LoneWorker IoT

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Objectives

- Ensure Worker Safety
- Timely and effective emergency response
- Enabling collective responsibility
- Ease of access
- Compliance with the law

Project Scope

The scope of the project will be constraint to :

- HMS (Heart Rate, Movement and Location Sensor)
- EMS (Gas (LPG/CO),Smoke , Temperature Sensors)
- Telemetry data will be collected from a single source
- One Surveillance stream to be analyzed
- Storing records of all events generated
- Solution implemented for a single user

System Overview

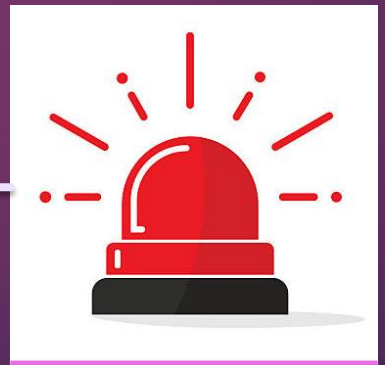
Workplace (EMS)

Surveillance (SAS)

Supervisor

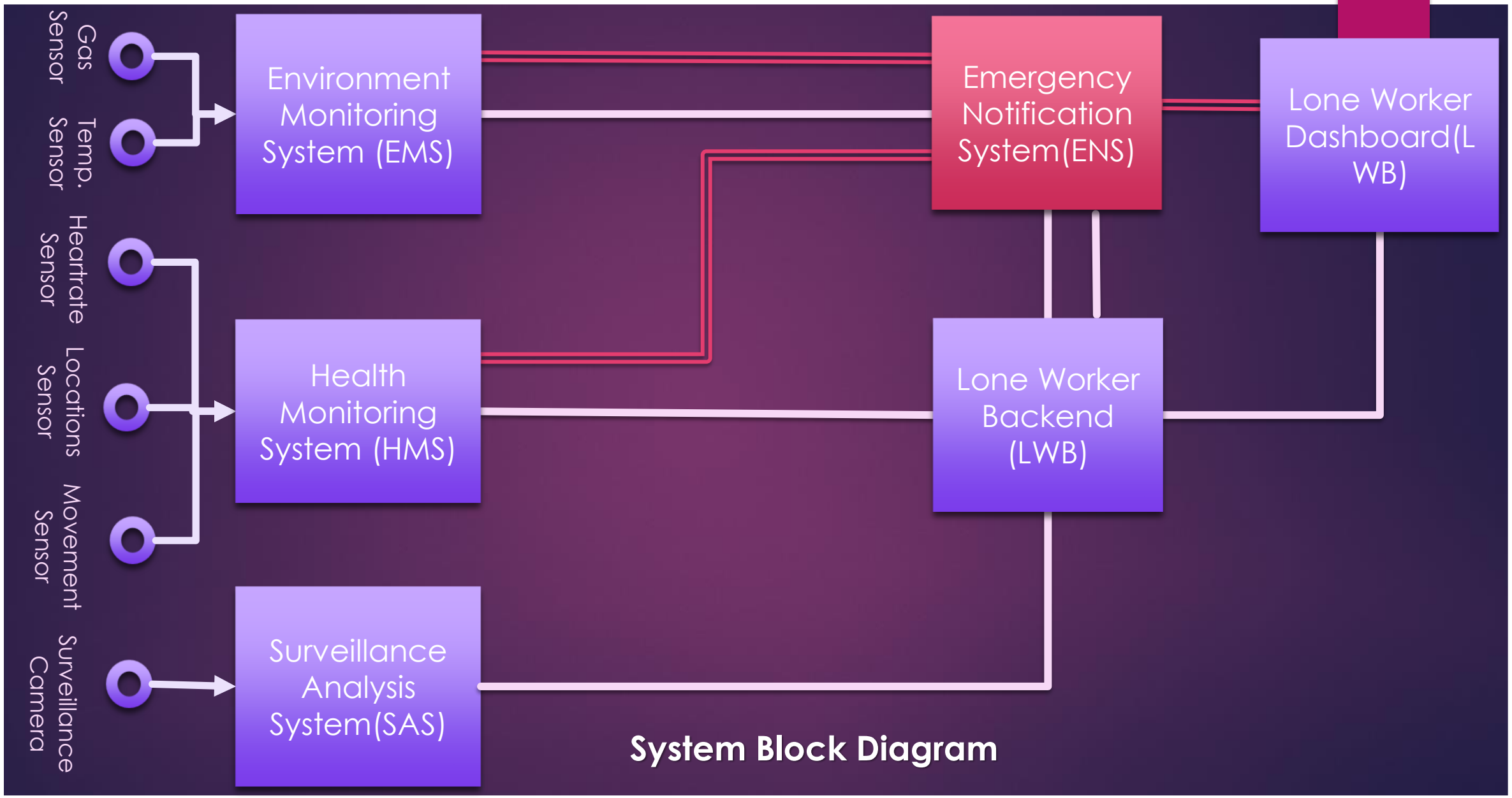
Lone Worker System

Worker(HMS)

