College code:9512

College name:JP COLLEGE OF ENGINEERING,ayikudu,

Department of electronics and communication engineering

Project code:proj_211931_Team_1

Title:TRAFFIC MANAGEMENT

Team Member

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PHASE 2:

INNOVATON:

SYSTEM ARCHITECTURE:

The system follows a layered architecture with four layers :

(i) a sensing layer with active things and sensors,

(ii) (ii) a network layer represents the mode of communication and protocols,

(iii) (iii) service layer indicates the data analysis and storage, and

(iv) (iv) application layer describe the end-user applications. The sensing layer collects vehicle data through the sensors installed on roadsides and the WiFi-based microcontroller transfer the real-time data to the service layer. Several open-source cloud IoT platforms are available to manage connected devices, data storage, and analysis. Thinger. io, which is an open-source IoT platform for integrating data fusion applications acts as a service layer in this study. The end-users

receive traffic updates through roadside message display units and dashboards. The physical infrastructures such as sensors and message display units are installed on roadsides at selected road intersections. The message units installed at important road intersections substitutes the smart devices and update drivers on the current traffic scenario. The authorities can also send messages on unusual road incidents along with expected clearance time or alternate route suggestions (if any) to assist emergency vehicle handling. The proposed system aims to generate public value by saving the on-road time of drivers through early warning messages. In summary, the proposed system has the following features:

(i)Appropriate to estimate traffic congestions on collector roads using road occupancy measure

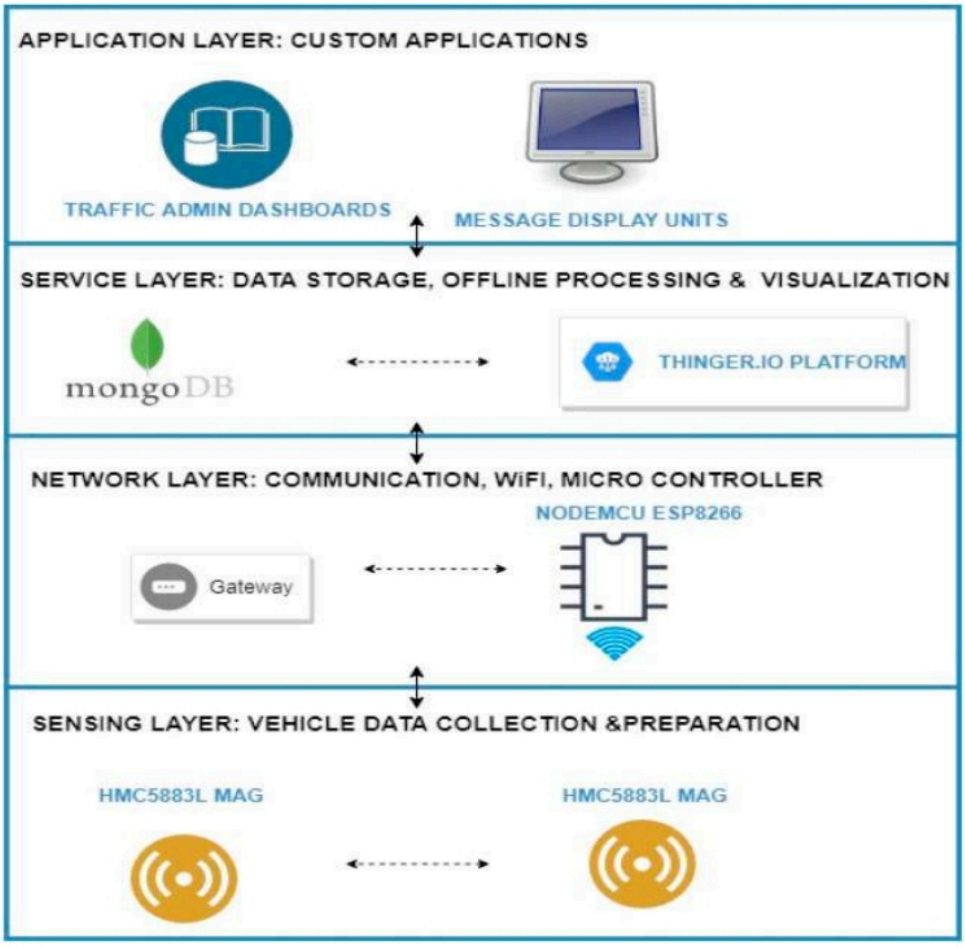
(ii)Update residents on real-time traffic messages through roadside display units

(iii)Monitor the road density of smart campuses especially during peak hours and help to improve mobility

(iv)Assist authorities to broadcast important traffic incident messages.

