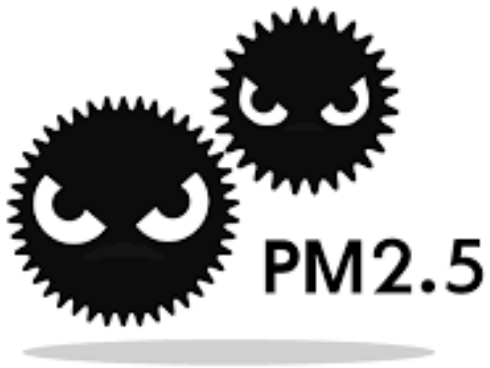
IOT-BASED PLATFORM

AIR QUALITY (PM2.5) MONITORING SYSTEM



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Outlines

1. Introduction
2. Overview
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4. Nonfunctional requirements
5. System models – Use case Diagram
6. Dynamic models – Sequence, State and Activity Diagram
7. Object and class model – Class Diagram
8. User interface – Screen Mockup
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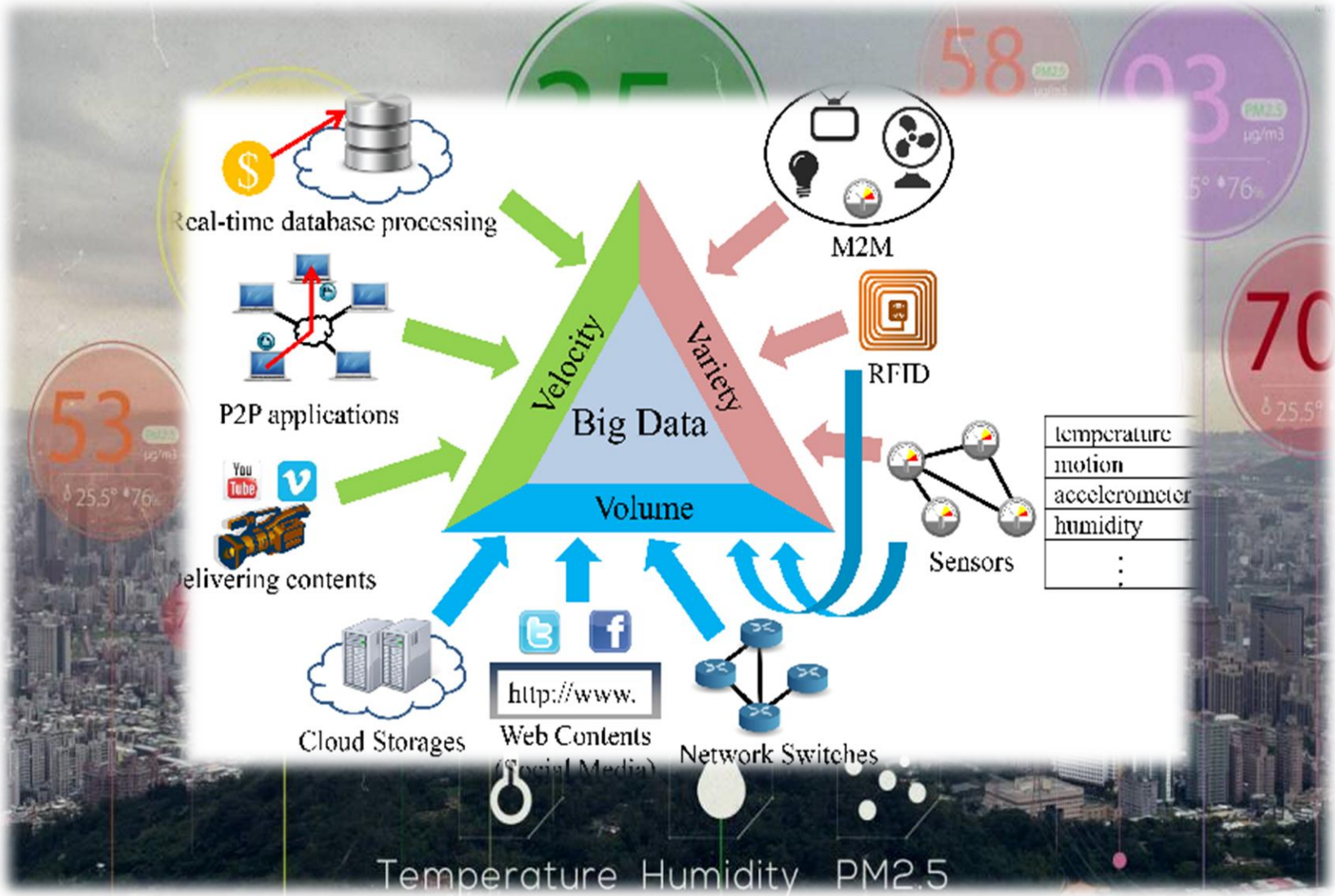
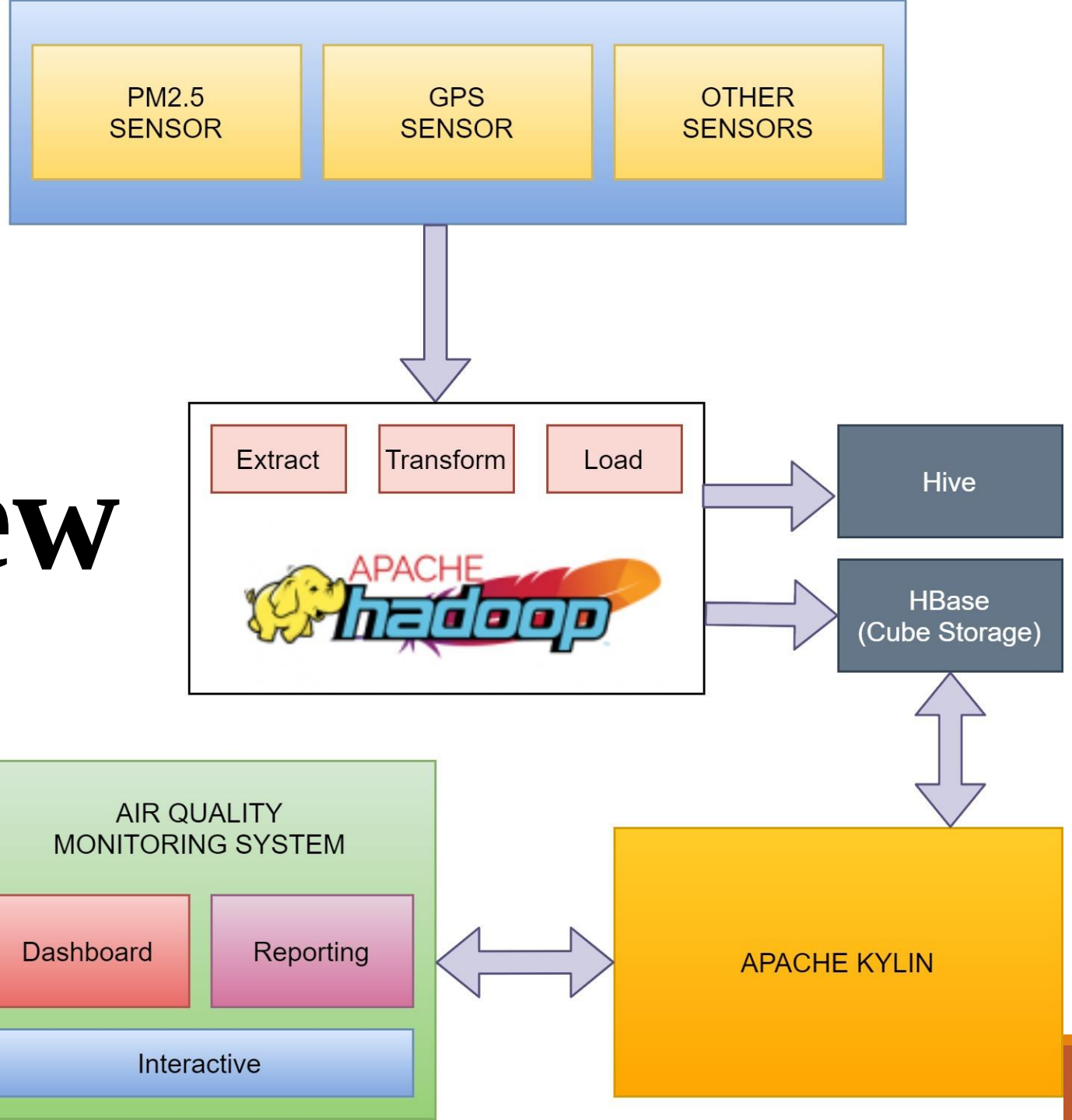
Introduction