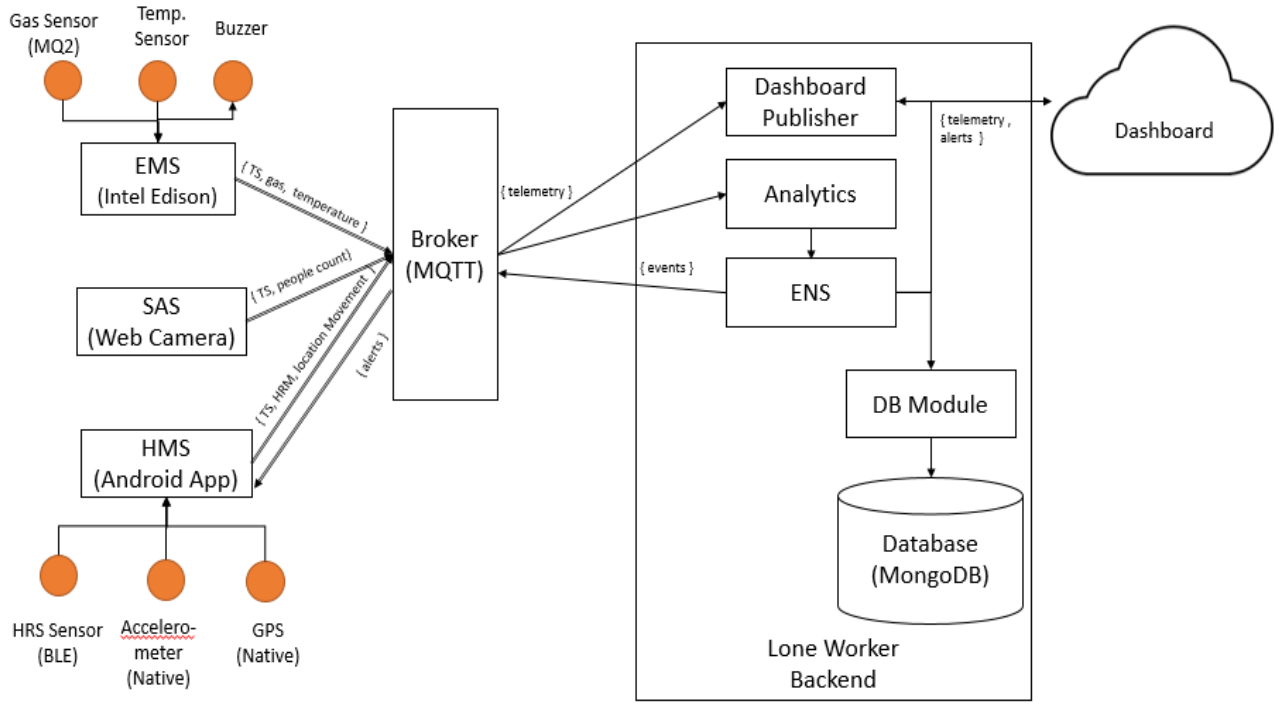


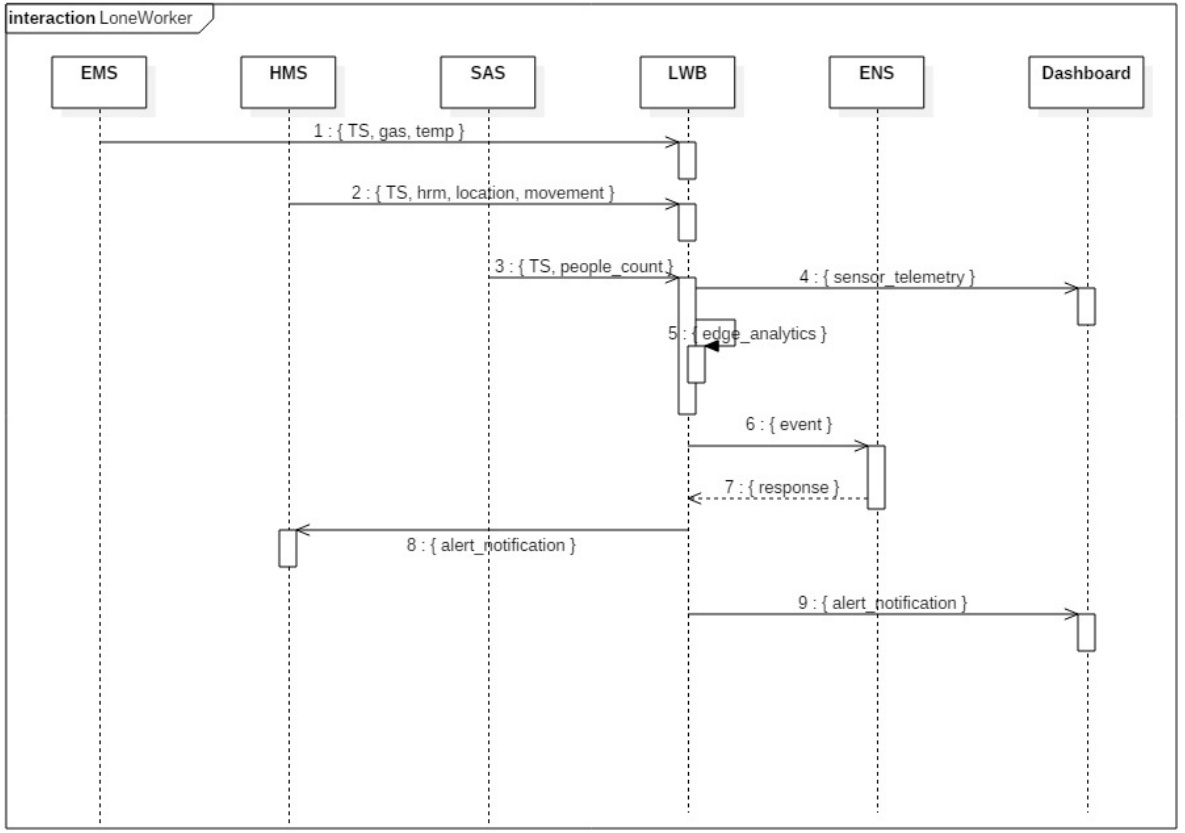
Alarm(ENS)

