TRAFFIC MANAGEMENT

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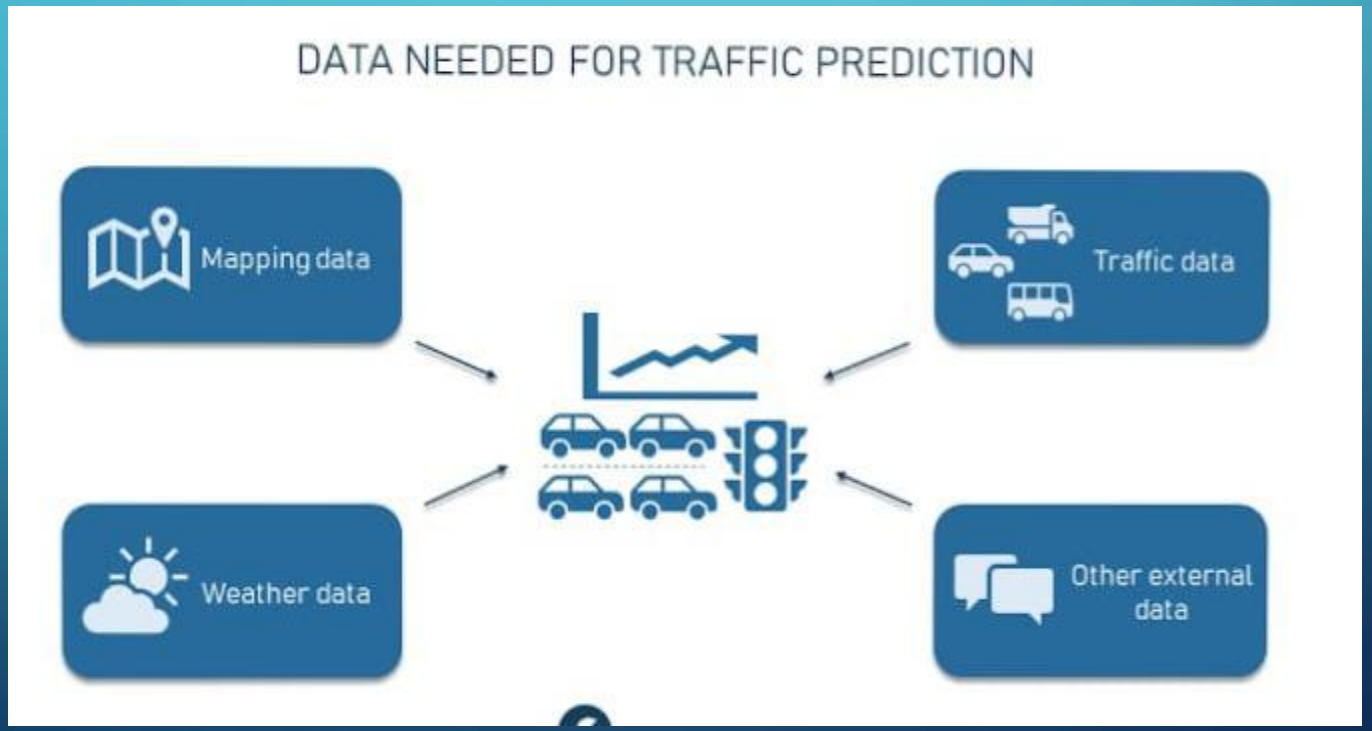
- PRIDICTIVITY ANALYTICS
- SMART TRAFFIC LIGHTS WITH AI
- CONNECTED VEHICLES
- EDGE COMPUTING
- BLOCKCHAIN FOR TRAFFIC DATA INTEGRITY
- CROWDSOURCED DATA
- DYNAMIC TOLLING SYSTEMS
- ENERGY-EFFICIENT TRAFFIC MANAGEMENT

PREDICTIVE ANALYTICS

- Utilize machine learning algorithms on IoT data to predict traffic patterns
- proactively adjust signals or suggest alternate routes, minimizing congestion.