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.

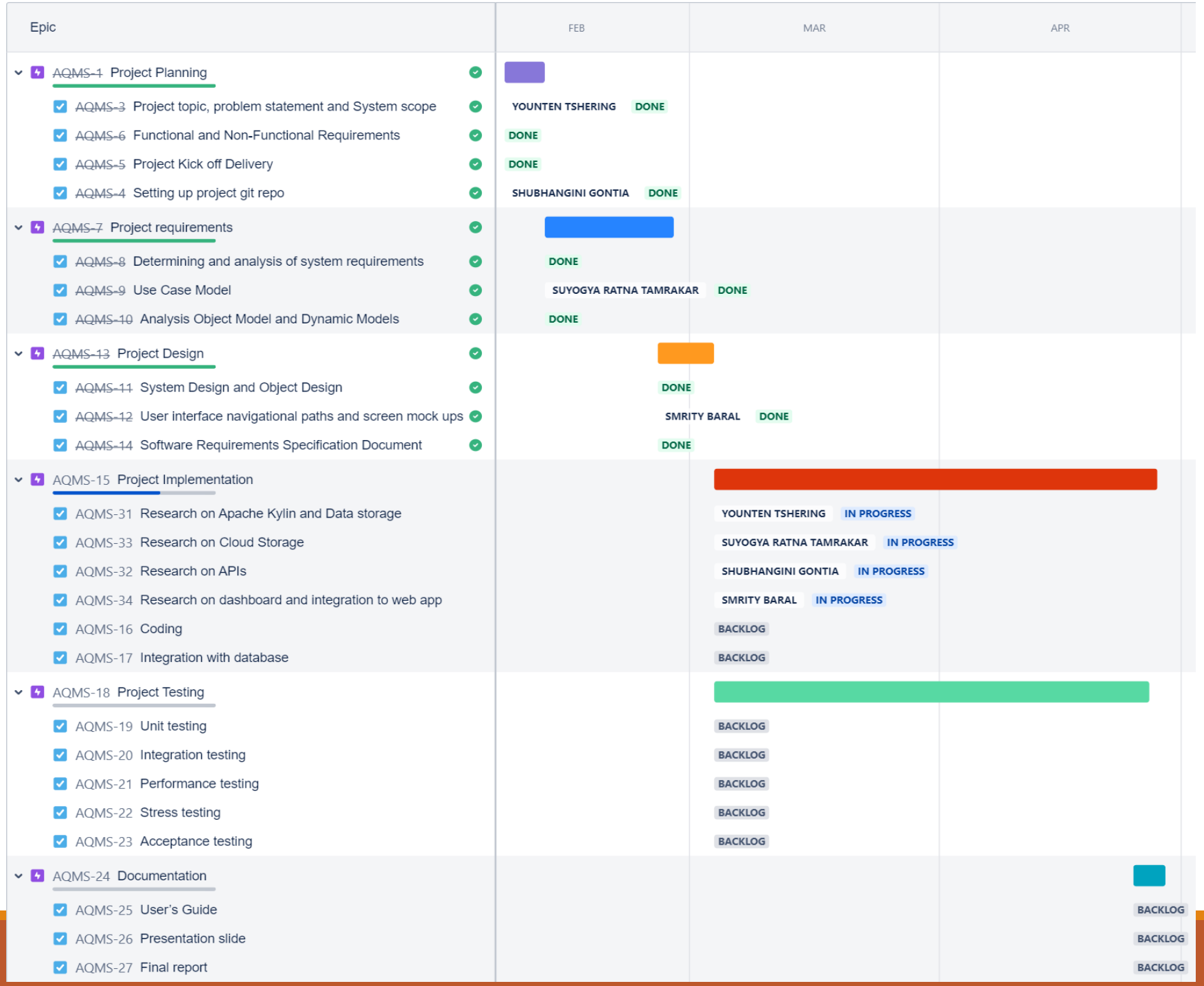
Data Collection Module

- 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
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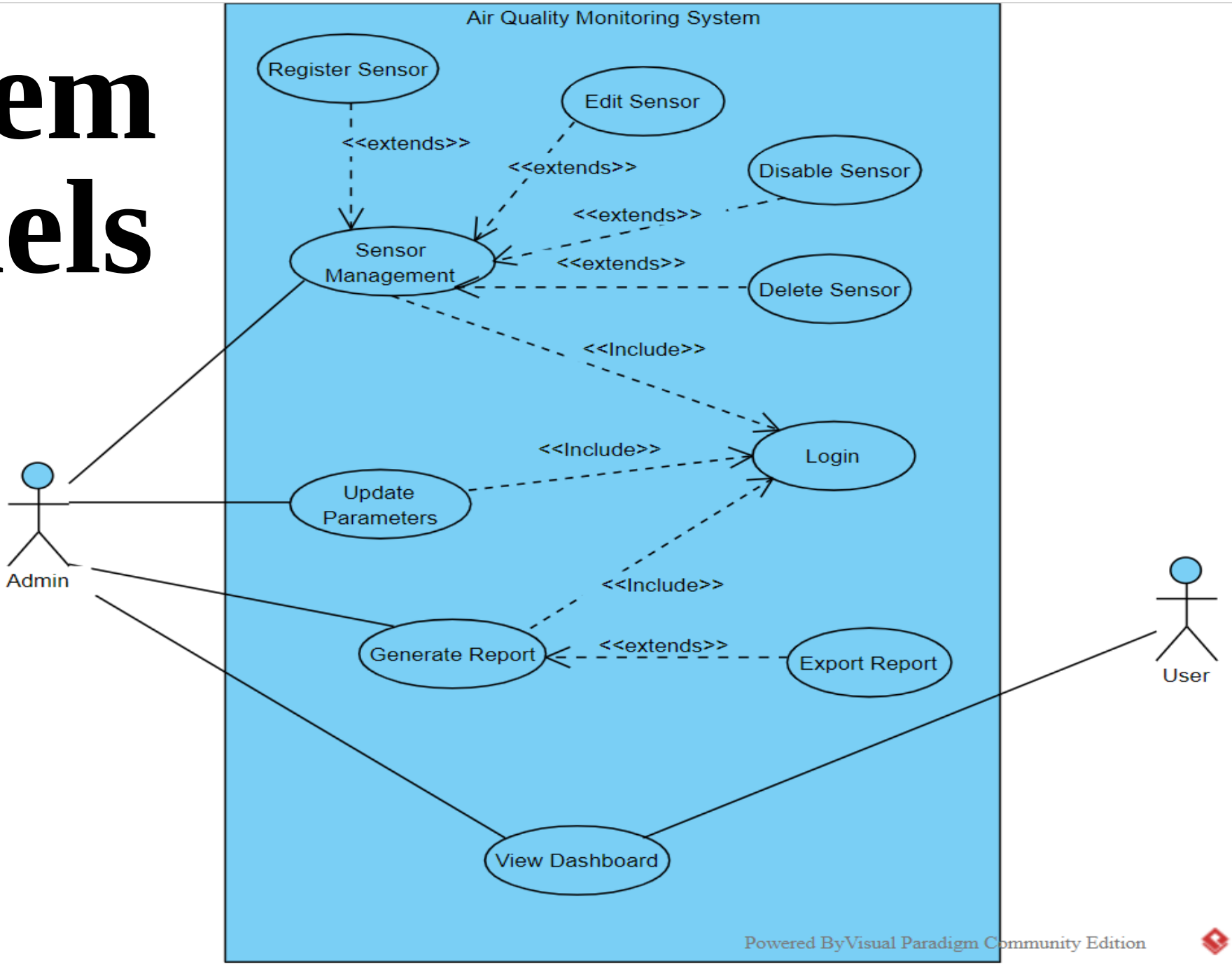
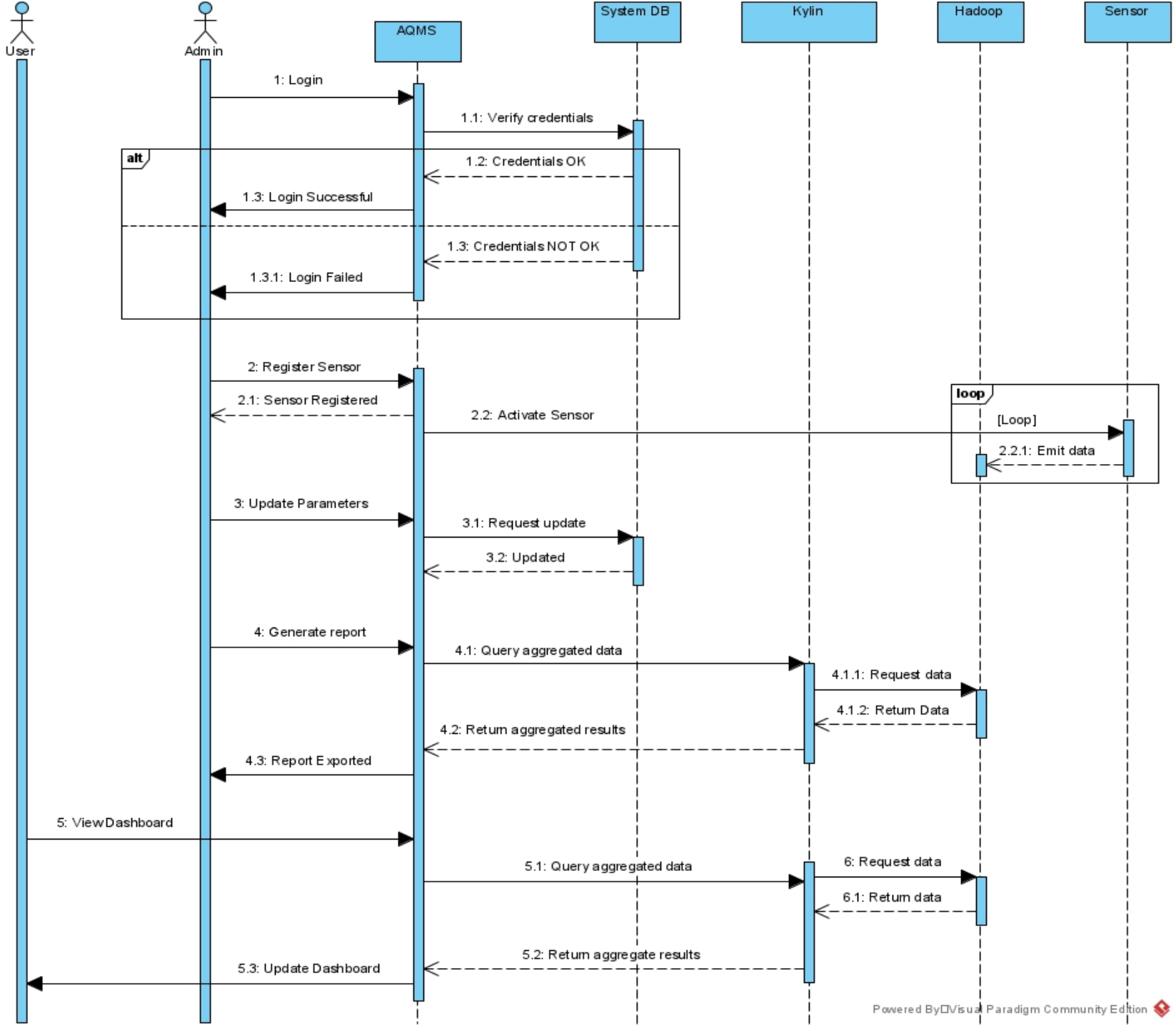
YOUNTEN TSHERING IN PROGRESS
AQMS-33 Research on Cloud Storage
SUYOGYA RATNA TAMRAKAR IN PROGRESS
AQMS-32 Research on APIs
SHUBHANGINI GONTIA IN PROGRESS
AQMS-34 Research on dashboard and integration to web app
SMRITY BARAL IN PROGRESS
AQMS-16 Coding
BACKLOG
AQMS-17 Integration with database
BACKLOG
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