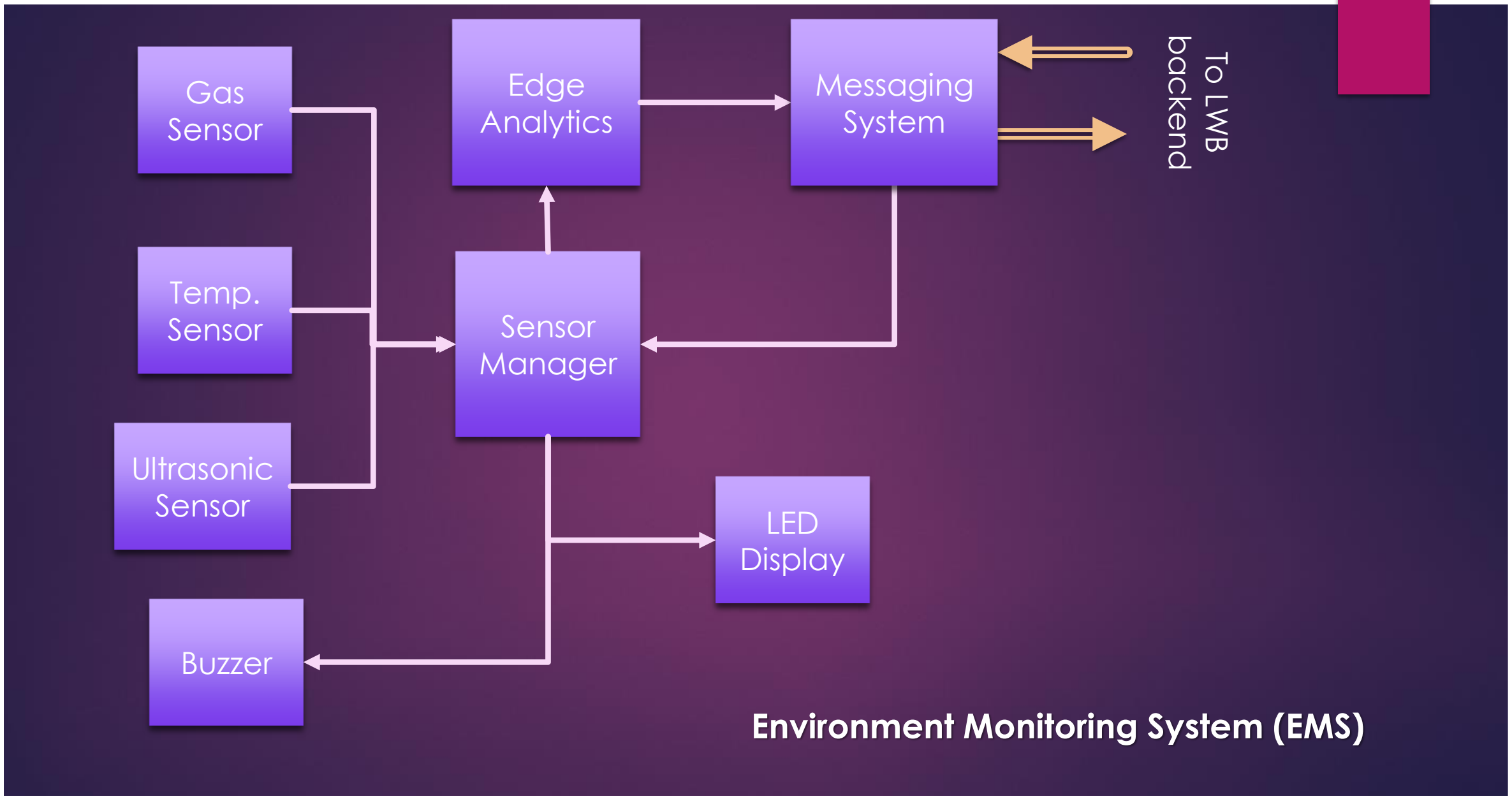
Components

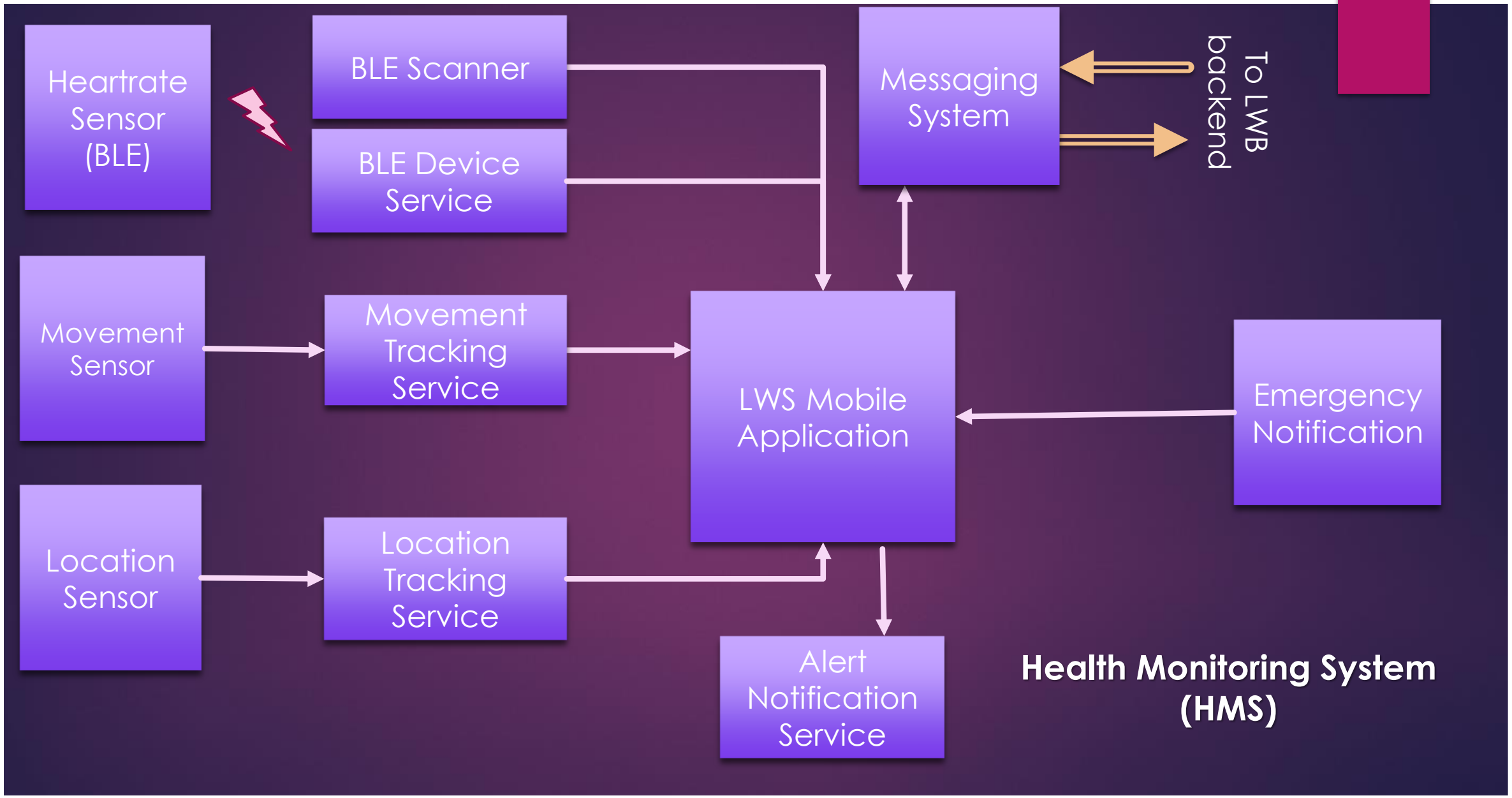

Gas Sensor
Temp. Sensor
Heartrate Sensor
Locations Sensor
Movement Sensor
Surveillance Camera
Environment Monitoring System (EMS)
Health Monitoring System (HMS)
Surveillance Analysis System(SAS)
Emergency Notification System(ENS)
Lone Worker Backend (LWB)
Lone Worker Dashboard(LWB)
System Block Diagram

