CAPSTONE DESIGN PROJECT

BATCH-16

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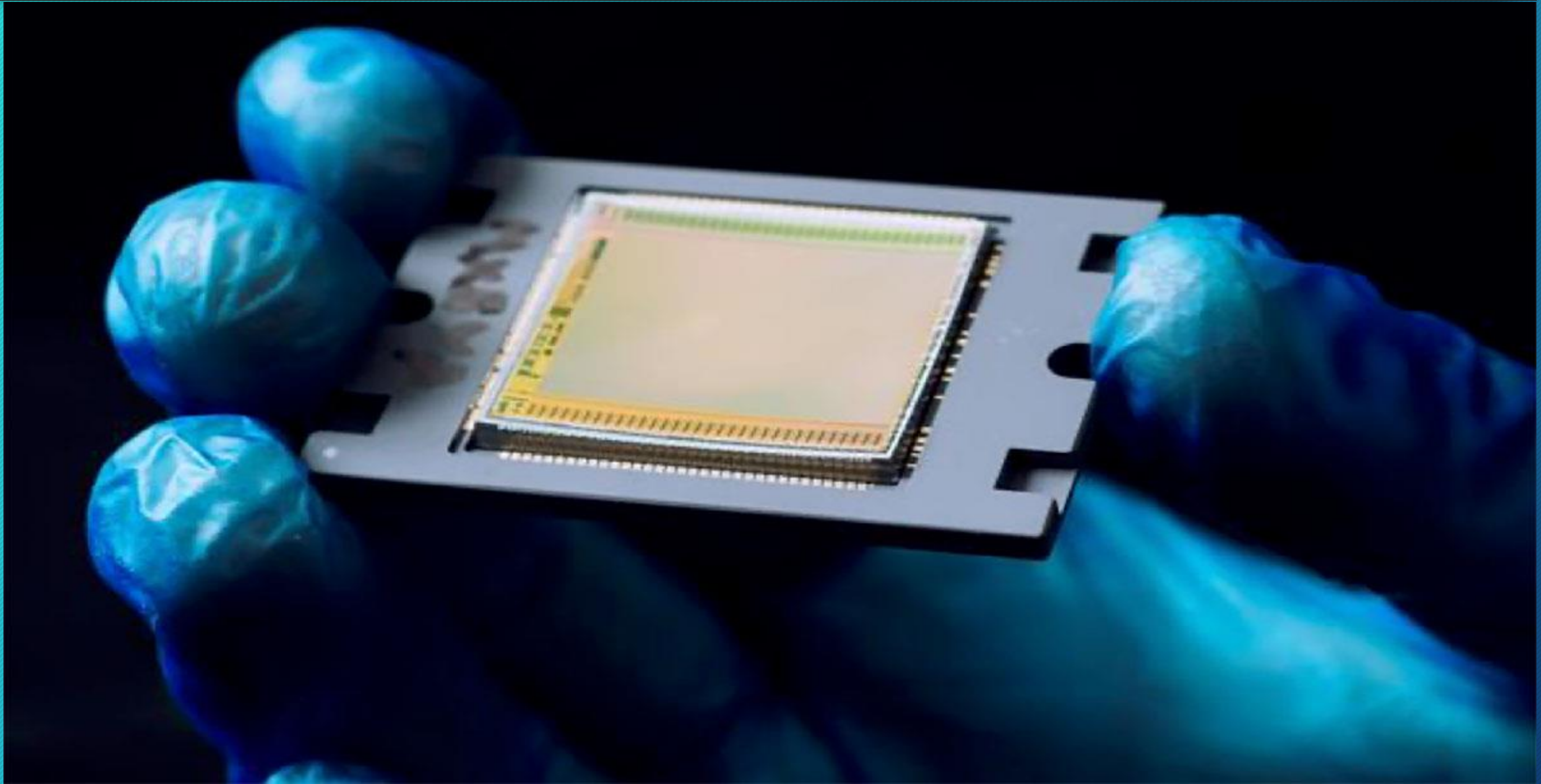
IOT Based Vehicle monitoring system with Automatic report generation