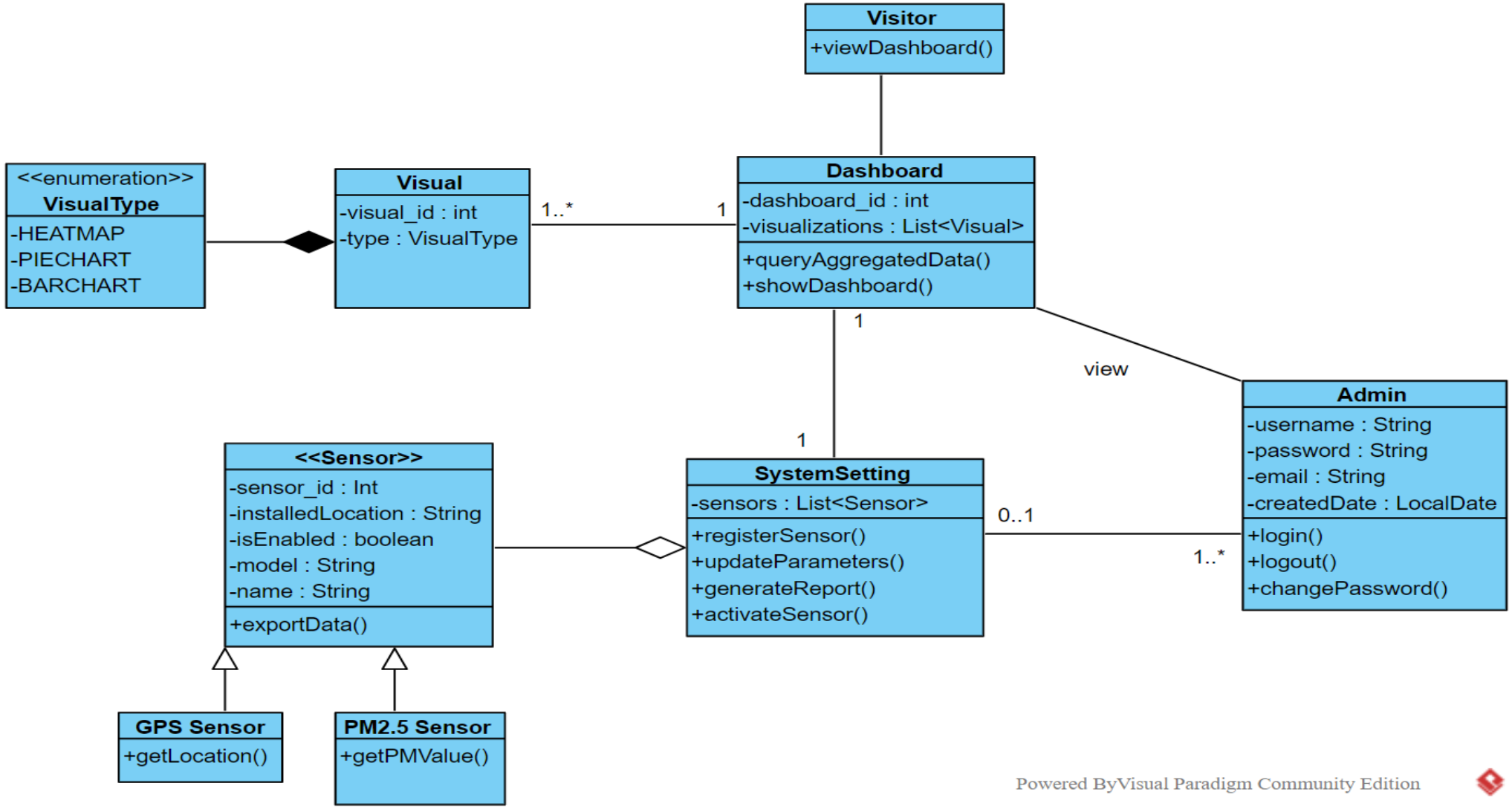
System models



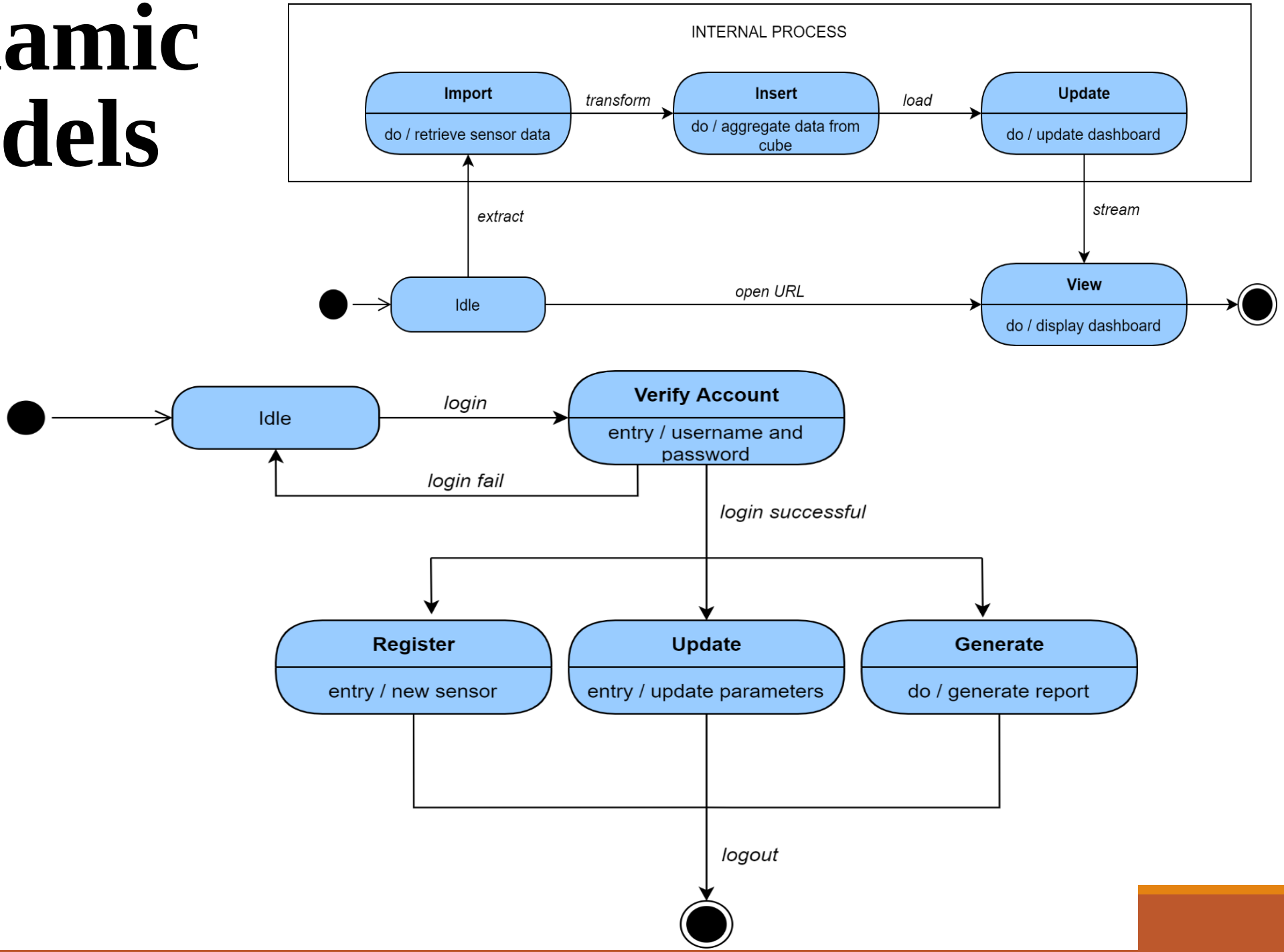
Dynamic models



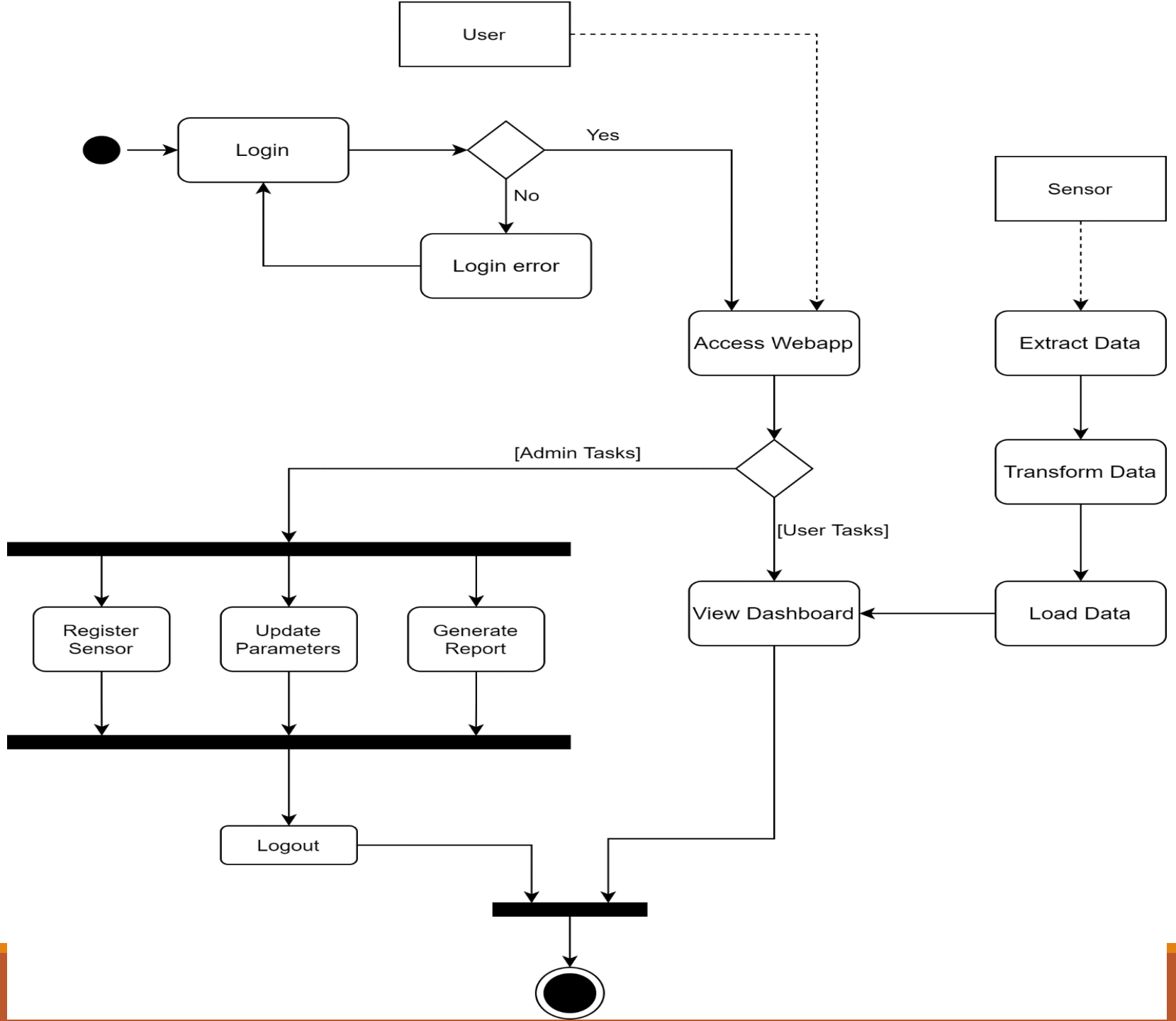
Object and class model



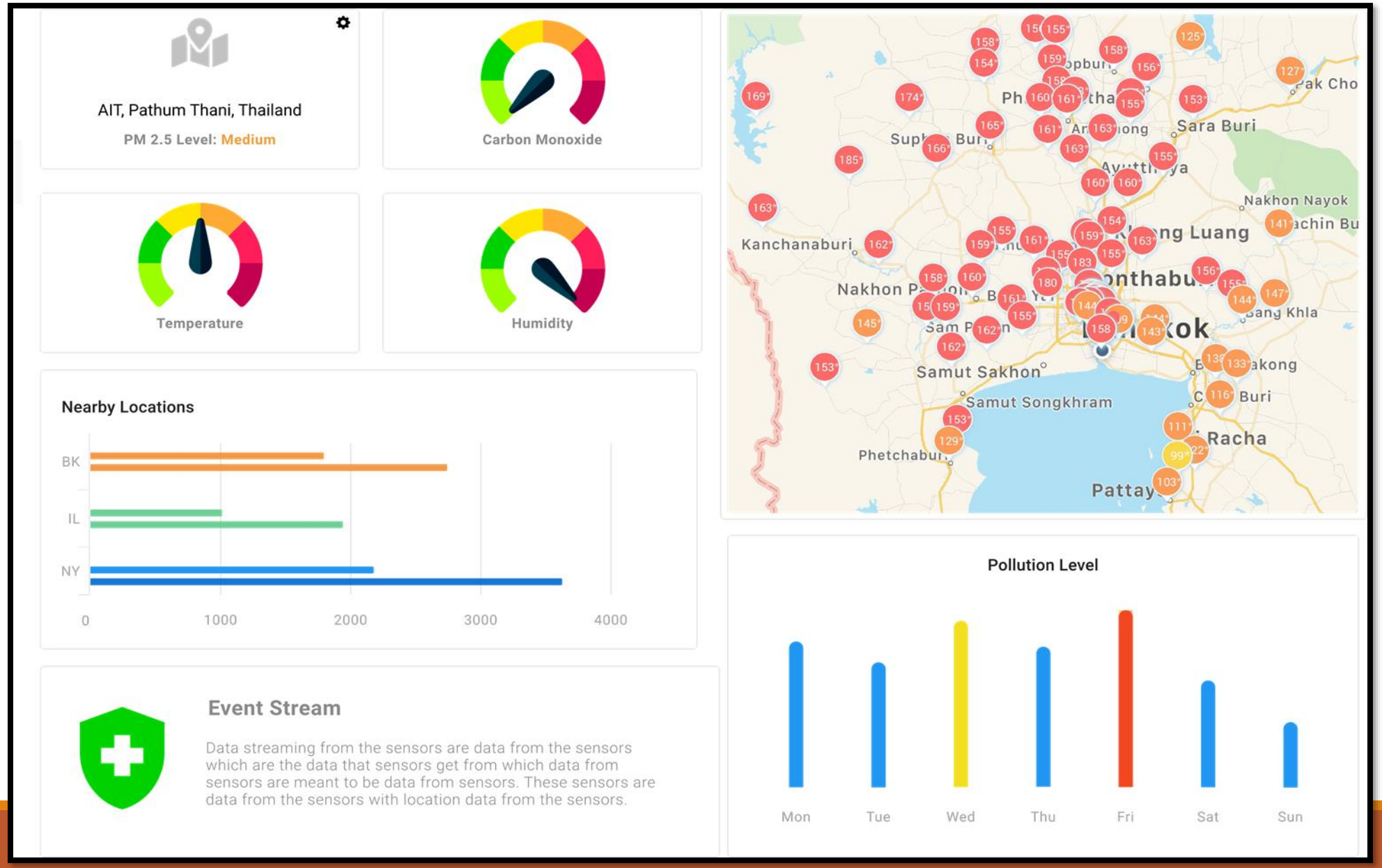
Dynamic models



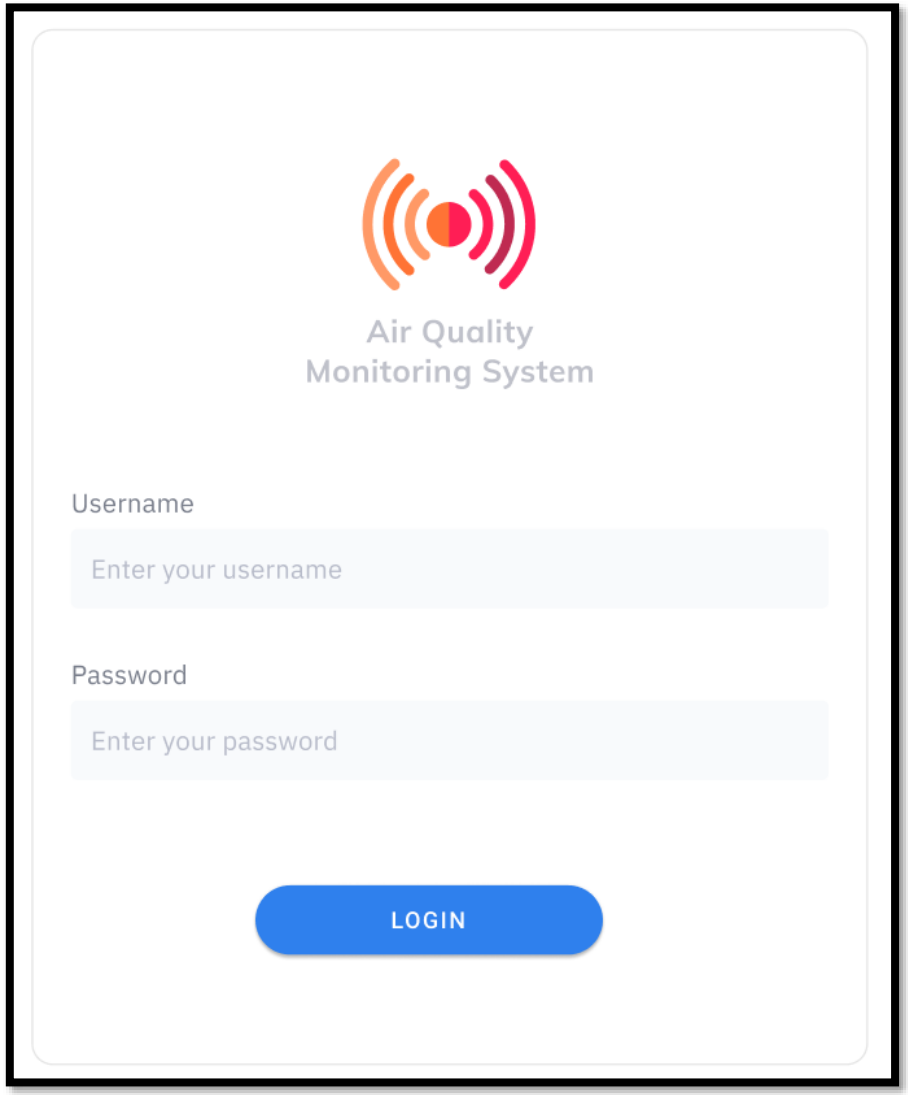