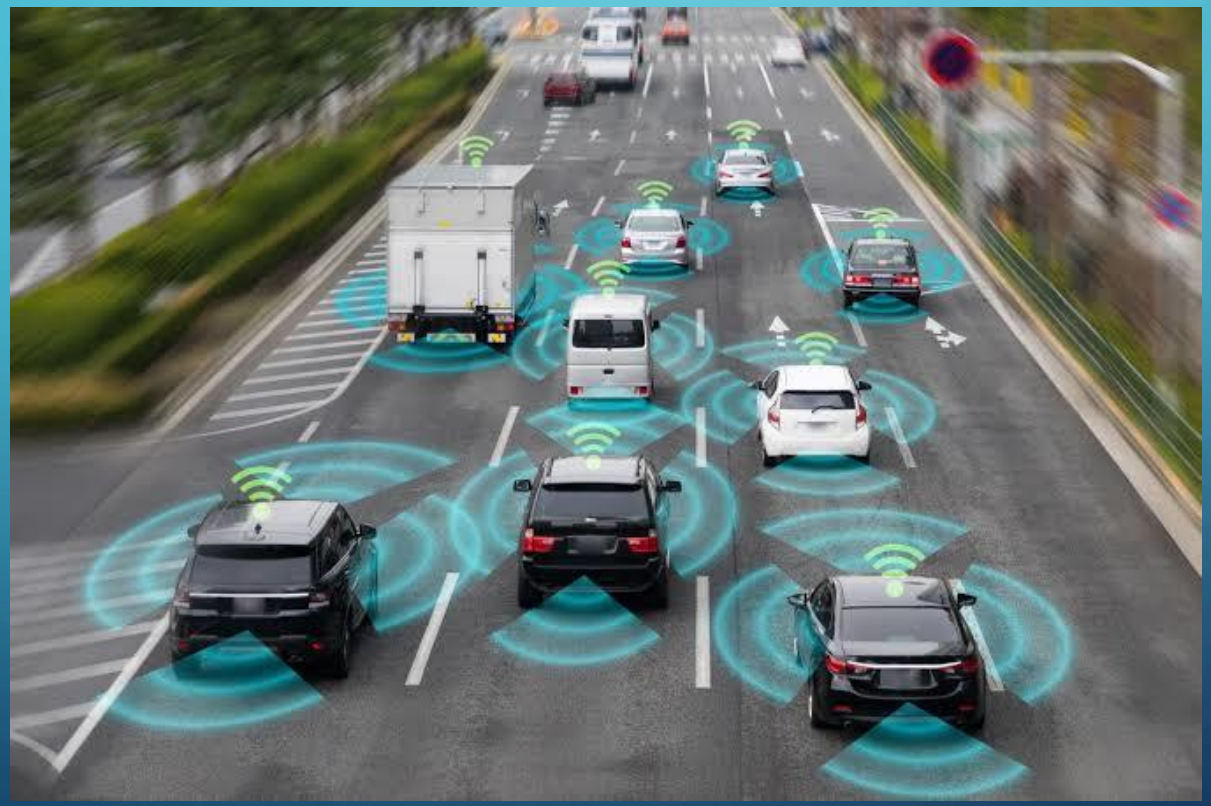


SMART TRAFFIC LIGHT WITH AL

- Implement traffic lights equipped with AI algorithms that dynamically adapt signal timings based on real-time traffic conditions, reducing wait times and improving overall flow.

