

IOT-BASED PLATFORM

AIR QUALITY (PM2.5) MONITORING SYSTEM



Submitted to :

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AT70.19 Software Development and Quality Improvement

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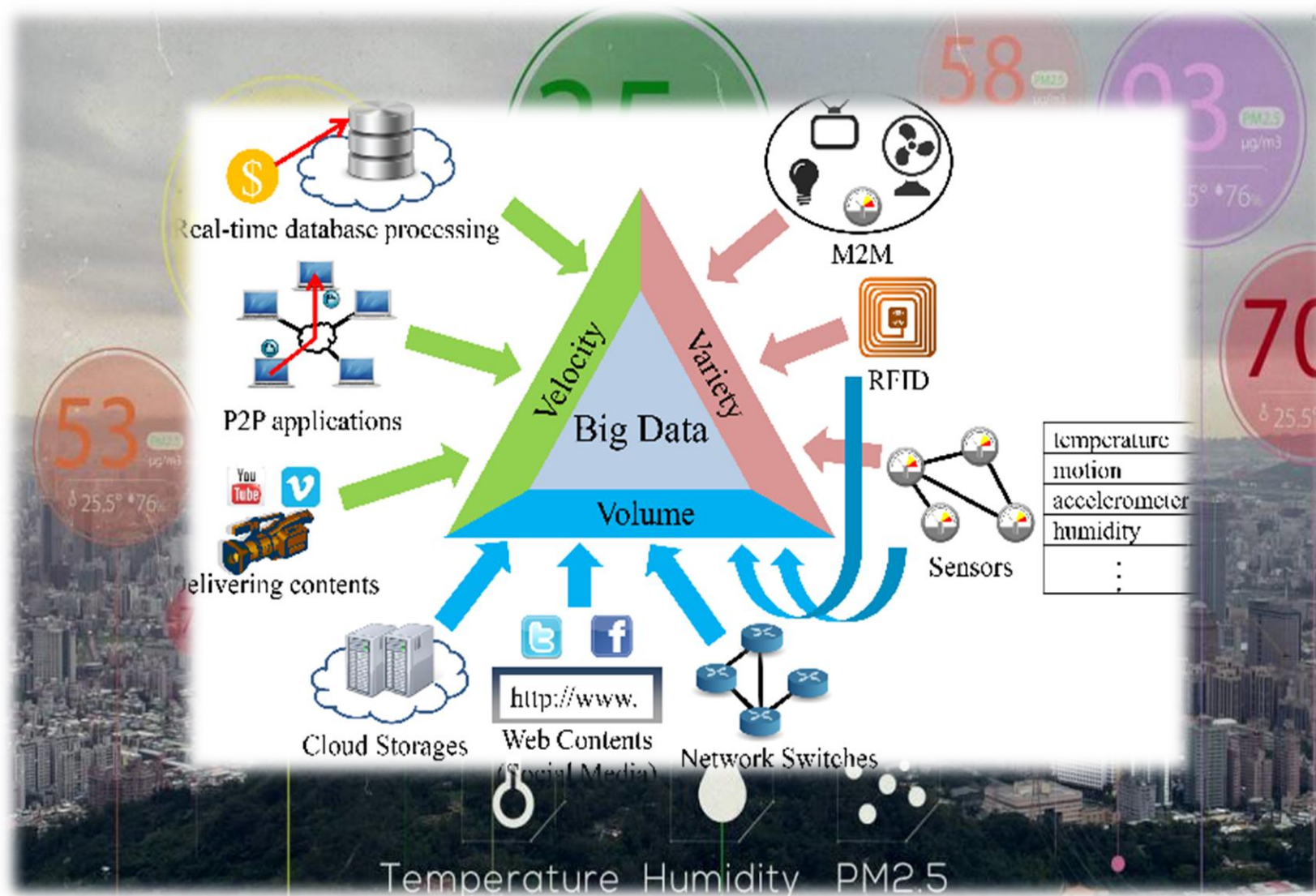
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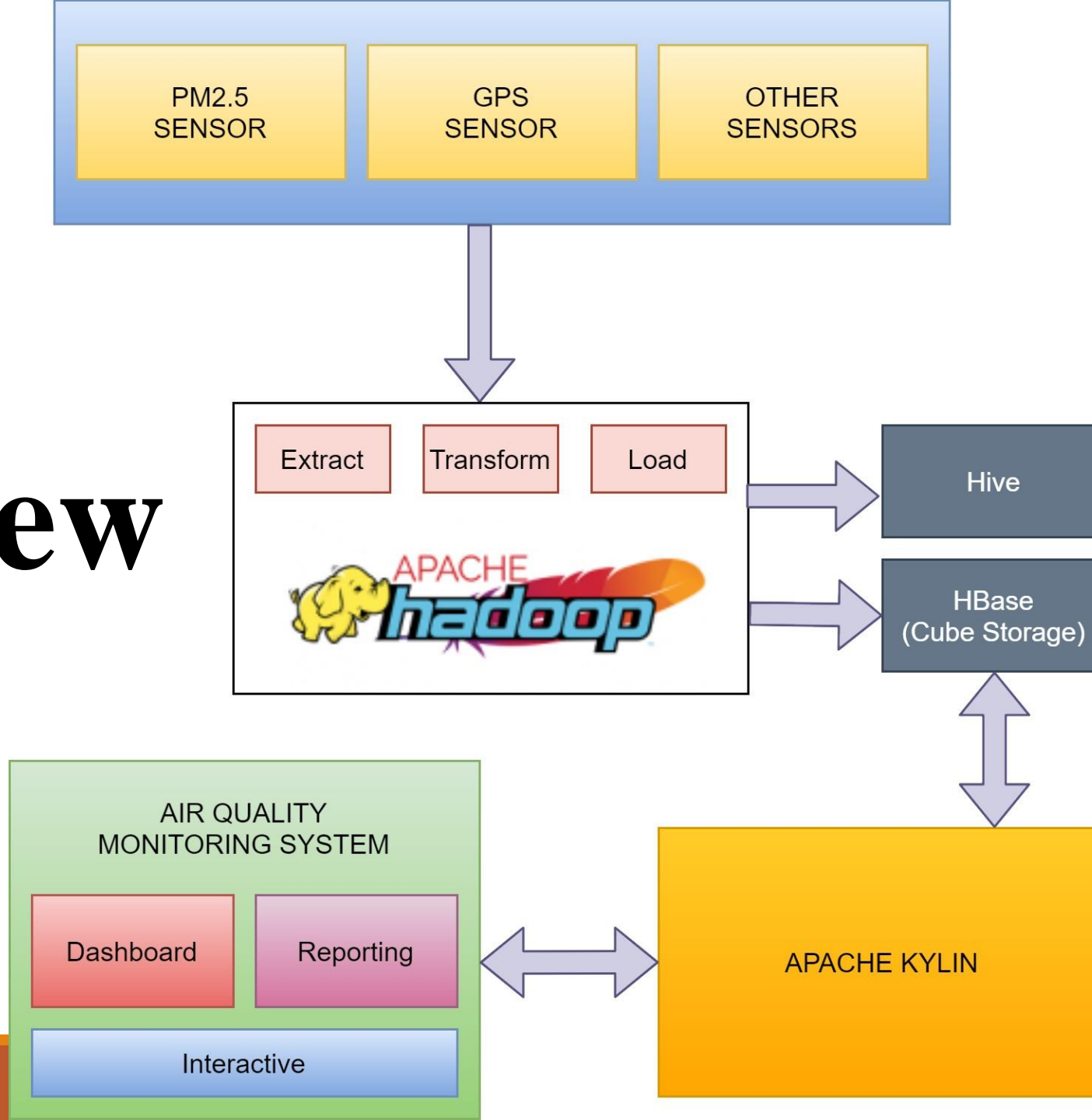
Outlines