Dynamic models



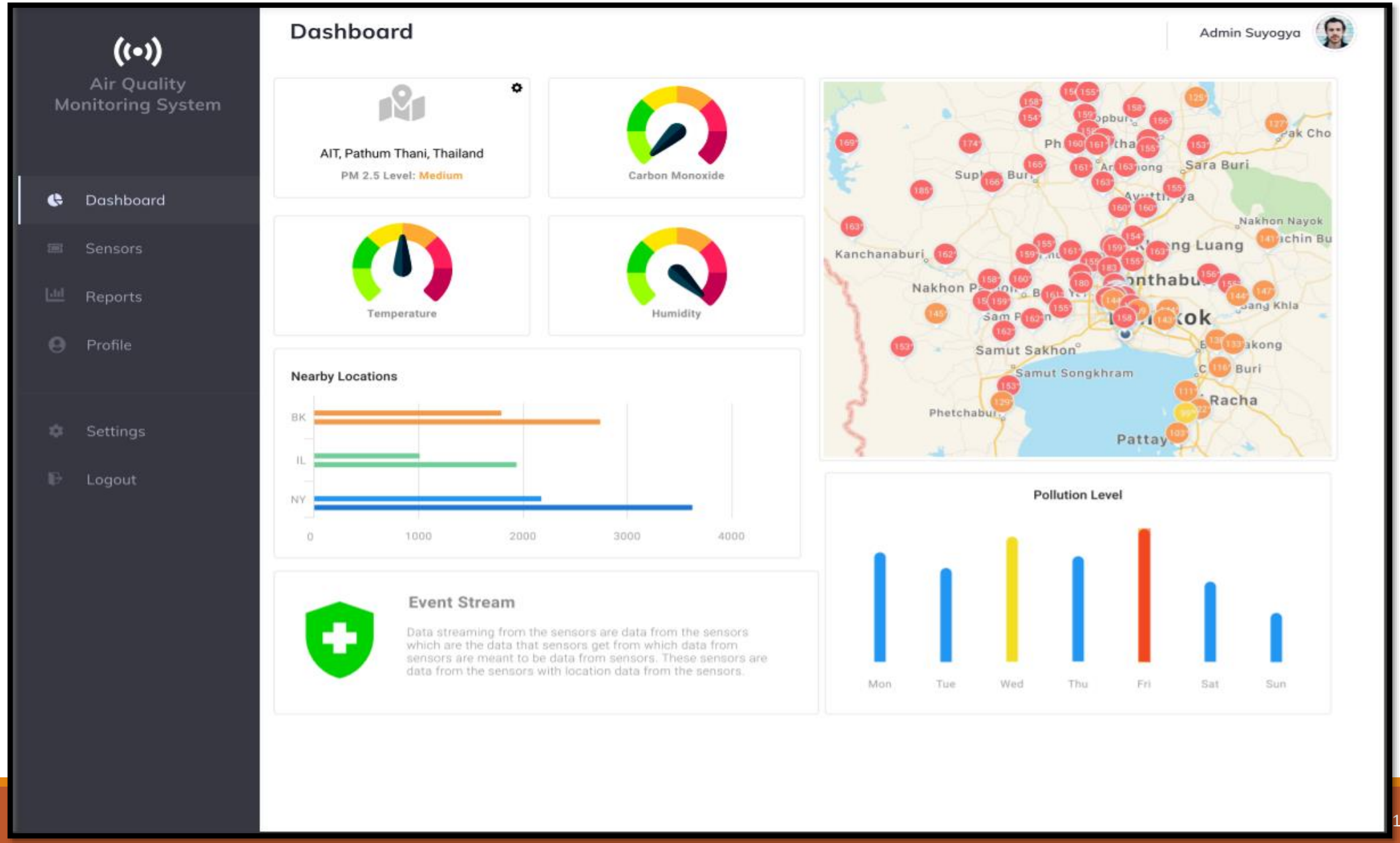
UI Mockups


AIT, Pathum Thani, Thailand
PM 2.5 Level: Medium
Carbon Monoxide
Temperature
Humidity
Nearby Locations
BK
IL
NY
0
1000
2000
3000
4000
Event Stream
Data streaming from the sensors are data from the sensors which are the data that sensors get from which data from sensors are meant to be data from sensors. These sensors are data from the sensors with location data from the sensors.
Kanchanaburi
Nakhon Nayok
Samut Sakhon
Samut Songkhram
Sara Buri
Pollution Level
Mon
Tue
Wed
Thu
Fri
Sat
Sun