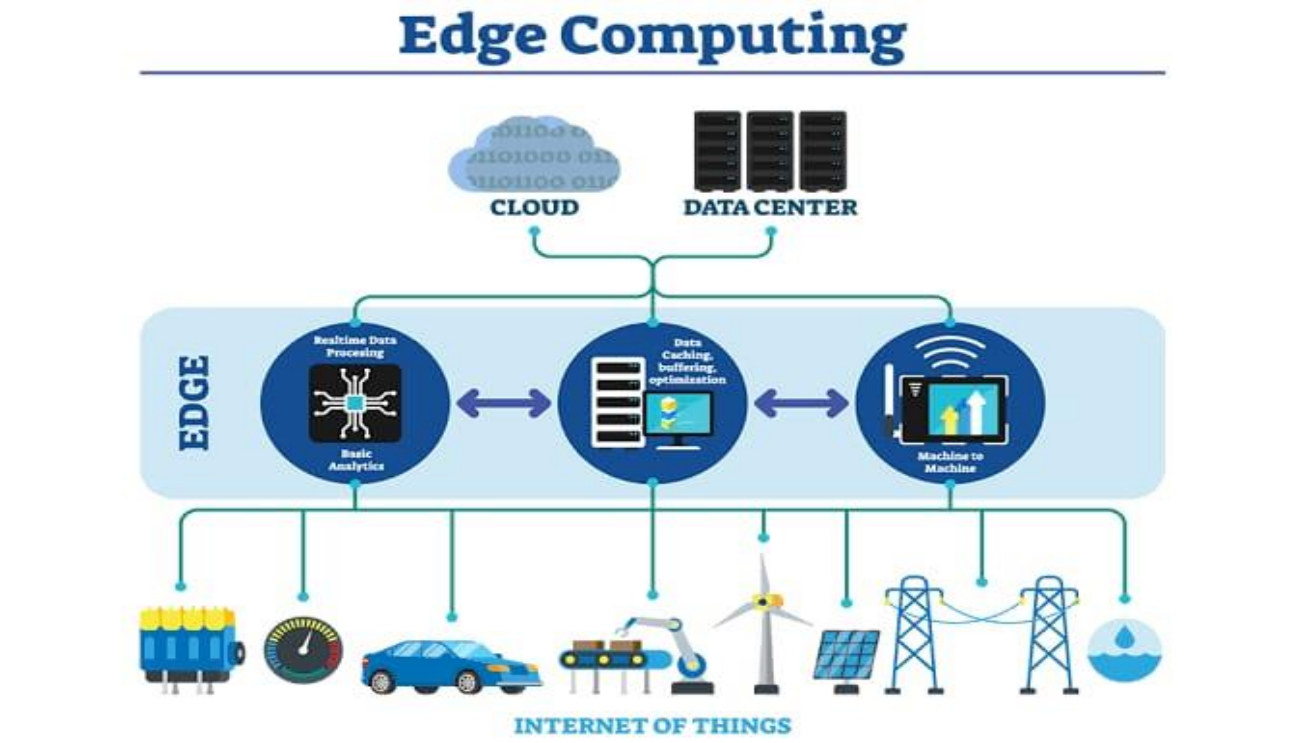
CONNECTED VEHICLES

- Connected Vehicles: Enable vehicles to communicate with each other and with traffic infrastructure, fostering a cooperative system that anticipates and reacts to changing traffic conditions.