1. Introduction
2. Overview
3. Functional requirements
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
9. Conclusion

Introduction



Overview



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.

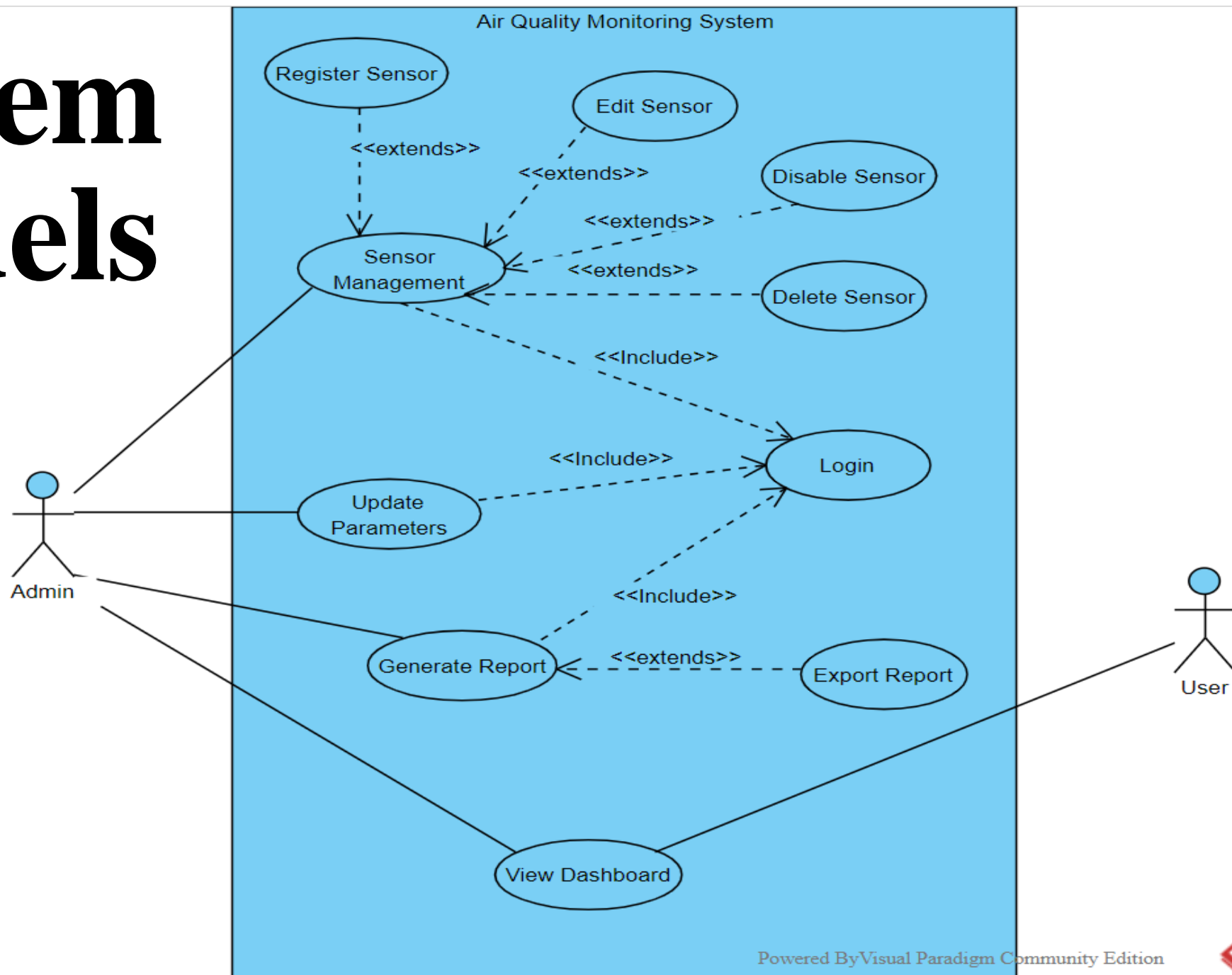
Nonfunctional requirements

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

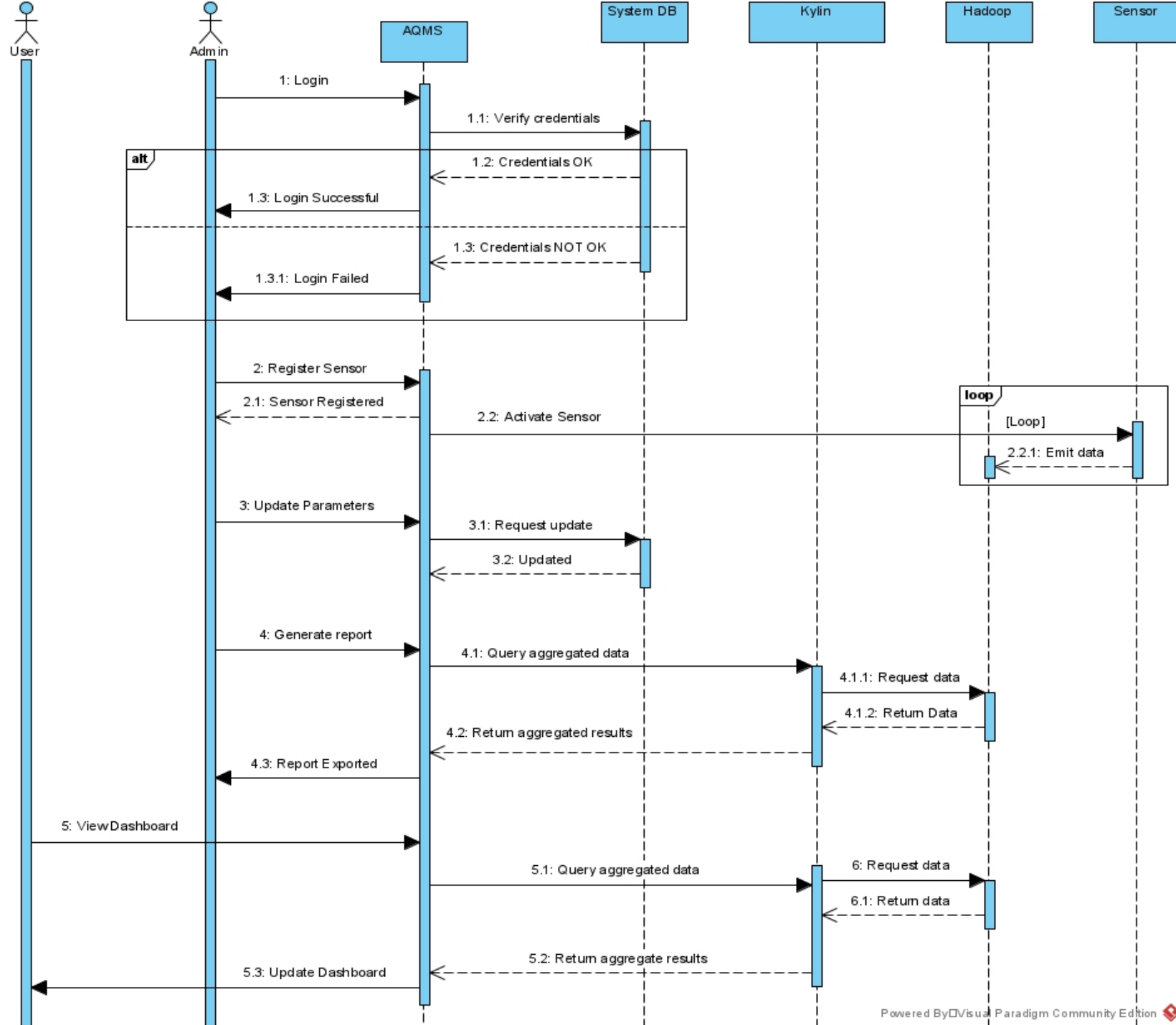
Schedule

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

