Signs with Smart Connectivity For Better Road Safety

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Abstract :

The Safe System (SS) approach to road safety emphasizes safety-by-design through ensuring safe vehicles, road networks, and road users. With a strong motivation from the World Health Organization (WHO), this approach is increasingly adopted worldwide. Considerations in SS, however, are made for the medium-to-long term. Our interest in this work is to complement the approach with a short-to-medium term dynamic assessment of road safety. Toward this end, we introduce a novel, cost-elective Internet of Things (IoT) architecture that facilitates the

realization of a robust and dynamic computational core in assessing the safety of aroad network and its elements. In doing so, we introduce a new, meaningful, and scalable metric for assessing road safety. We also showcase the use of machine learning in the design of the metric computation core through a novel application of Hidden Markov Models (HMMs). Finally, the impact of the proposed architecture is demonstrated through an application to safety-based route planning.

Description :

To replace the static signboards, smart connected sign boards are used.

These smart connected sign boards get the speed limitations from a web app using weather API and update automatically.

Based on the weather changes the speed may increase or decrease.

Based on the traffic and fatal situations the diversion signs are displayed.

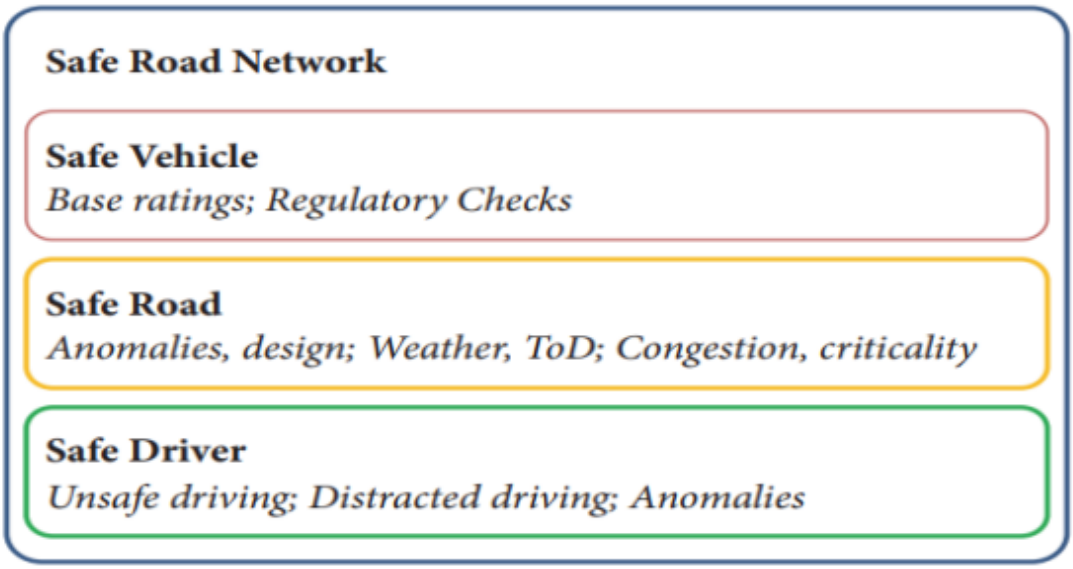
Guide(Schools), Warning and Service(Hospitals, Restaurant) signs are also displayed accordingly.

Different modes of operations can be selected with the help of buttons.

Litterature Survey :

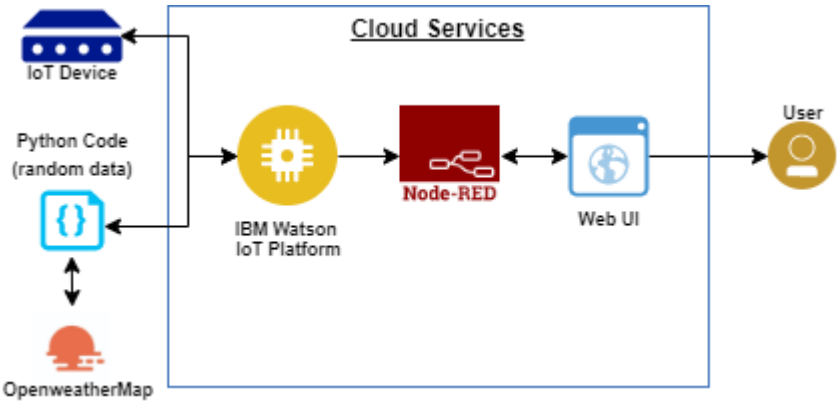
An IOT Architecture for Assessing the Safety of a Dynamic Road Transport System

Assessment Elements. The way the SS approach comprises the three elements of safe vehicle, safe road, and safe driver facilitates a hierarchical safety assessment approach whereby the safety of the individual elements can provide a collective indicator of safety for the road network, as illustrated. In turn, this indicator can be concatenated from the assessment of individual road segments, to routes, to the road network.It is possible to consider a meaningful safety metric based on the live (or real-time) status of the road. For example, the safety level of a certain segment/road depends on the aggregate safety of vehicles currently traversing it, combined with the number of potholes and/or the wetness or how slippery is the road, in addition to safety/alertness of the drivers on the road.



In designing our architecture, we exploit three important dependencies. The first is between the SS elements, e.g., how well a car can handle a certain road, or how some drivers exhibit safer behavior in instances of higher visibility. The second dependency is in between consecutive segment/roads, especially in terms of traversing vehicles and drivers. The third dependency is like the second but is established in time. Abrupt changes in safety levels can thus be viewed as an anomaly (outlier) or inferred as indicator to a substantial change in the road context.

Architecture :



Safety-Based Route Planning :

Route planning has become widely used in both personal and commercial use, resulting in an increasing dependence on its reliability. Various applications employ efficient algorithms for route planning [43]. Trip time and cost, e.g., for tolls, have been the typical metrics for route planning applications, but other metrics, however, have been utilized, e.g., for fuel emission/consumption or energy requirements of electric vehicles.

Software Skills

Python,IOT Cloud Platform ,IBM Cloud,Node- RED,IBM IoT Platform,IBM Nodered,IBM Cloudant DB.

Advantages:

Road Engineering features may interact with the safety levels of the vehicle mix to create undetected variations in crash risk and crash severity.

Disadvantages:

Variations in crash risk and severity due to are accomodated

through the use of actual crash data.

Conclusion:

Everyone must follow the road rules.Do not drive at excessive speed and try to enhance the general awarness so risks of traffic accidents can be reduced.Driver must also check the vehicle health regularly and its maintenance parts to eliminate any potential risks.

Reference:

R. Bhandari, R. Bhaskaran, and N. Venkata, “FullStop: Tracking unsafe stopping behaviour of buses,” inProceedings of the In Conference on Communication Systems Networks, pp. 65–72, 2018.

N. Arbabzadeh and M. Jafari, “A Data-Driven Approach for Driving Safety Risk Prediction Using DriverBehavior and Roadway Information Data,” IEEE Transactions on Intelligent Transportation Systems, vol. 19, no.2, pp. 446–460, 2018