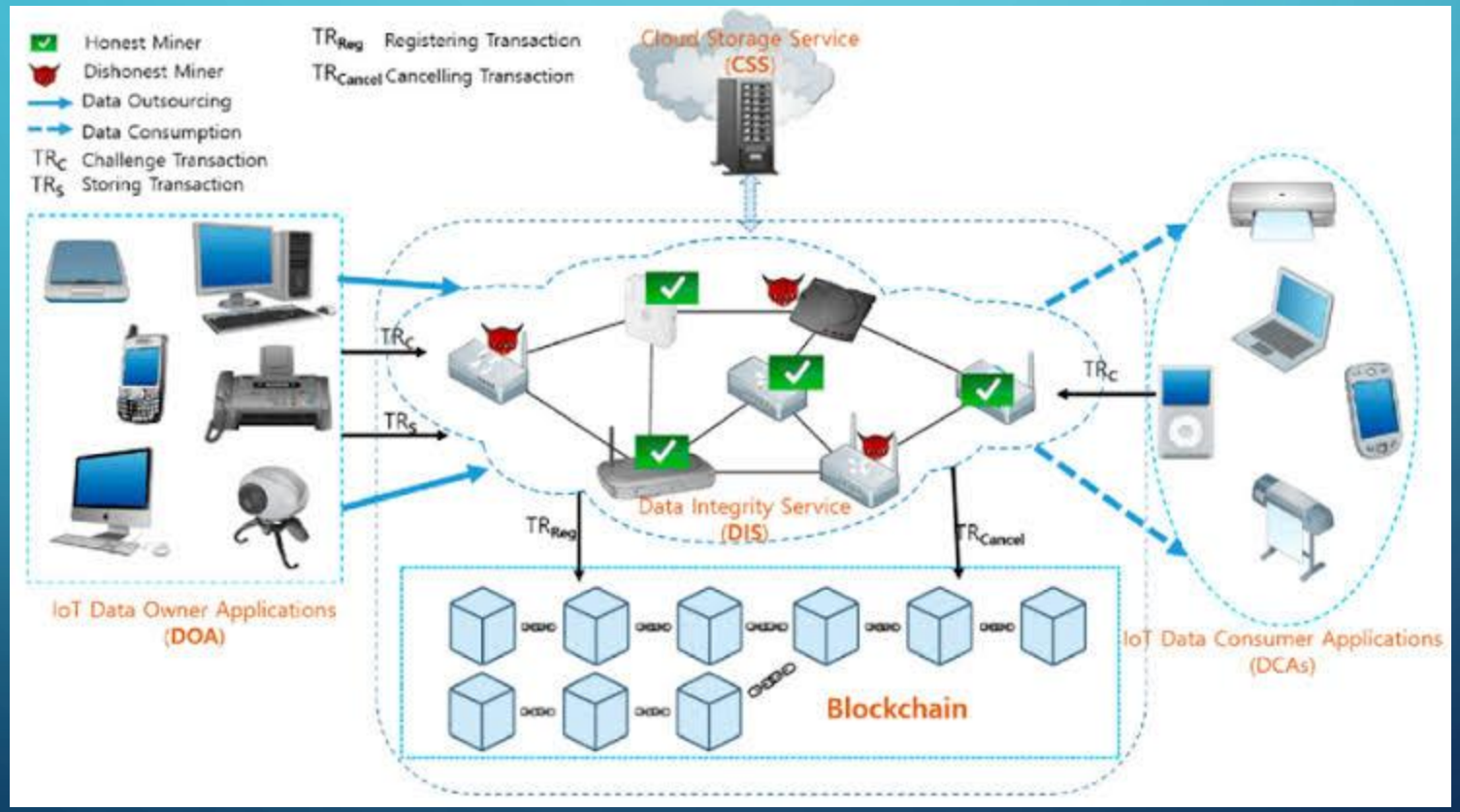
EDGE COMPUTING

- Edge Computing: Process and analyze IoT data at the edge of the network (closer to the data source), reducing latency and allowing quicker decision-making for adaptive traffic management.