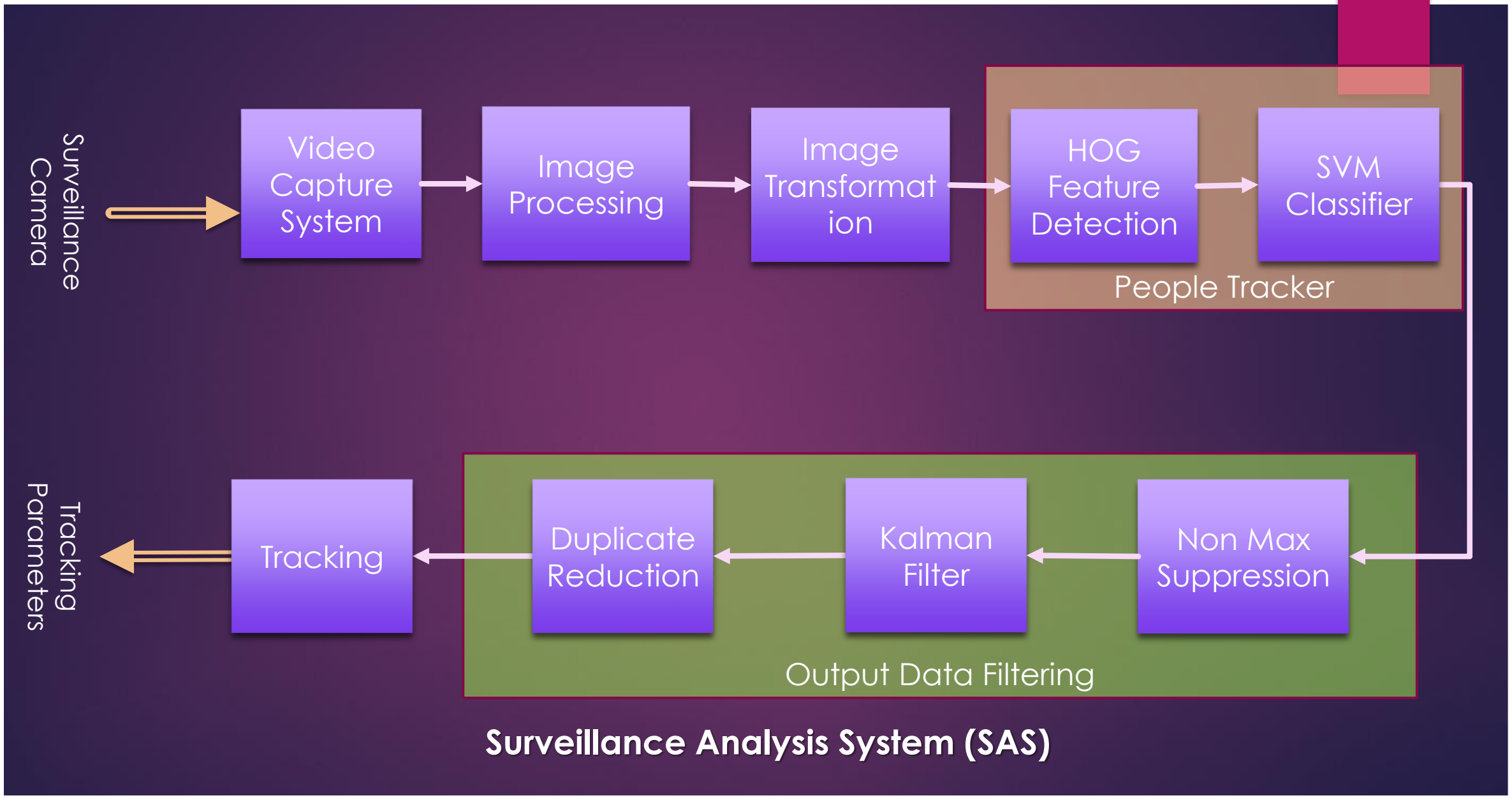
Overall Architecture





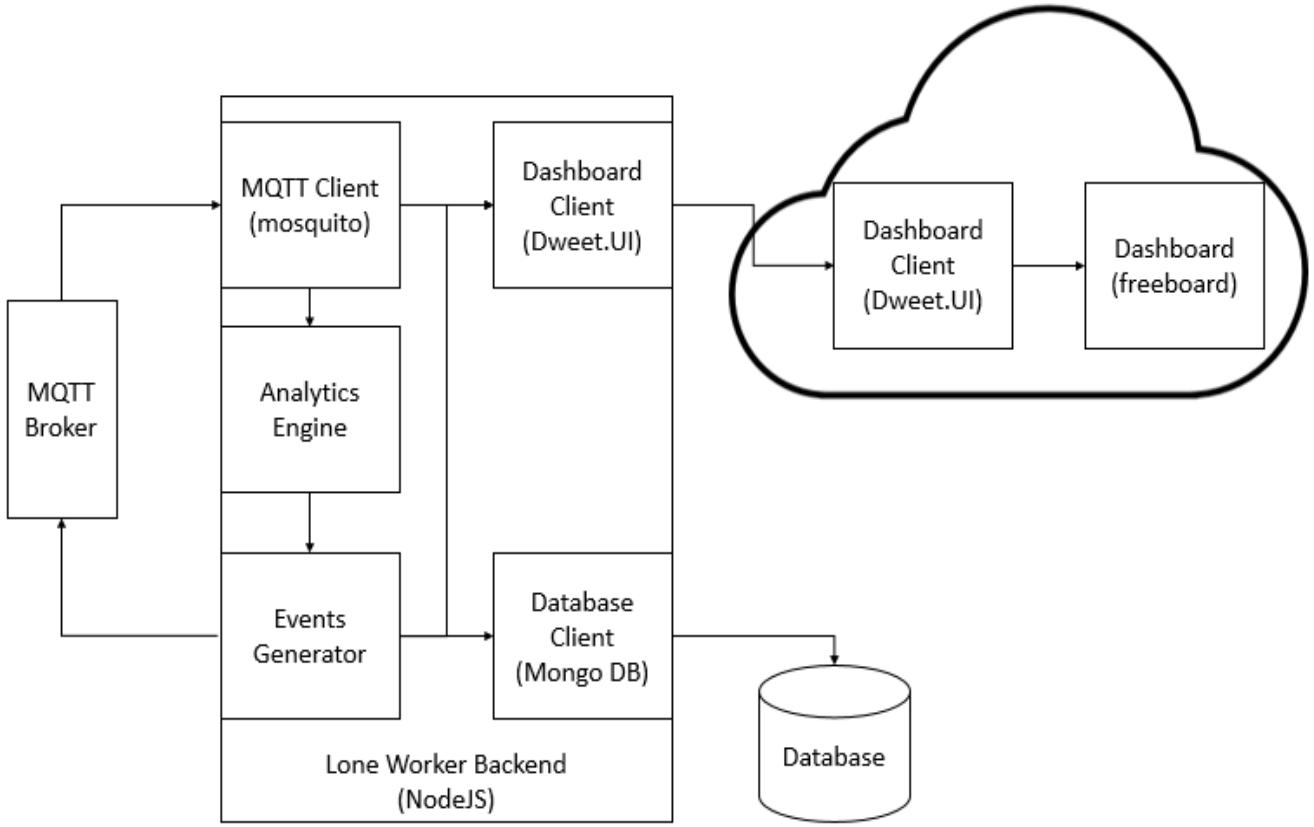

Gas Sensor
Temp. Sensor
Ultrasonic Sensor
Buzzer
Edge Analytics
Sensor Manager
Messaging System
LED Display
To LWB backend
Environment Monitoring System (EMS)


Heartrate Sensor (BLE)
BLE Scanner
BLE Device Service
Messaging System
To LWB backend
Movement Sensor
Movement Tracking Service
LWS Mobile Application
Emergency Notification
Location Sensor
Location Tracking Service
Alert Notification Service
Health Monitoring System (HMS)