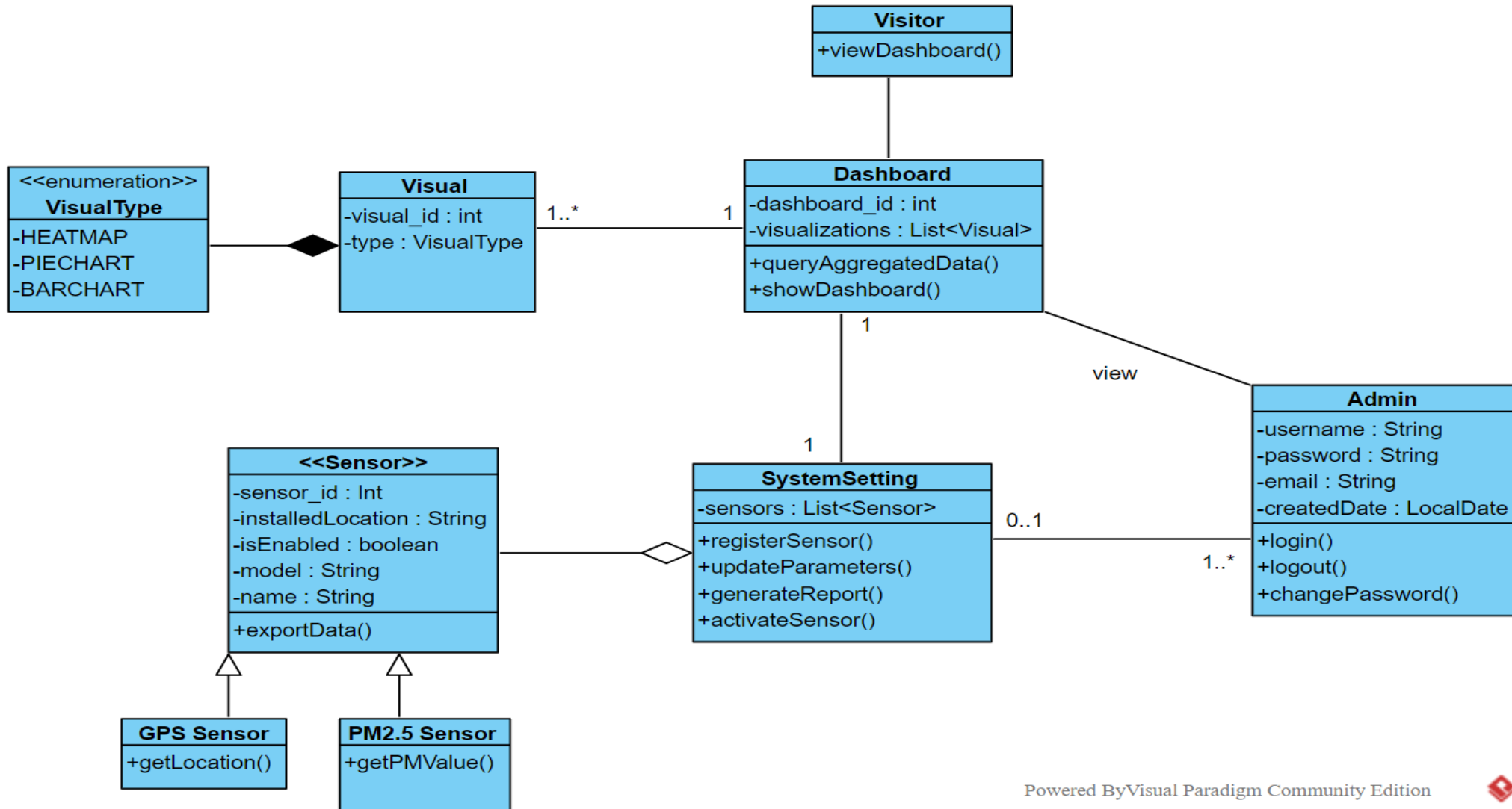
System models



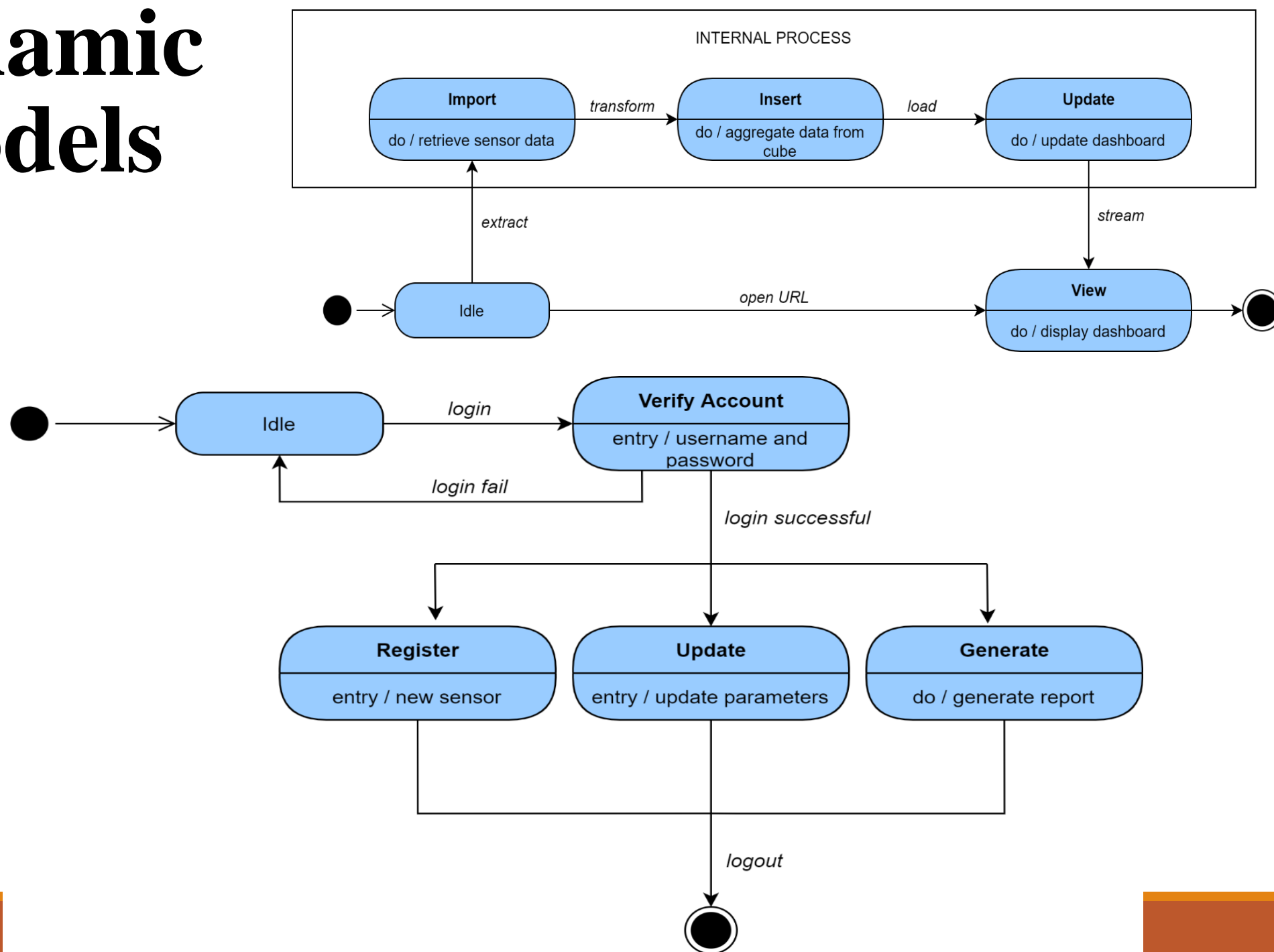
Dynamic models



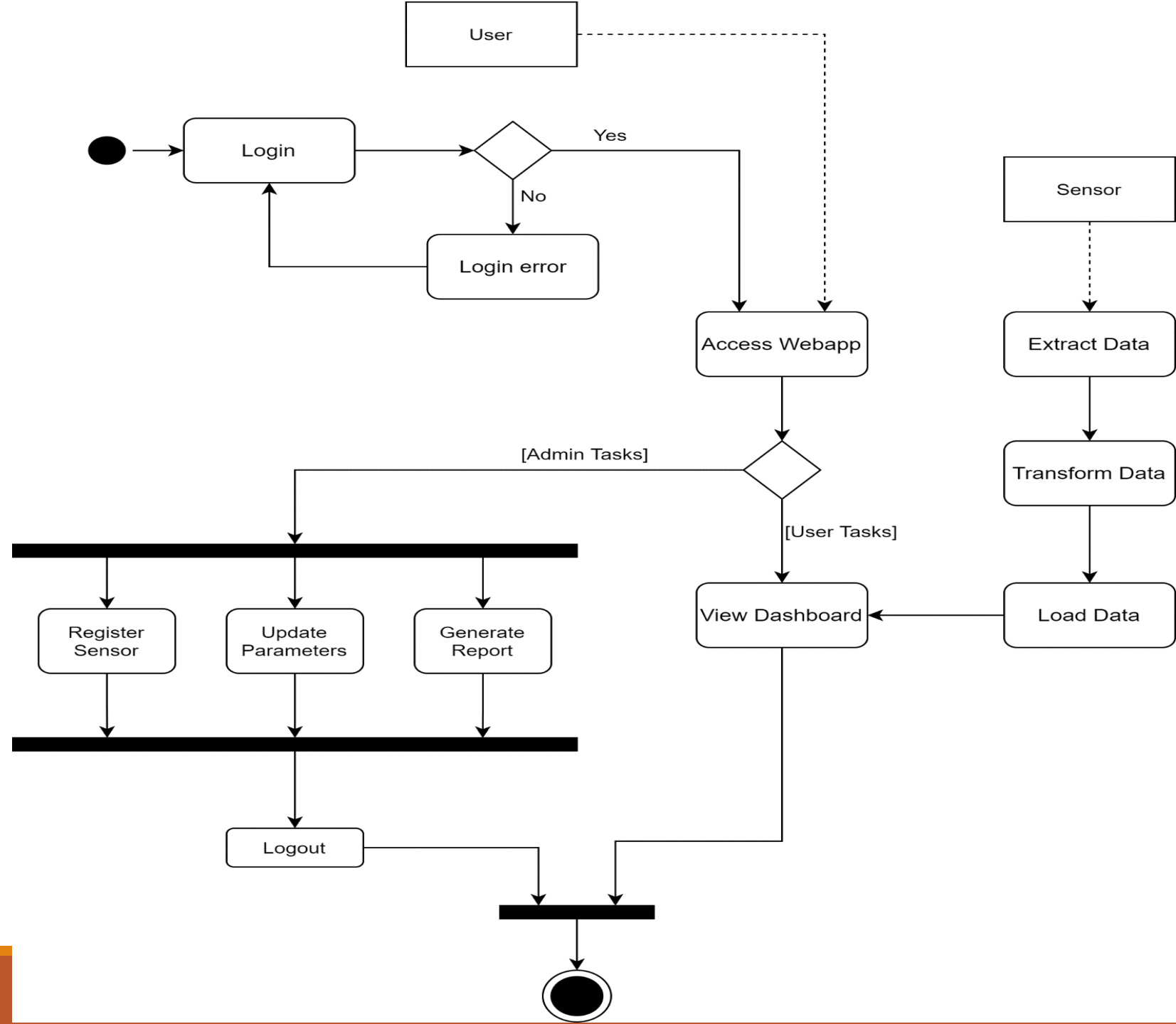
Object and class model



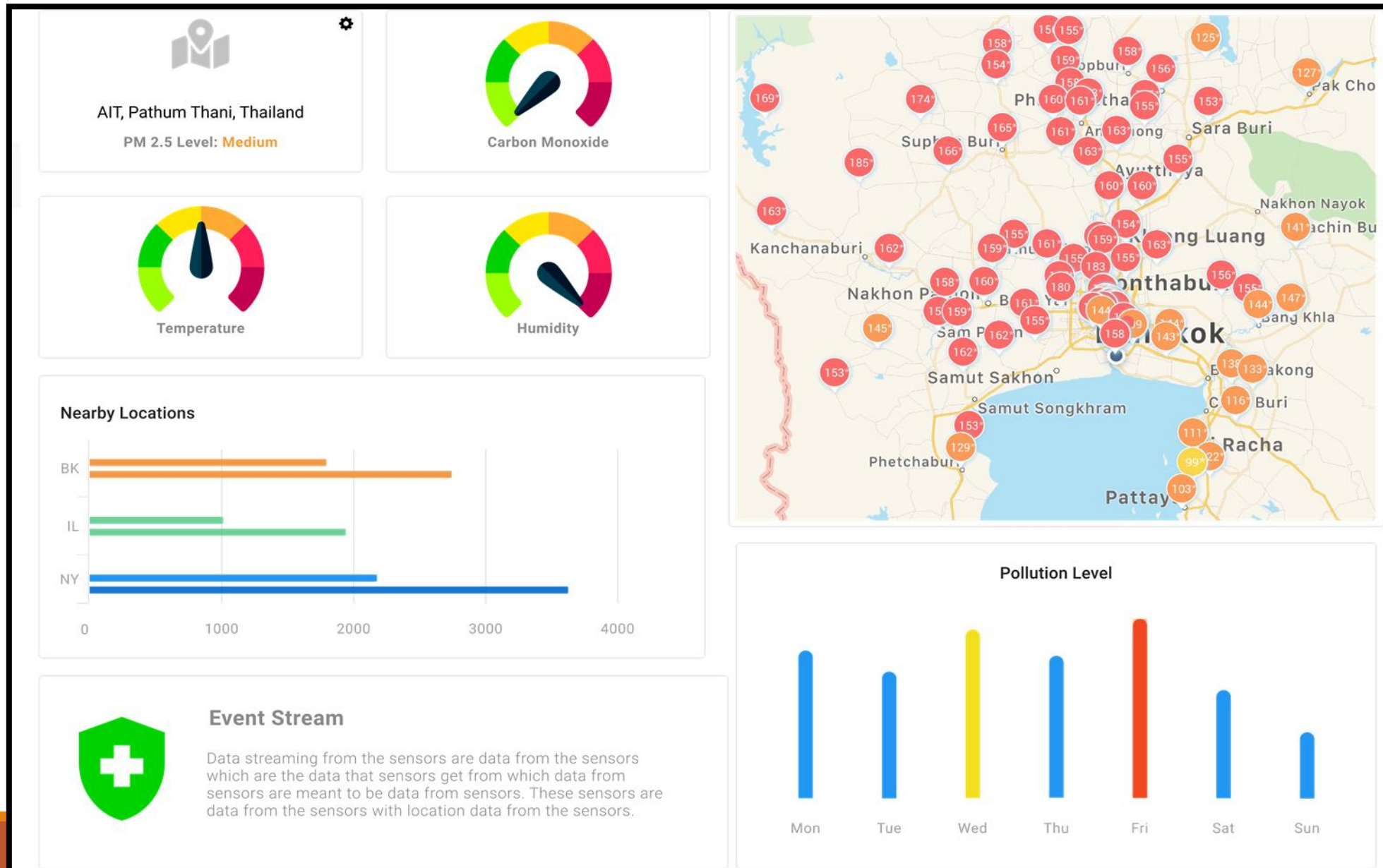
Dynamic models




Dynamic models



UI Mockups



Admin Login Form



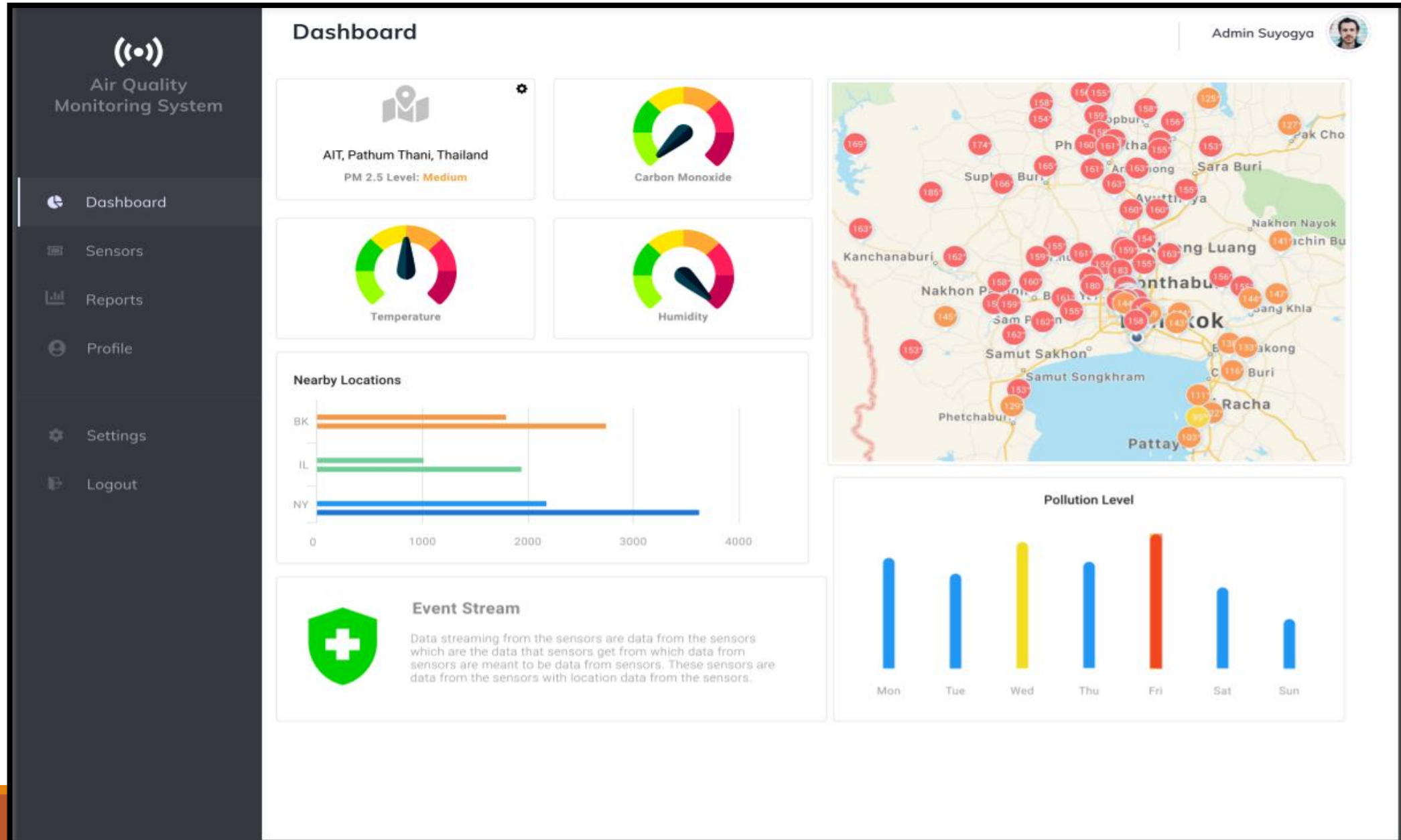
Air Quality
Monitoring System

Username


Password

LOGIN

Admin Dashboard