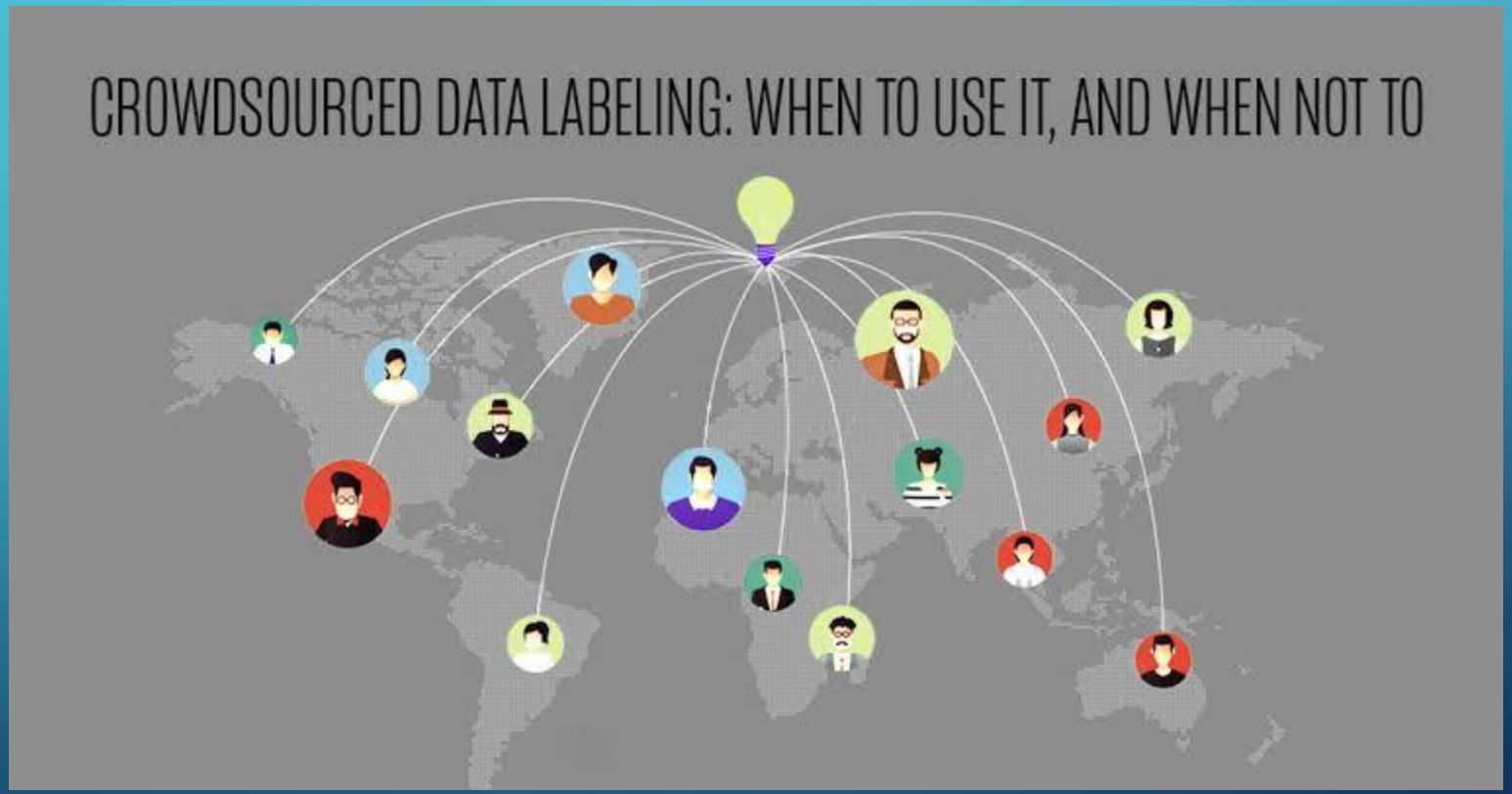
BLOCKCHAIN FOR TRAFFIC DATA INTRGRITY

- Blockchain for Traffic Data Integrity: Implement blockchain technology to ensure the integrity and security of traffic data, preventing tampering and enhancing trust in the information collected by IoT devices.