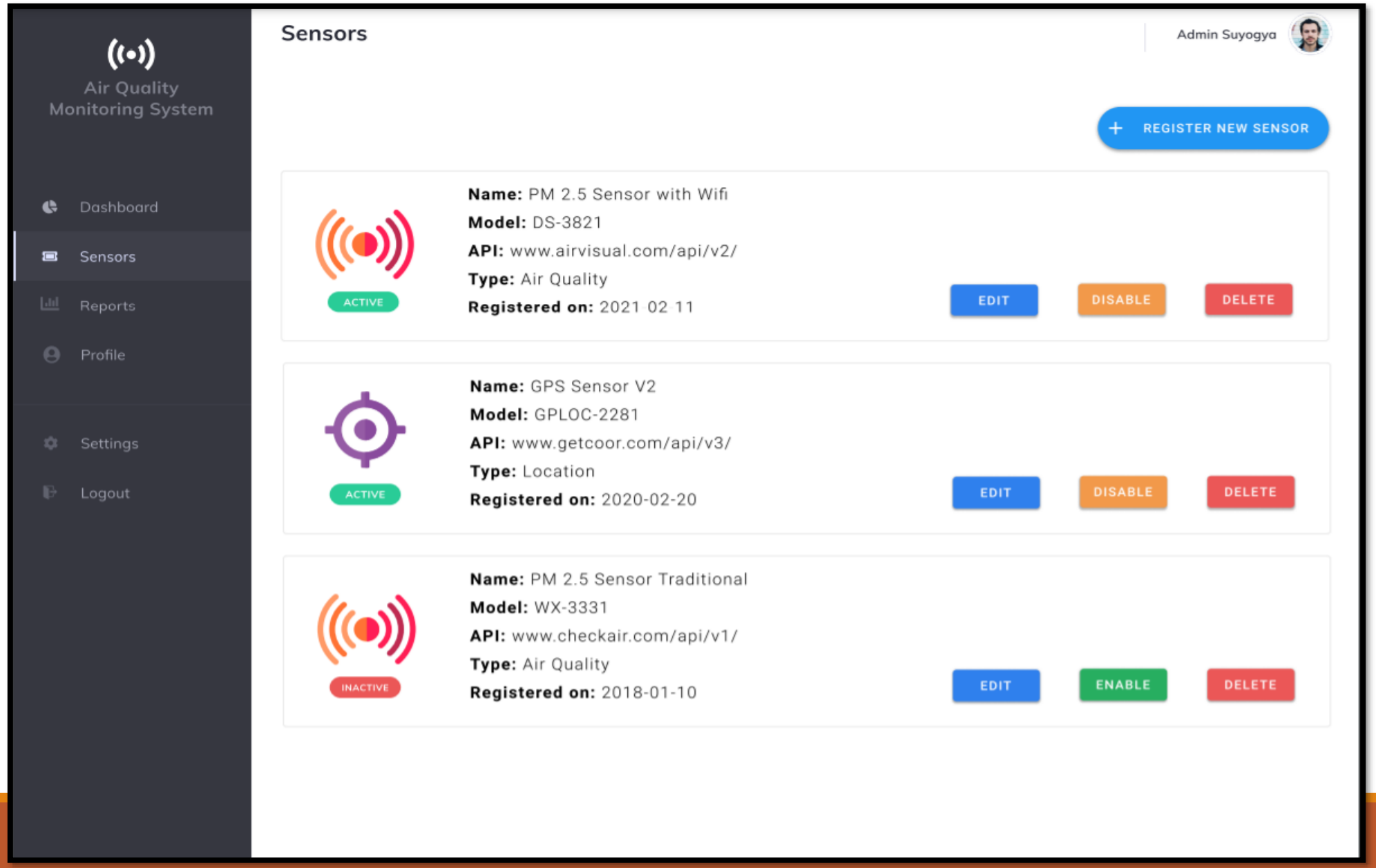
Admin Login Form



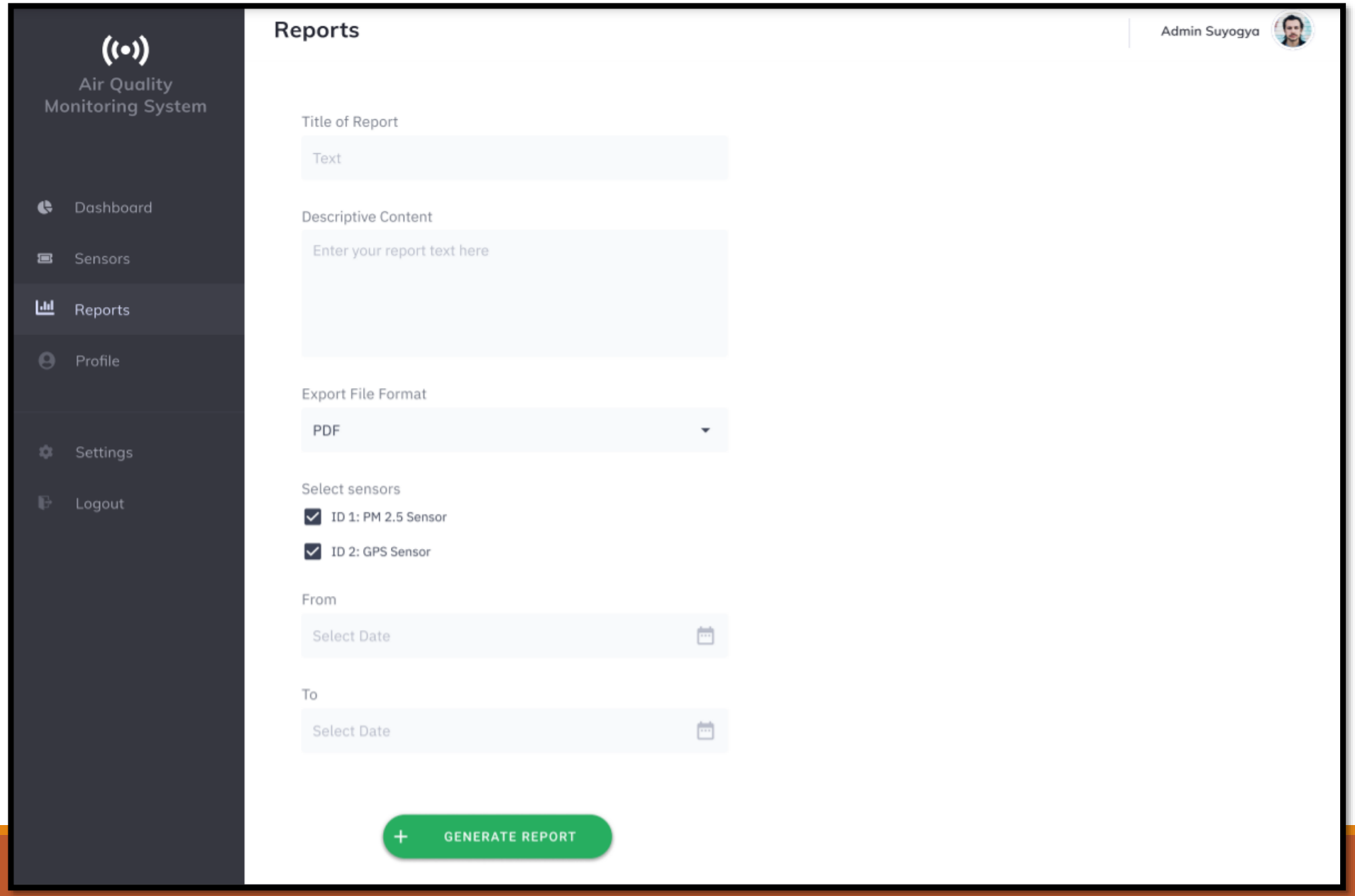
Admin Dashboard



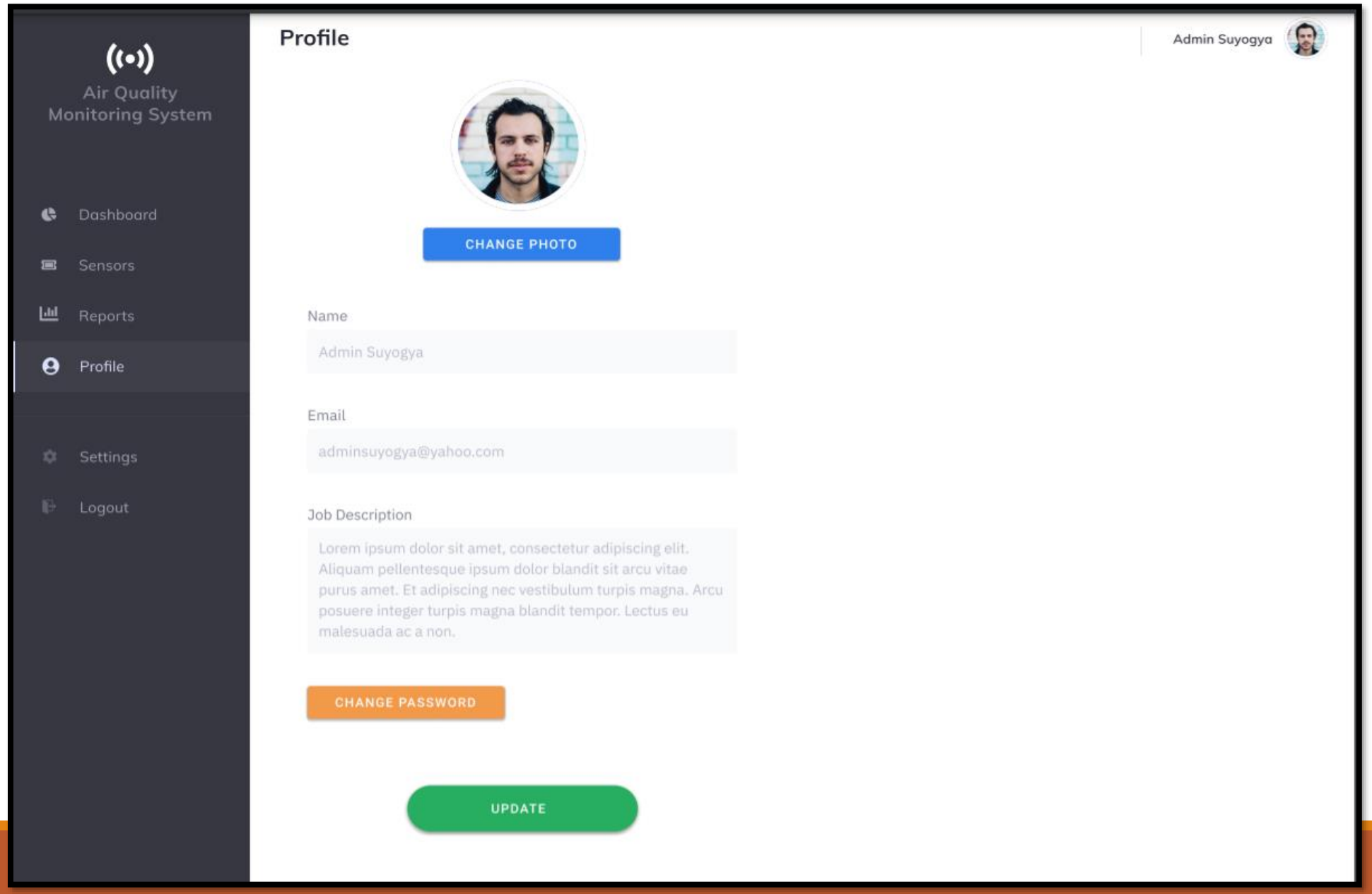
Sensors Management



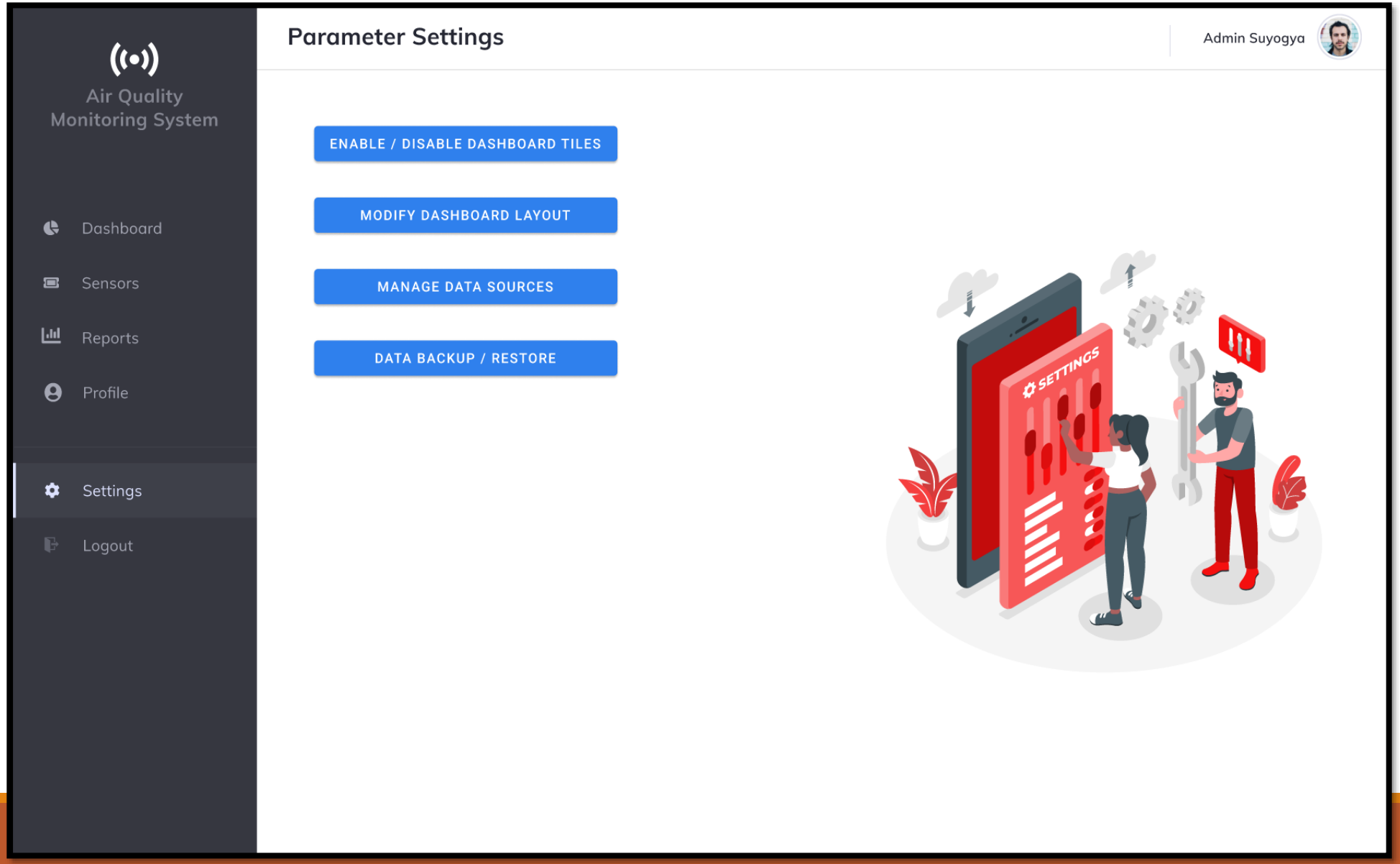
Reports


Air Quality Monitoring System
Dashboard
Sensors
Reports
Profile
Settings
Logout
Reports
Admin Suyogya
Title of Report
Text
Descriptive Content
Enter your report text here
Export File Format
PDF
Select sensors
ID 1: PM 2.5 Sensor
ID 2: GPS Sensor
From
Select Date
To
Select Date
GENERATE REPORT

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

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Questions and Feedback