Surveillance Camera
Video Capture System
Image Processing
Image Transformation
HOG Feature Detection
SVM Classifier
People Tracker
Tracking Parameters
Tracking
Duplicate Reduction
Kalman Filter
Non Max Suppression
Output Data Filtering
Surveillance Analysis System (SAS)

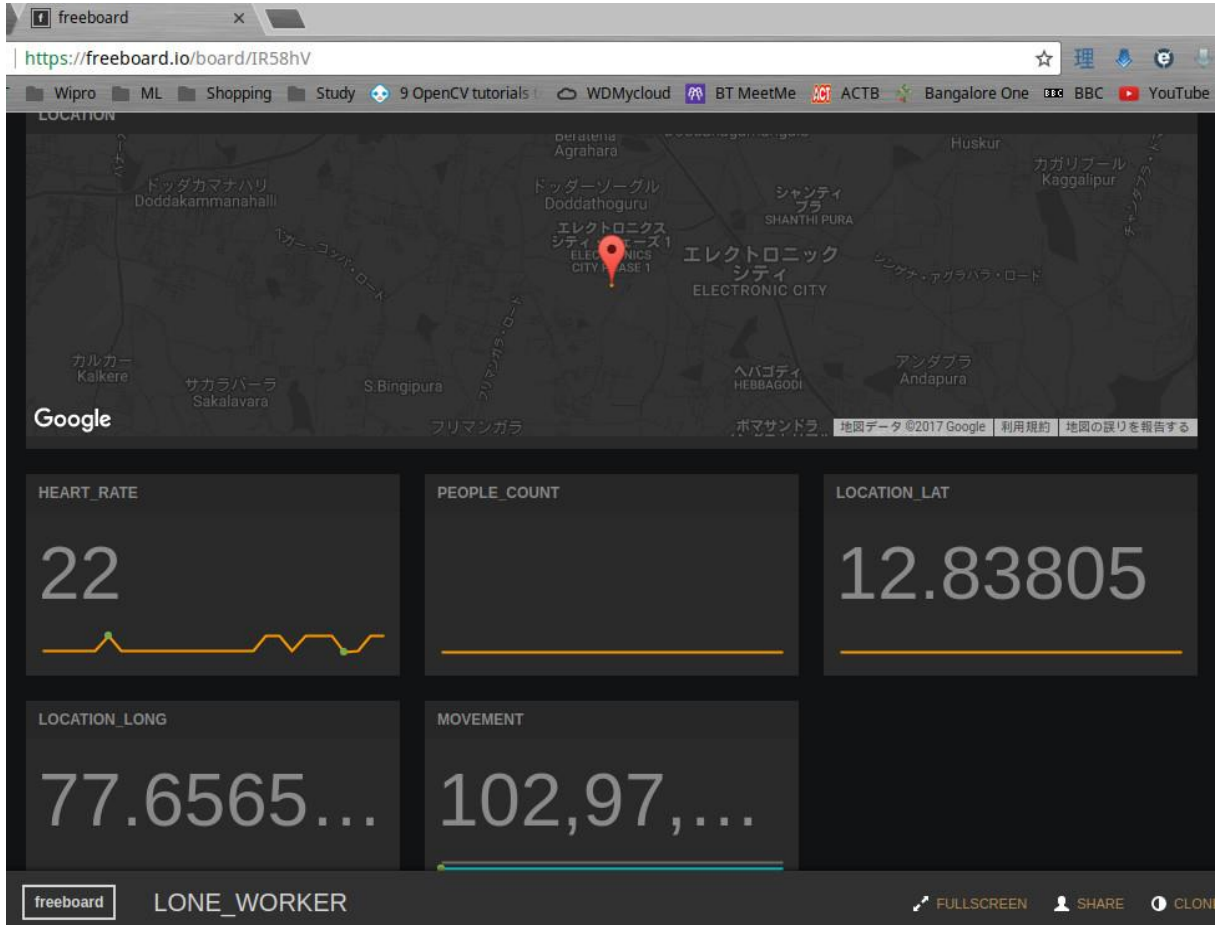
From EMS / HMS / SAS
Messaging System
Event Management
Device Management
Device Registration
Alert Notification
Publisher
To Dashboard
Lone Worker Backend (LWB)
Tracking Parameters