(v)Provide a real-time dashboard to monitor the traffic updates.

- An IoT based system architecture mostly contains a sensing layer, network layer, service layer, and an application layer . The sensing layer acquires data from the things, the network layer transfers the collected data from devices to the service layer, the service layer controls the devices and analyzes the collected data, and finally, the application layer which indicates the user interface. The layered architecture is presented



Flow chart:

- The geographical map provides the road segment information, intersections, and routes. The maps are processed to load the road information to the database as well as to extract the message board locations. The user-generated map can be used to find the message board location.

- The road junctions that have more connected road segments are the best locations to display traffic-warning messages. The message board locations are selected based on its exposure to maximize message visibility.

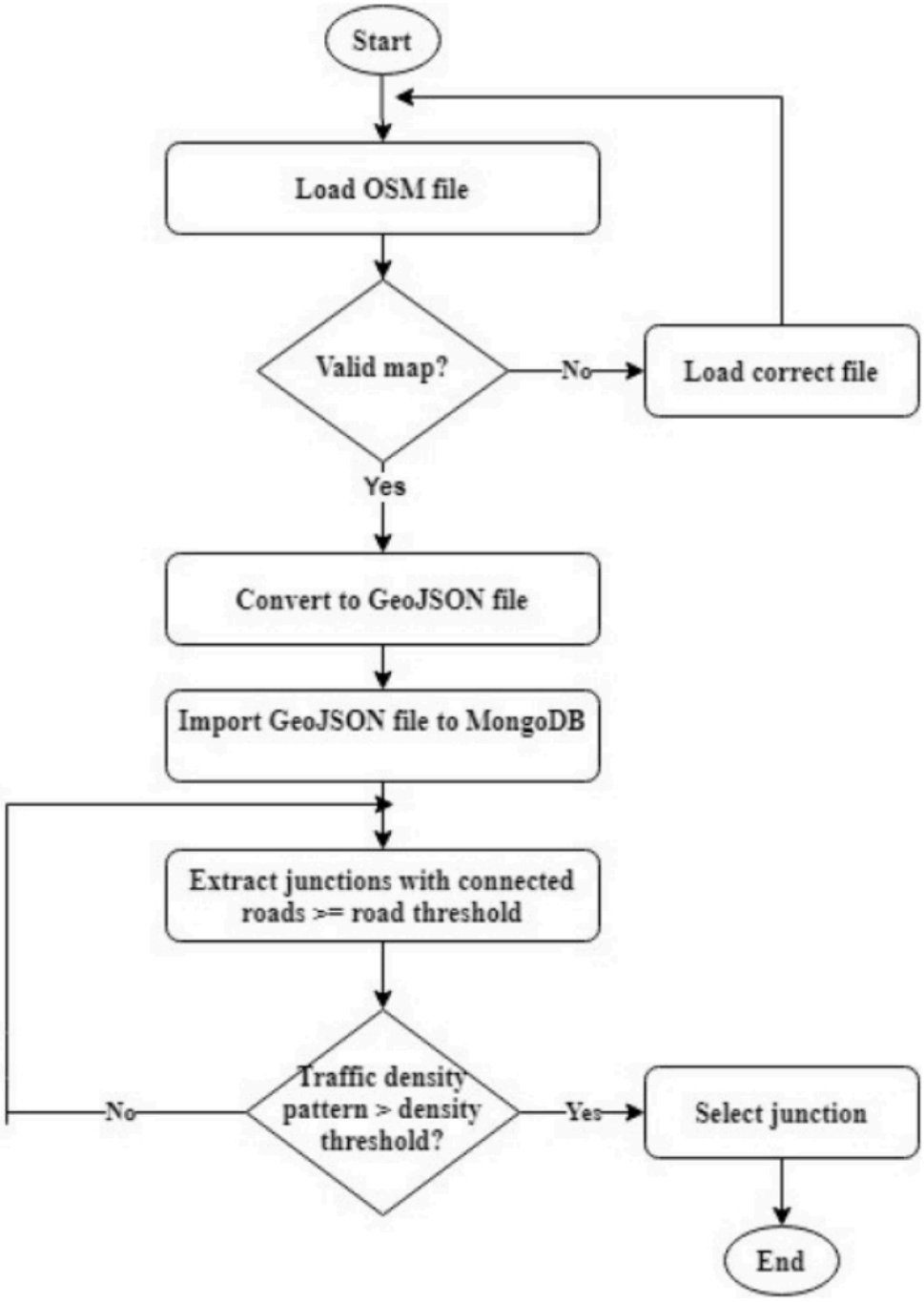
- The message board selection is considered as a maximization problem because the objective is to maximize the visibility of the message.