CROWDSOURCED DATA

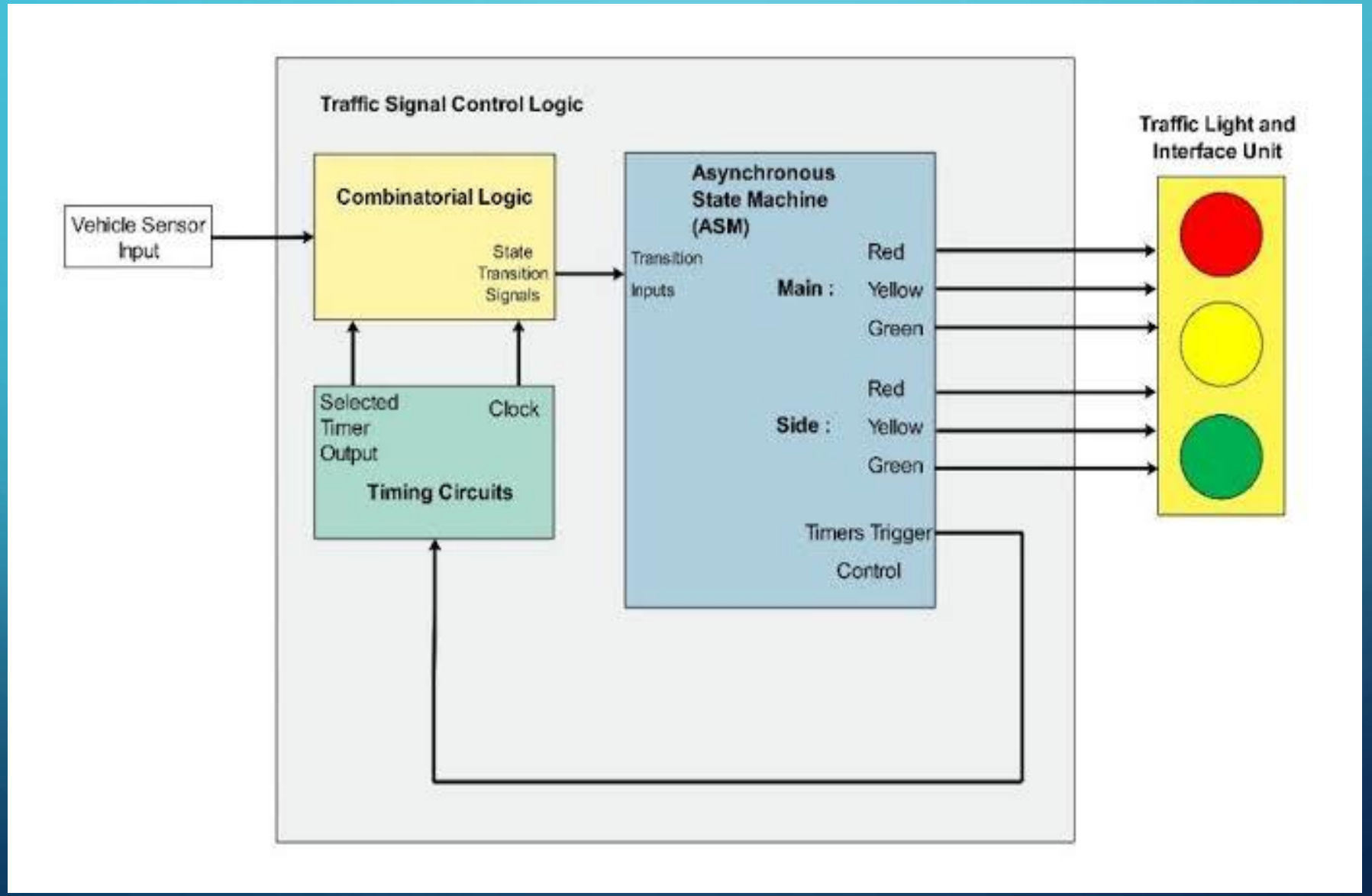
- Crowdsourced Data: Encourage citizens to contribute real-time data through mobile apps, social media, or other platforms, providing a rich source of information for dynamic traffic management decisions.



TYPES OF NEW SENSOR IN TRAFFIC SIGNAL

- Infrared sensor
- Microwave sensor
- Video sensor

BLOCK DIAGRAM OF TRAFFIC SIGNAL



EXPLANATION OF BLOCK DIAGRAM

- Consider a traffic scenario with the timing requirements of traffic signals from the main and side street, as shown in Figure 1. The system has six states, and will move from one state to the other depending upon certain predefined conditions. These conditions are based on three timers; a long timer TL =25 s, a short timer TS = 4 s and a transitory timer Tt = 1 s. Additionally, the digital input from side traffic detection sensor is required. A thorough description of each of the six system states and the state transition control signals is given

STEP 2:

- In the sixth and the last state of the system, both the main and side signals are red for the period of the transitory timer (Tt =1 s). After that, the system goes back to the first state and starts over again.
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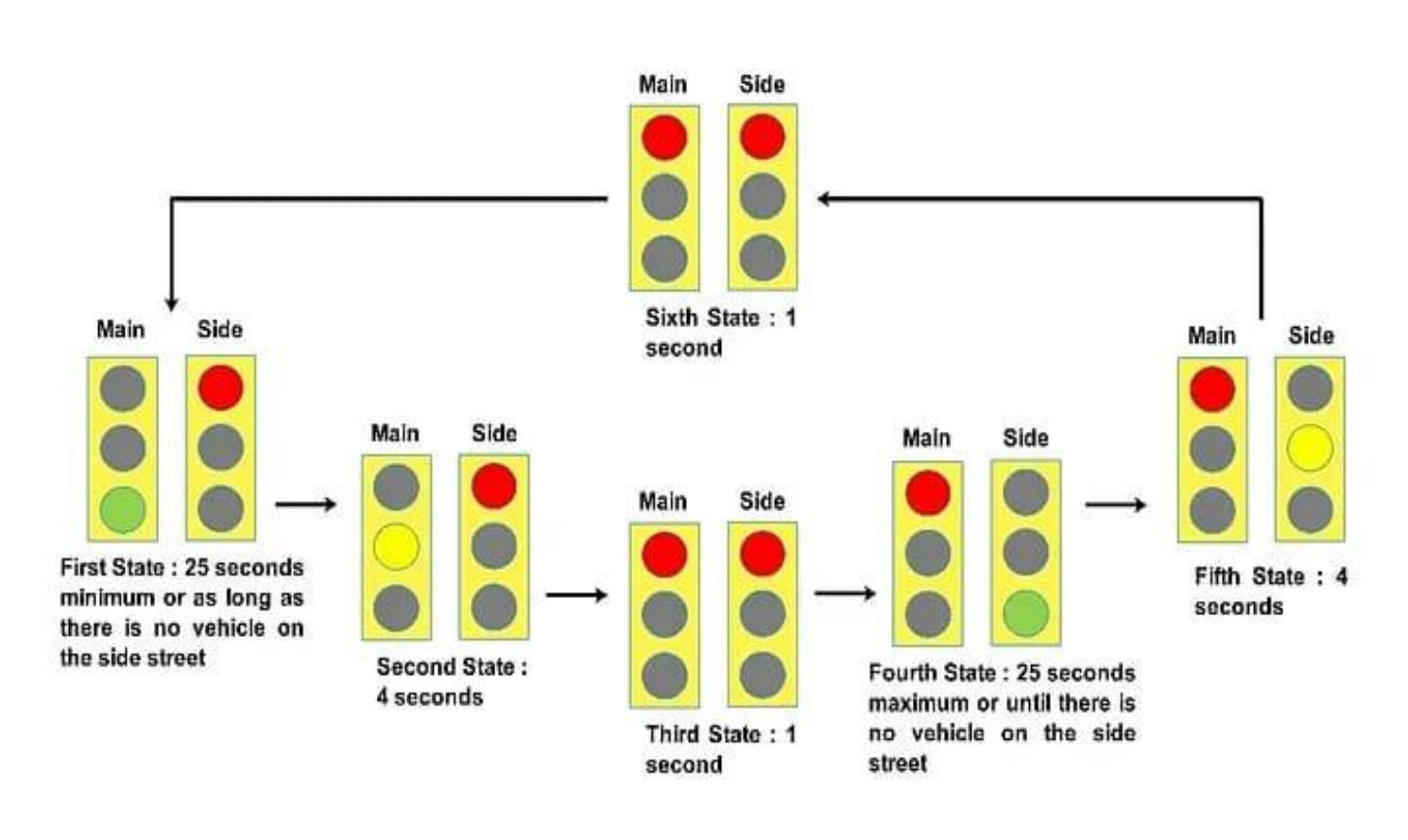
- The third and sixth states provide a buffer state where both (main and side) signals stay red for a brief period of time during changeover. State 3 and 6 are similar and may seem redundant, however this allows the implementation of the proposed scheme to be simple.

BLOCK DIAGRAM



IMPLEMENTATION SCHEME:

- Implementation Scheme
- A complete block diagram of the system is shown in Figure 2. This figure illustrates the overall structure, function of the system, and lists all the required inputs and outputs.
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- The proposed traffic signal controller has been built around the finite state machine (FSM) concept. The timing requirements described above are translated into a six state FSM as depicted in Figure 3.