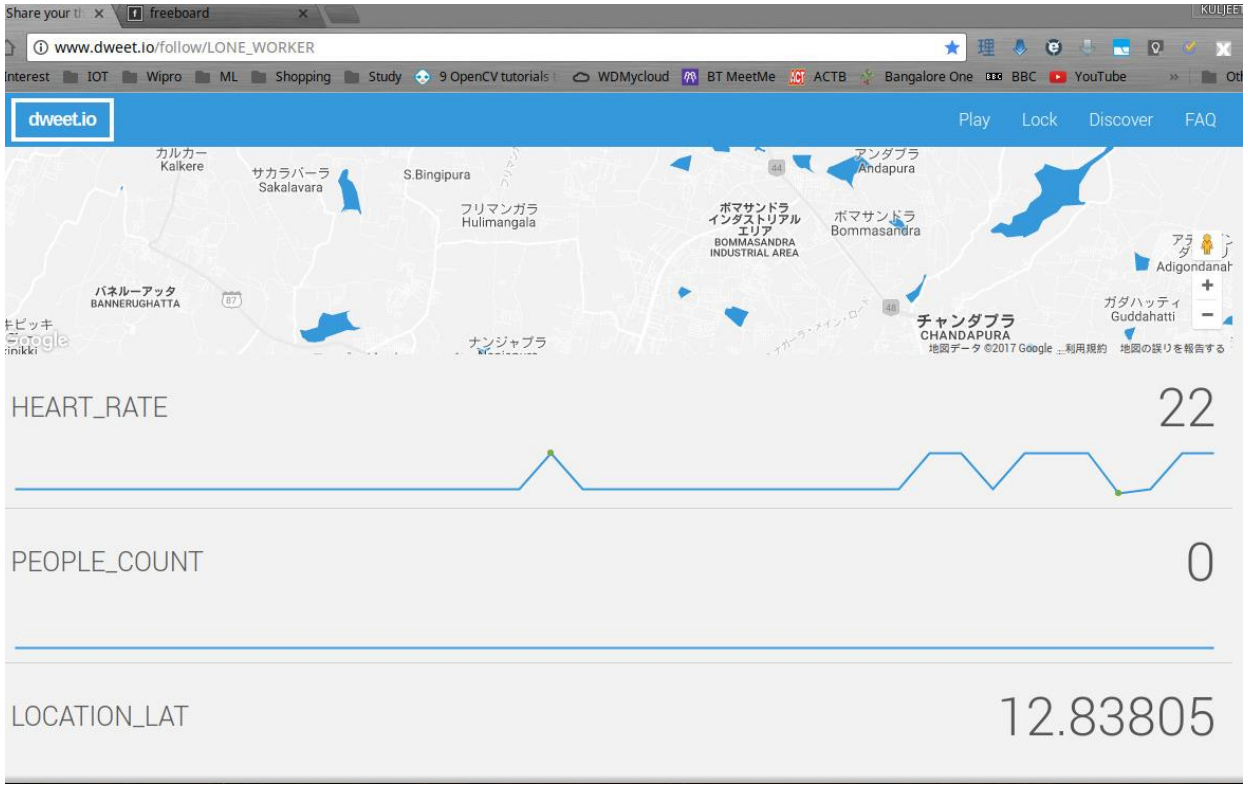
Block diagram




```
/bin/bash 82x19
2017-09-05 13:48:39
6
Worker in distress : Heart rate low
12.838050
77.656554
false
2017-09-05 13:48:40
4
12.838050
77.656554
Worker in distress : Heart rate low
false
2017-09-05 13:48:42
4
Worker in distress : Heart rate low
12.838050
77.656554
false
```

Results


freeboard
https://freeboard.io/board/IR58hV
Wipro
ML
Shopping
Study
9 OpenCV tutorials
WDMycloud
BT MeetMe
ACTB
Bangalore One
BBC
YouTube
LOCATION
Google
HEART_RATE
22
PEOPLE_COUNT
LOCATION_LAT
12.83805
LOCATION_LONG
77.6565...
MOVEMENT
102,97,...
freeboard
LONE_WORKER
FULLSCREEN
SHARE


freeboard
www.dweet.io/follow/LONE_WORKER
dweet.io
Play
Lock
Discover
FAQ
HEART_RATE
22
PEOPLE_COUNT
0
LOCATION_LAT
12.83805

Tools and Technologies

Operating System	Linux (Ubuntu 16.04 / Yocto) , Android
Languages	Python, Java, JavaScript, C
Framework	Intel UPM, MRAA libraries, OpenCV, Android Application Framework
Database	None
Messaging	MQTT, WebSockets
Commercial Off the Shelf (COTS) Packages:	OpenCV libraries, Freeboard/Dweet Cloud
Testing Platform	Linux, Android, Arduino/Intel Edison
Others	