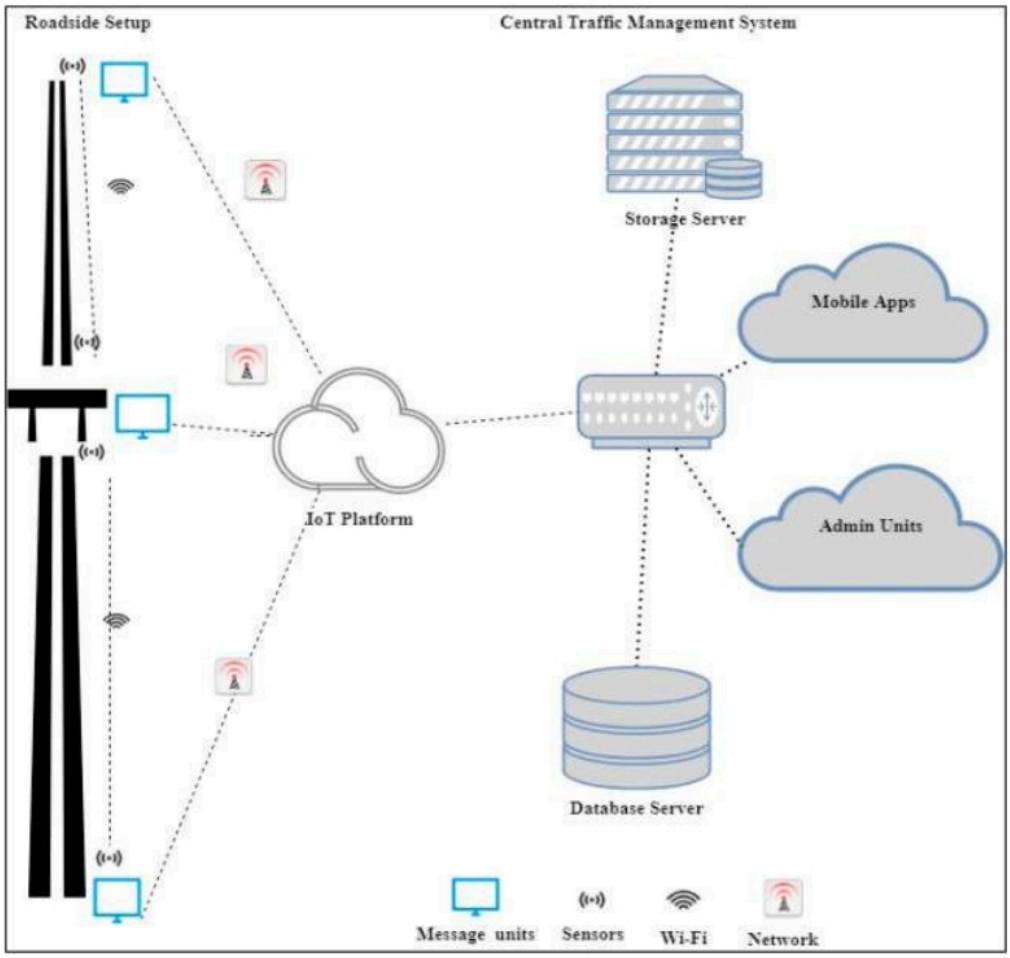
- The idea of billboard advertising can be applied here to maximize the strength of message exposure . Also, the major parking slots in a closed campus can be selected to reach the messages to the maximum.

- The number of connected roads is one parameter that decides the strength of message exposure. Besides, the earlier patterns of traffic density can also be selected while determining the message unit location.

- The process begins with geographical map format conversion and database loading.

- The second step is to identify the message board locations based on previous traffic density at intersections and the number of connected roads.


Start
Load OSM file
Valid map?
No
Load correct file
Yes
Convert to GeoJSON file
Import GeoJSON file to MongoDB
Extract junctions with connected roads >= road threshold
Traffic density pattern > density threshold?
No
Yes
Select junction
End



- The proposed system model, different software and hardware components required, and algorithms to implement the proposed system. The proposed system communication model is presented in which has components installed at the roadside and a cloud-based central server. The roadside setup includes sensors and message boards. The sensors and boards will be installed between two road segment intersections. The central server includes data storage, cloud services, and interfaces. The components can communicate with each other using WiFi.