Sensors Management



Air Quality Monitoring System

Dashboard

Sensors


Reports

Profile


Settings

Logout

Sensors

Admin Suyogya 

+ REGISTER NEW SENSOR



ACTIVE

Name: PM 2.5 Sensor with Wifi


Model: DS-3821

API: www.airvisual.com/api/v2/

Type: Air Quality

Registered on: 2021-02-11

EDITDISABLEDELETE



ACTIVE

Name: GPS Sensor V2


Model: GPLOC-2281

API: www.getcoor.com/api/v3/

Type: Location

Registered on: 2020-02-20

EDITDISABLEDELETE



INACTIVE

Name: PM 2.5 Sensor Traditional

Model: WX-3331


API: www.checkair.com/api/v1/

Type: Air Quality


Registered on: 2018-01-10


EDITENABLEDELETE


Reports





Air Quality
Monitoring System


 Dashboard

 Sensors


 Reports

 Profile

 Settings

 Logout

Reports



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





Air Quality
Monitoring System


 Dashboard

 Sensors


 Reports


 Profile

 Settings

 Logout

Profile

Admin Suyogya 



CHANGE PHOTO

Name

Admin Suyogya

Email

adminsuyogya@yahoo.com


Job Description

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam pellentesque ipsum dolor blandit sit arcu vitae purus amet. Et adipiscing nec vestibulum turpis magna. Arcu posuere integer turpis magna blandit tempor. Lectus eu malesuada ac a non.


CHANGE PASSWORD


UPDATE


Parameter Settings





Air Quality
Monitoring System


 Dashboard

 Sensors

 Reports


 Profile

 Settings

 Logout

Parameter Settings

Admin Suyogya




ENABLE / DISABLE DASHBOARD TILES

MODIFY DASHBOARD LAYOUT

MANAGE DATA SOURCES

DATA BACKUP / RESTORE



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.



References

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

Questions and Feedback