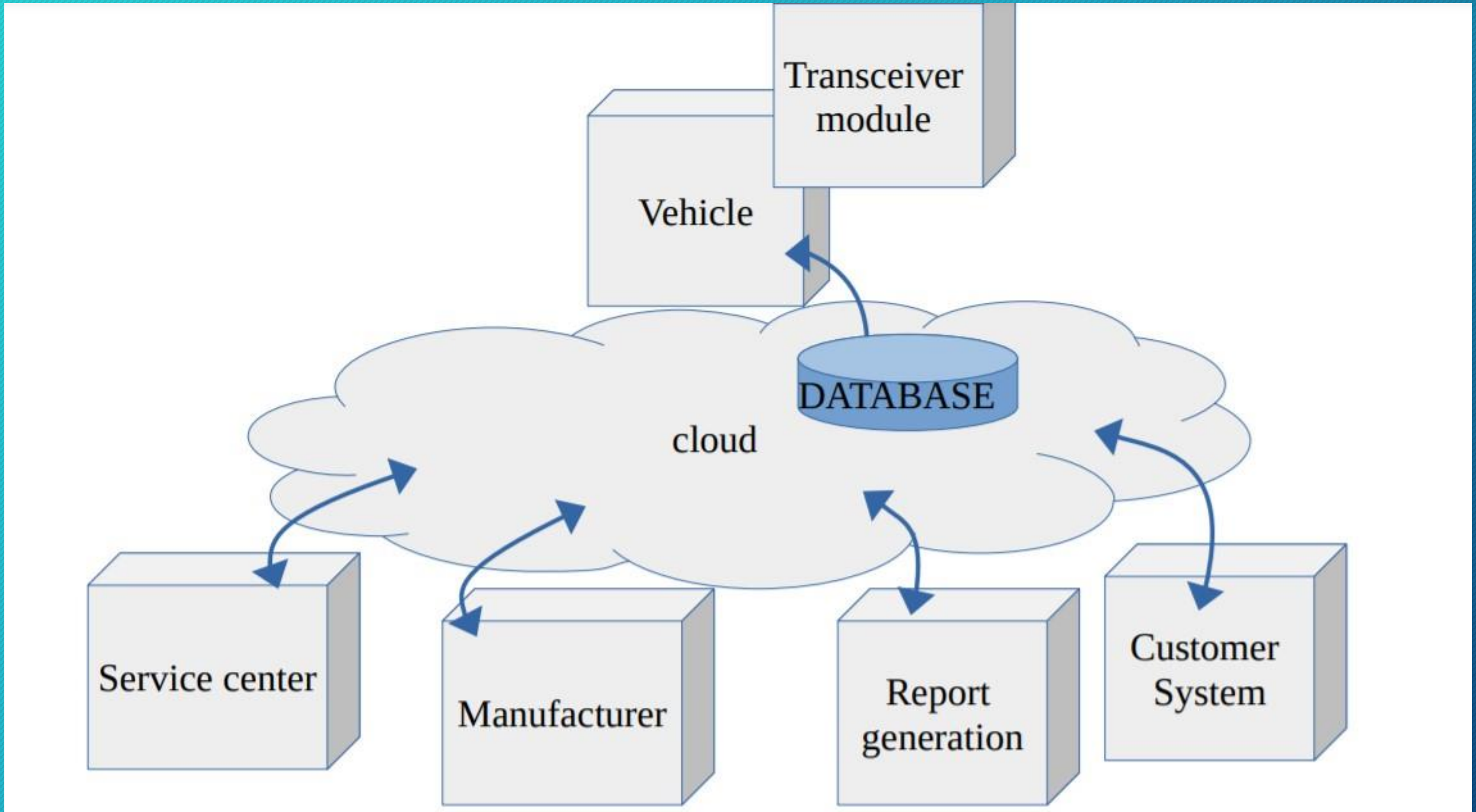
INTRODUCTION

- The future of IoT is virtually unlimited due to advances in technology and consumers desire to integrate devices such as smart phones with household machines.
- Many automotive manufactures are now moving towards a IOT platform for manufacturing and for service purposes.
- The main advantages of using IoT in cars are: Optimized maintenance and logistics.
- Our ideas is to monitor vehicle status (fuel, efficiency/Km, battery, oil levels etc..,.) to the customer as well as the manufacturer.

CONCEPT

- The main aim of every car manufacturer is to increase the life of the car and it’s crucial to maintain the car in a good condition to achieve it.
- Many problems in vehicles arise due to improper maintenance. Many lose track of their service status and it’s a tiring process to keep in touch with every customer for a large automotive industry.
- If we maintain a system, that automatically updates the vehicles conditions periodically to a specified server, and the system will generate a report, that will be forwarded to the customer and the service team, a lot of manual work will be removed.
- We as a team provide a IOT solution for vehicle maintenance and report generation system.

FLOW DIAGRAM-I



FUNCTIONAL DECOMPOSITION

- Our system collects data from the sensors available in the car itself and reports it to a transceiver module(ESP8266) which is connected to a database in cloud.
- The when a new data is updated/inserted into the table an event is triggered. This event updates the information in the dashboard, which will be displayed to the customer and manufacturer.
- Then a weekly/monthly/yearly report generation event is triggered, which will mail the report to the specified recipient.

