKLOG		
☑ AQMS-20 Integration testing	BACKLOG		
☑ AQMS-21 Performance testing	BACKLOG		
☑ AQMS-22 Stress testing	BACKLOG		
☑ AQMS-23 Acceptance testing	BACKLOG		
⌄ ⚡ AQMS-24 Documentation	🟦		
☑ AQMS-25 User's Guide			BACKLOG
☑ AQMS-26 Presentation slide			BACKLOG
☑ AQMS-27 Final report			BACKLOG

System models

Air Quality Monitoring System
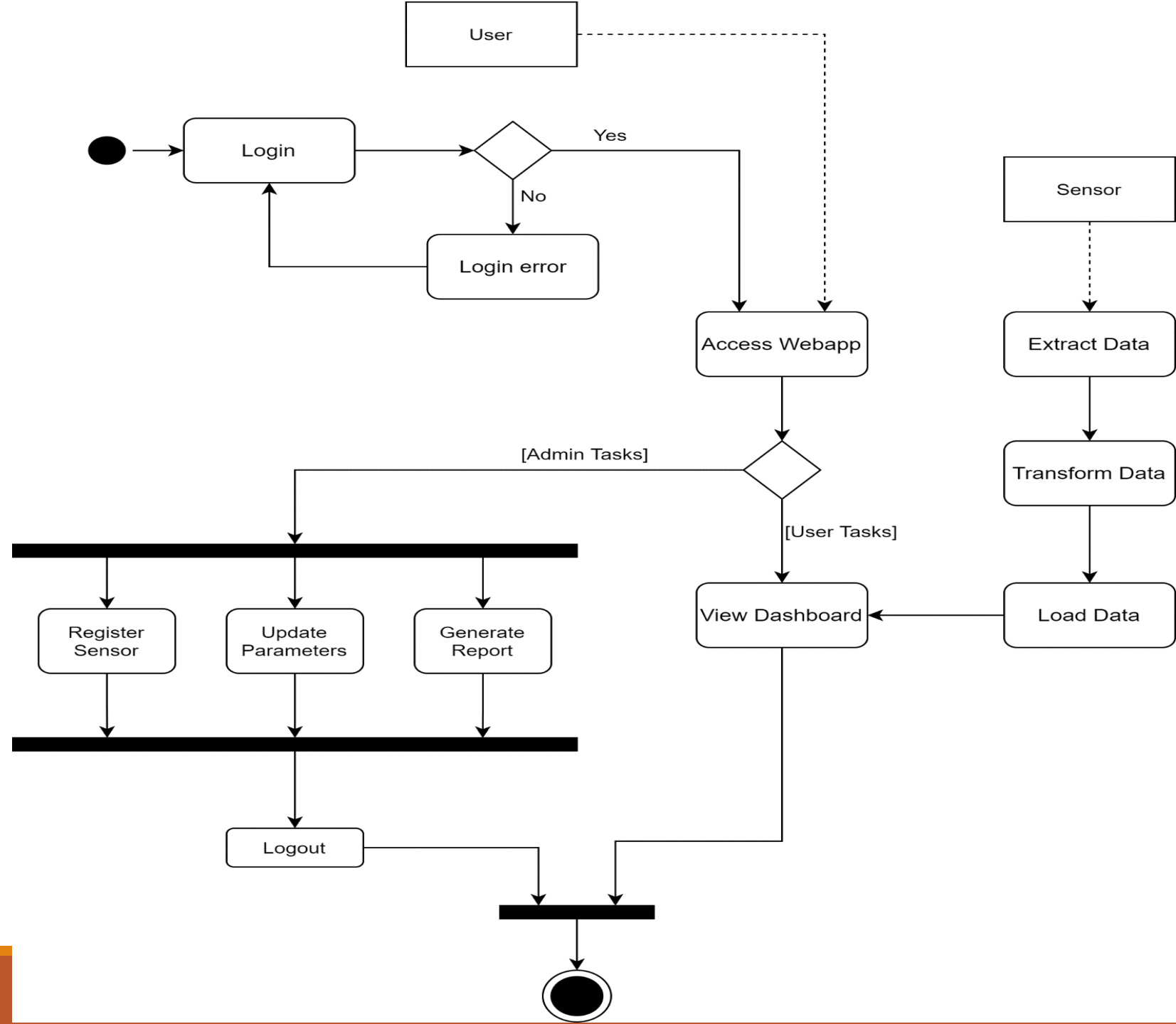
Dynamic models

