Technical Architecture & stack

Cloud Deployment

Date	19 September 2022
Team ID	PNT2022TMID43270
Project Name	Signs with smart connectivity for better road safety
Maximum mark	2Marks

Role of IoT in road safety and traffic management

Transport, travel, and roads are an integral part of every country and make a difference in every citizen's life. The well-being and development of a country significantly depend on the road and traffic of the country. India is focusing a lot on smart cities with safe, efficient, and congestion-free transport. With the exponential modernization comes the need for safer and smarter roads, as roads are said to be the nervous system of a nation.

However, the world witnesses an alarmingly high number of road accidents and related property damage. According to the WHO (World Health Organization), approximately 1.35 million people die every year due to road traffic accidents, and up to 50 million more suffer non-fatal injuries.

Connected cars

The global market for car data could grow as high as $750 billion by 2030, according to McKinsey & Company. And more than 250 million connected vehicles will be on the roads by 2020, according to Gartner. Connected vehicles incorporate a large number of sensors that make communication with the cloud,

other vehicles and devices possible. This is great progress towards the improvement of road safety.

As an example, all Tesla cars operate as a network, and when one car learns something, they all learn it. Tesla CEO Elon Musk stated that the company's autopilot service is constantly learning and improving thanks to machine learning algorithms, the car's wireless connection, and detailed mapping and sensor data that Tesla collects. These cars use the power of AI and machine learning to predict the behavior of cars and pedestrians in different circumstances.

- Vehicle performance and maintenance monitoring help in evaluating the quality of the vehicle and need for maintenance of the vehicle. This way, pollution caused by these vehicles can be reduced, and the health of the vehicle stays closely monitored.

- Improved control and safety can be achieved through IoT-enabled cars. In case of over-speeding, the notification gets displayed on the car's windscreen alerting the driver.

- Ensuring safe driving experience with real-time assistance, navigation, and even monitoring driving patterns and any emergency situation. Additionally, along with the state of the traffic, IoT drivers can receive updated information on the state of the roads, i.e., potholes, ice, grade changes, black spots, etc.

```html
<html>
<body bgcolor="#bg99FF">
<p>Type:{{Machine_Type}}</p>
<p>AcquisitionDevice:{{ SensorList }}</p>
<p>Machine_ID: {{Machine_ID}}</p>
<p>OperatingCondition:{{ Disturbance / Standalone / loading }}</p>
<p> DisturbanceNature: {{Constant Speed}}</p>
```

```html
<p> Vibration: {{ samples .tdms }}</p>
<p>Speed:{{RatedSpeed}}>/p>
</body>
```

```python
from django.contrib import admin
from django.urls import path
from import .views
urlpatterns = [
path('admin/', admin.site.urls),
path('dataAquisition/',views.acquireVibrationData),
path('dataframe1/',views.ConditionMonitoring_Standalone),
path('dataframe2/',views.ConditionMonitoring_Disturbance),
patch('dataframe3/',views.ConditionMonitoring_Loading),
path('analysis/',views.StatisticalAnalysis),
…..]
```

```xml
<!--Dataframe representation-->
<?xml version="1.0"?>
<Dataframe>
<Machine_Type>DC Motor</Machine_Type>
<Machine_ID>EE-M5864</Machine_ID>
<OperatingCondition>Standalone – Starting to No load speed
</OperatingCondition>
<DisturbanceNature>NIL</DisturbanceNature>
<Vibration>snl.tdms</Vibration>
<Speed>1500</Speed>
</Dataframe>
```