FUNCTIONAL DECOMPOSITION

Data collection:

The data is collected from the sensor stream of the car. This data is redirected to the ESP8266 module. The ESP8266 is connected to the server, that is allotted to car. The ESP8266, when all data is collected, converts it into a JSON file. Then the server sends a post request to the server.

Event trigger:

Many database servers provide pl/sql based triggers. Here an Update and Insert trigger is created for the table. Oracle server provides a wide range of PL/SQL functions. The IP of ESP8266 is connected to the oracle server, which on periodic update in table triggers an event.

Dashboard:

The dashboard is created using HTML and CSS and deployed in cloud using NODE JS framework. Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser.

FUNCTIONAL SPECIFICATION

Hardware:

ESP8266 CP2101 module(CAR)

ESP8266 CP2101 module(HOME)

Programming Language:

SQL

Java script (Node JS)

C++(Arduino .ino)

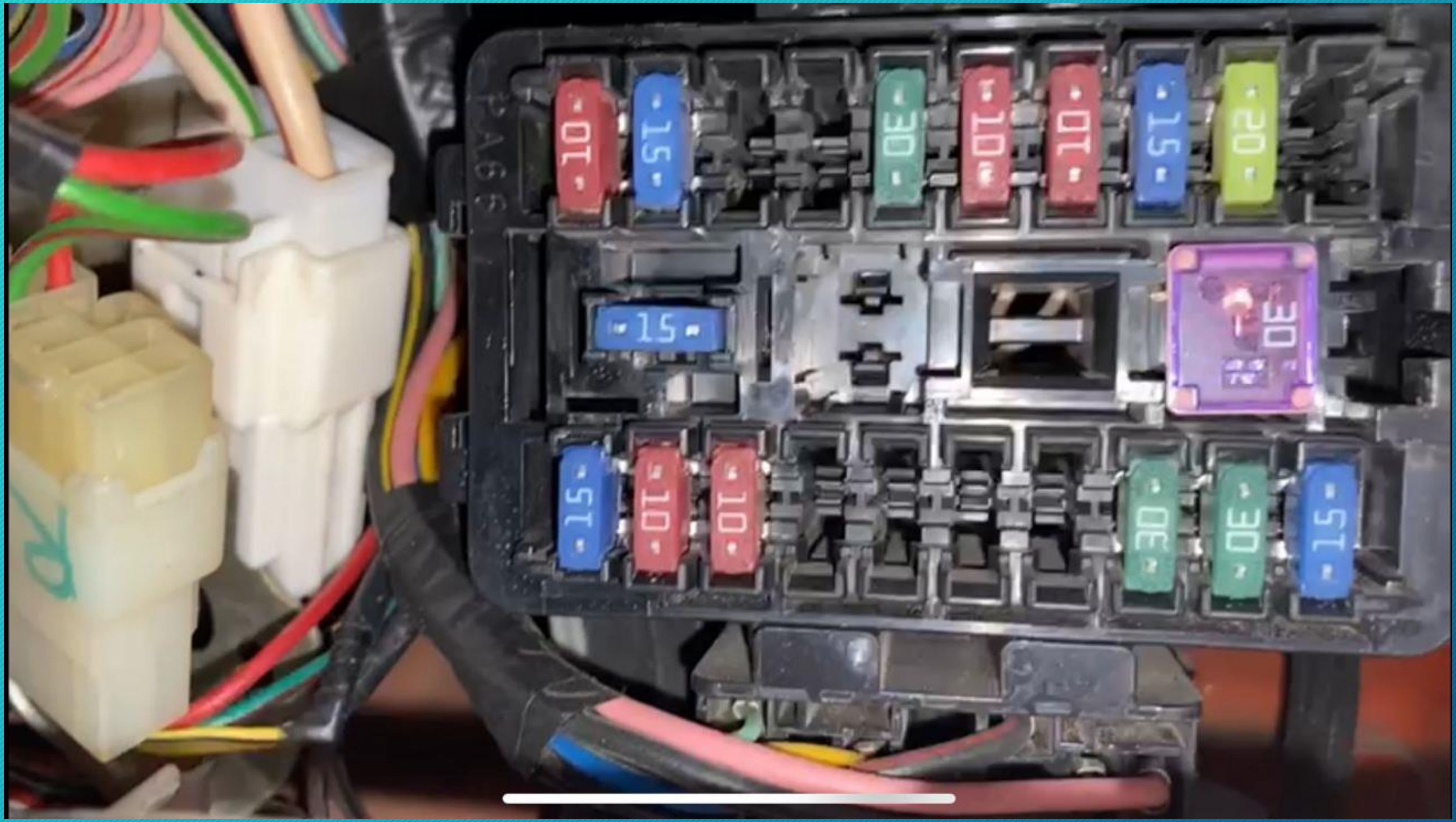
HTML CSS

Cost = 390

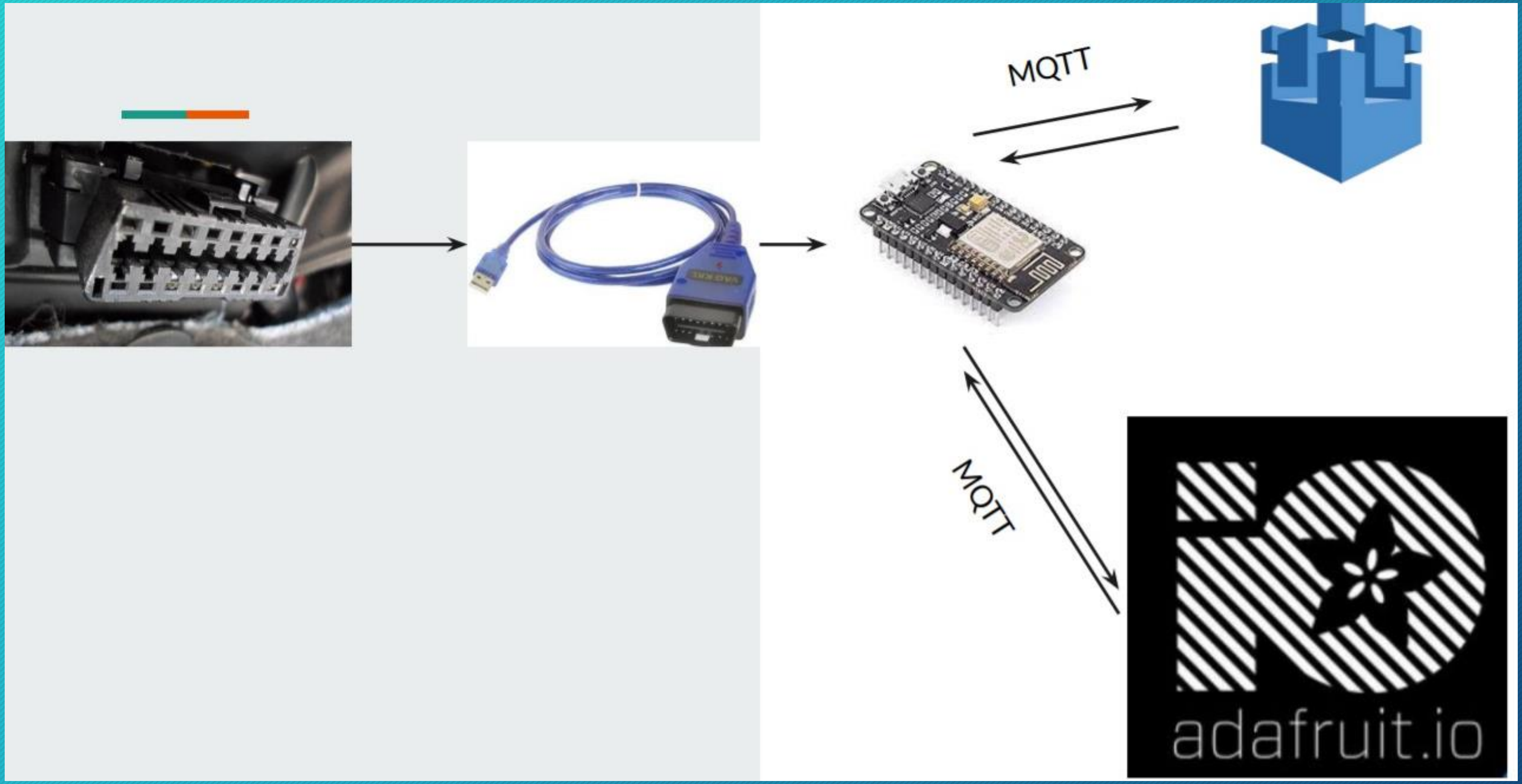
OBD Port

- The OBD Port, is located in every cars from where you can plug in any OBD tool into the vehicle to pull vehicle information.
- Nowadays, cars have up to 80 built-in ECUs in their system. An ECU stands for “electronic control unit”. These units are embedded in the car and they control one or more electrical systems of a vehicle.
- For example, there is a specific ECU in your car that controls the fuel system. With an OBD reader, you are able to access this ECU to get data about your fuel system.
- The embedded software in these ECU makes cars more sophisticated, not just in their functions but also in how much data they provide