Object and class model
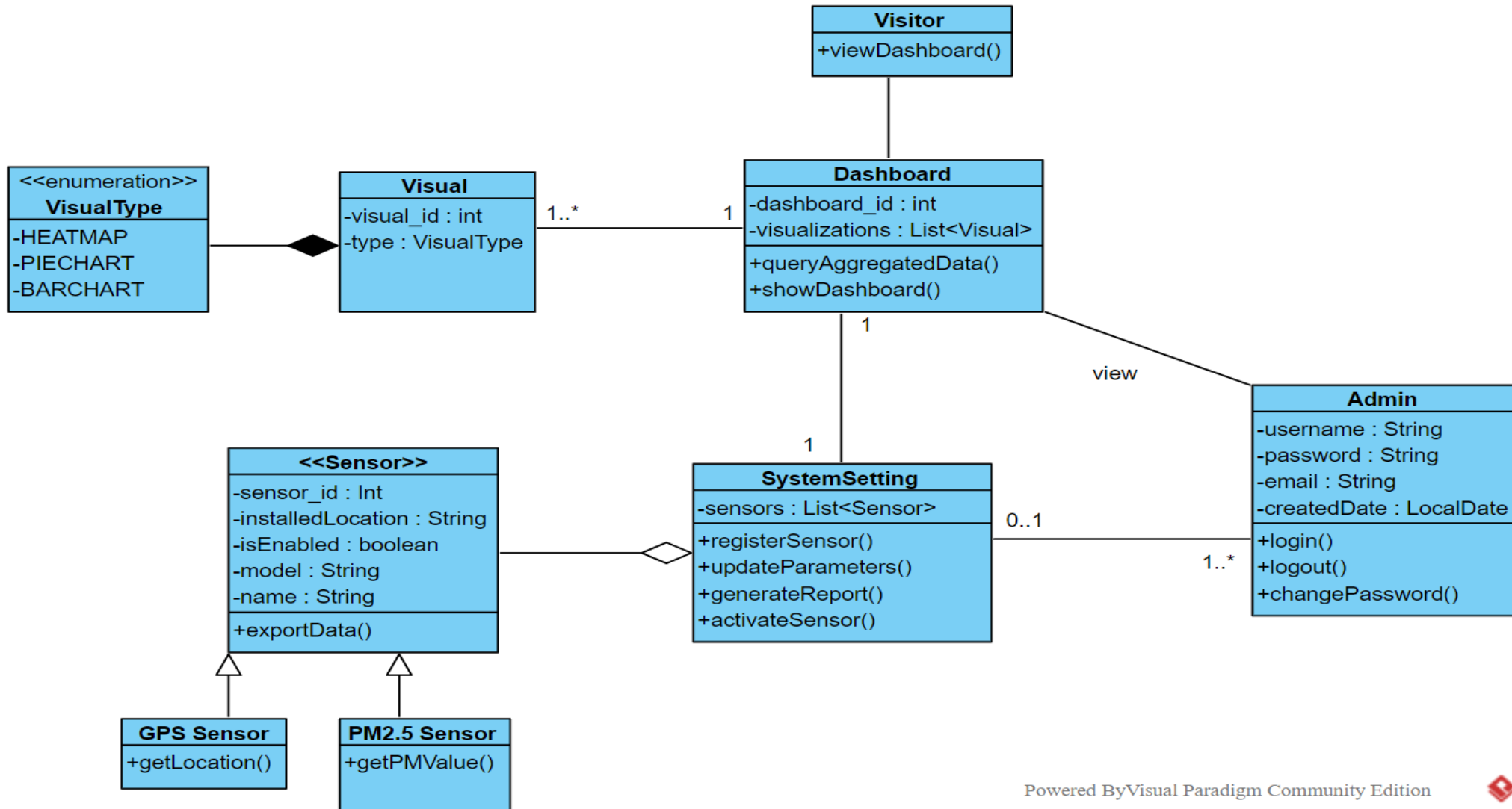
Dynamic models
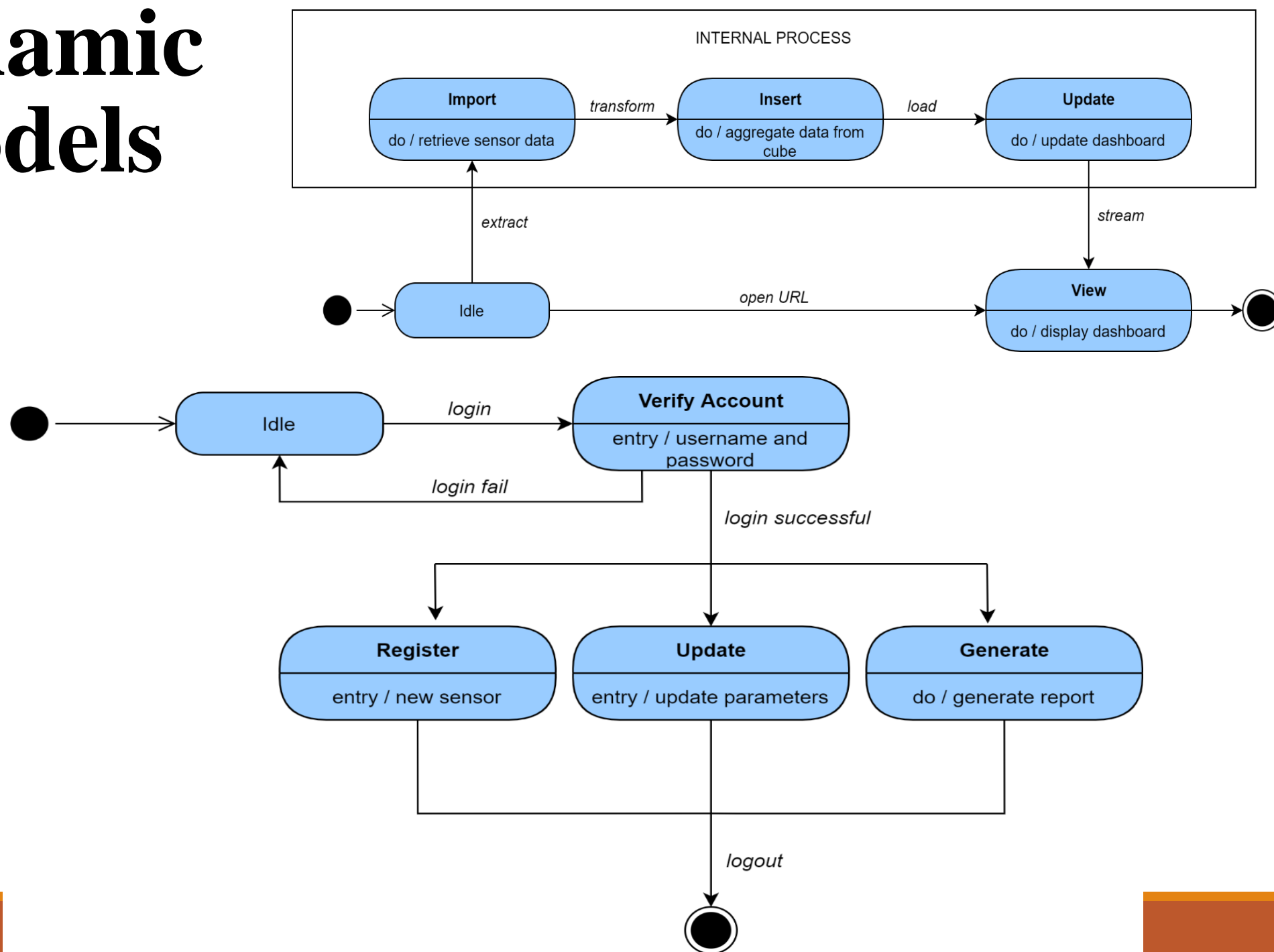
Dynamic models
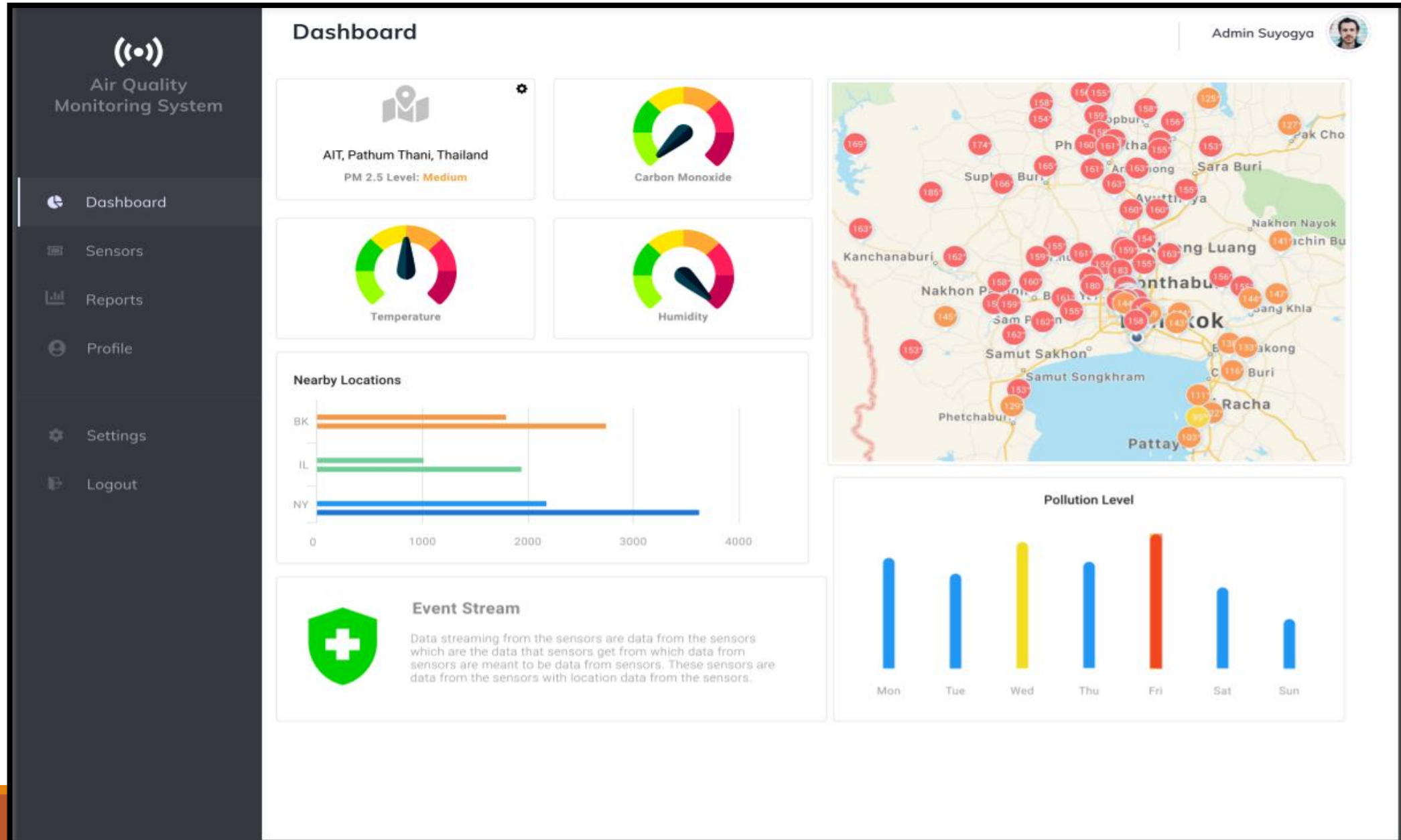
UI Mockups
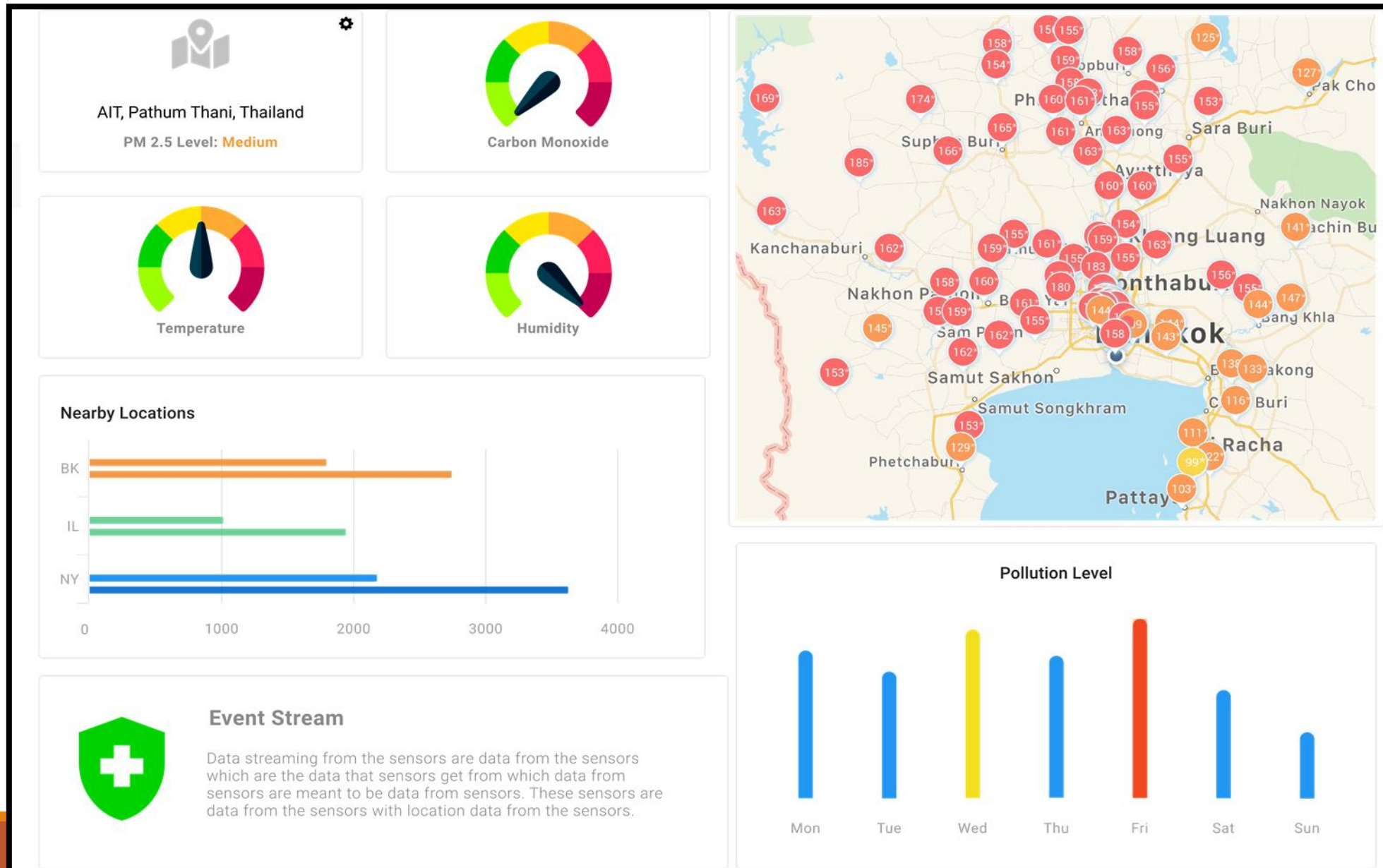
Admin Login Form

Admin Dashboard

Sensors Management

Reports

Update Profile

Parameter Settings

Conclusion

❑ The system 'Air Quality (PM2.5) Monitoring System' will be especially designed to be used by any user who are cautious about their health.

https://github.com/shubhanginigon/SDQI2021_G1

References

Apache Kylin. (2015). Bring OLAP back to big data! Retrieved from Apache Kylin | Analytical Data Warehouse for Big Data

Fann,N.,& Risley,D. (2011,January 5). The public health context for PM2.5 and ozone air quality trends. Air Qual Atmos Health 6, 1–11 (2013). https://doi.org/10.1007/s11869-010-0125-0

Gupta,A.k., & Johari,R. (2019). IOT based electrical device surveillance and control system. International Conference on Internet of Things: Smart Innovation and Usages (IoT-SIU), https://doi.org/10.1109/IoT-SIU.2019.8777342

https://github.com/shubhanginigon/SDQI2021_G1

Questions and Feedback