OBD Port in Cars



Flow Diagram-II



IoT Rules and AWS SNS

IoT RULES:

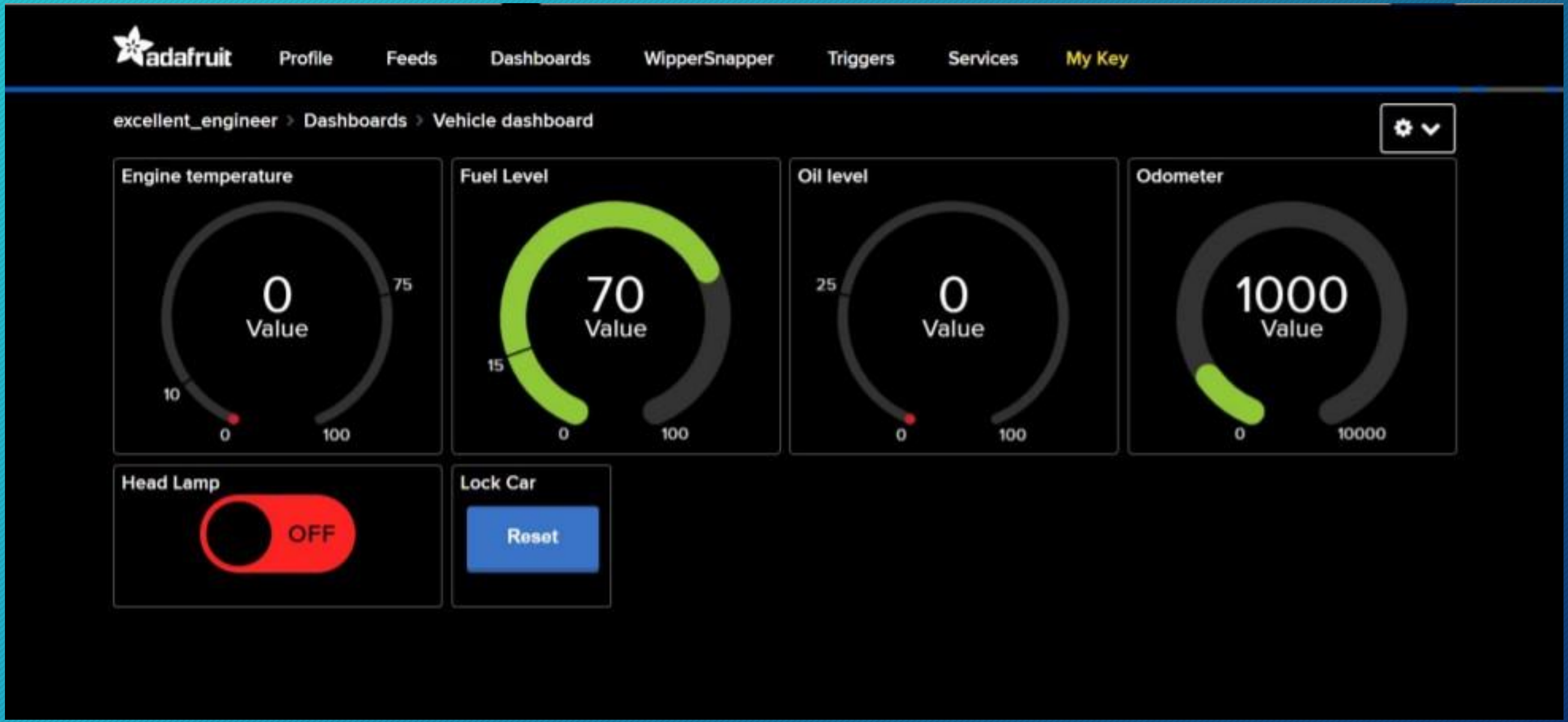
AWS IoT rules send data from your devices to other AWS services. They listen for specific MQTT messages, format the data in the message payloads, and send the result to other AWS services.

AWS Simple notification service(SNS):

Amazon Simple Notification Service (Amazon SNS) is a fully managed messaging service for both application-to-application (A2A) and application-to-person (A2P) communication.

Dashboard

The dashboard is developed using Adafruit.io. This website provides dashboard development for MQTT based devices.



Engine temperature 0 Value

Fuel Level 70 Value

Oil level 0 Value

Odometer 1000 Value

Head Lamp OFF

Lock Car

THANK YOU!