BAT

BE AWARE OF TRAFFIC
INTELLIGENT TRAFFIC ALARM SYSTEM

What is BAT?

An automated and intelligent system that calculates road traffic to tracks and report some natural and unnatural events that have occurred. The difference between this system is intelligence and processing data at the camera (Station) installation site. One of the special advantages of this system is displaying the status of the route and reporting the status in each station or installation location of each camera. In addition to the camera, processing and control circuits, each station has a monitor to display the processed output of the previous or subsequent stations, so the information of the front station, which is installed at a distance of 10 to 50 km, can be seen and vehicles can know about the road and traffic situation. The analyzed parameters are blockages, accidents, fires, Fog, Floods, earthquakes, landslide, rainfall intensity, and the diagnosis of road surface frost. Using intelligent systems, it is possible to predict rainfall in future or forecast traffic on the route according to the entry and exit of vehicles.

Description:

This system is designed in such a way that, online and without delay, you can observe the traffic and blockage of urban and intercity routes, and select the traffic route according to that. In this system, there are stations at a distance of about 10 to 100 km, on each of which, solar panels and required equipment, including cameras, image receiving and analyzing circuits, data transmission systems, as well as systems Circuit feeding is installed. The equipment installed at each station will be able to use image processing systems, artificial intelligence as well as positioning information such as traffic volume, accidents, fire, flooding, flood, road blockage, earthquake, road surface frost, fog. Identify and record road breakdowns, mountain falls, and any other event that changes the normal course of traffic. This data is also sent to other stations so that other stations are aware of its status.

To Cite an example: Suppose a flood blocks a road in an area. Our system analyzes and detects road closures (Intelligently with a Variety of Image Processing Techniques and Artificial Intelligence) and provides blocking information to other nearby stations (Distance of 10 to 100 km per panel depending on geographical location). And radio Systems) are installed. This information is sent simultaneously to the central station so that it can send precautionary measures or relief aid to the scene of the accident. In addition, vehicles traveling on this route can be informed of the situation ahead and make decisions accordingly.

System parts:

This system has several parts that are directly related to each other and together will be able to provide excellent services online, these parts include the following.

1- Camera

2- Image processing board

3- Data communication board with server

4- Panel networking system

5- Data server network

6- Server program

7- Special application for mobile (Android and iOS)

8- Web service provider

9- Display the status

10- LEDs to show the general condition

1)Camera:

The camera is the most important part or the sensor that receives the data or image. The cameras are mounted on high-altitude stands with the right angle and direction to dominate the road and be able to detect and analyze data. For this purpose, using the right camera can be different for each system depending on the road conditions with the right lens at a specific angle and height. Which, of course, can be calculated.

2) Image processing board:

For receiving images and initial and fast processing, an electronic board is considered, whose task is to analyze the images received from the camera and process it quickly, and if the symptoms of any of the stated events or events that block the signal path are detected, a signal will be sent. In this project, which has been launched as a demo, a Raspberry Pi Series B board with a logo processor has been used.

3) Communication board with the server:

In order to be able to send the processed information from the processor and the electronic part to the server, a part was designed as a communication with the server in which data was sent to the server using a mobile network.

4) Panel networking system:

Another system that needed to be designed was the network of sensors or panels in order to form a coherent network of paths as a tree network. This theme is used to display data and road conditions on status displays.
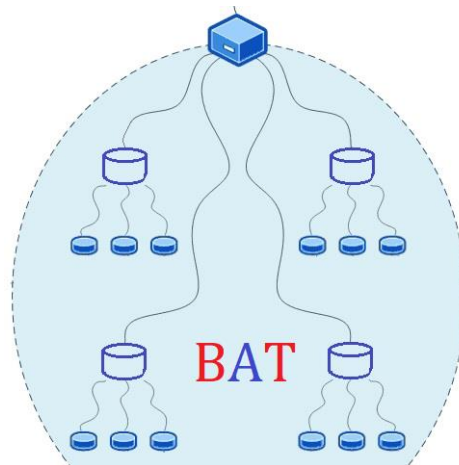
5) Data server network

The received data is networked and their information is reprocessed in the server to get a possible processing error on the panel side and if it is not detected correctly, the server will announce the detection.

6) Server application:

In the server, after networking and detection, a program has been implemented to review, analyze and display data.


7) Mobile application (Android and iOS):

For the convenience of users (drivers) as well as people who intend to enter the streets, roads and urban and interurban highways, a program has been provided that can view the situation online.

8) Web service delivery

In case of lack of access to smartphones and also problems in this regard, a web service has been provided so that users can see the status and use it with a personal computer system.
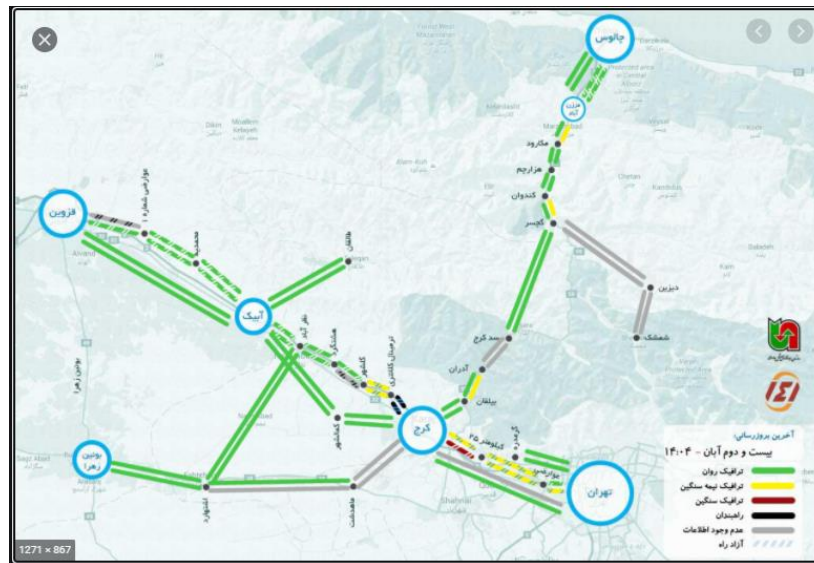

9) Display to show the situation on intercity roads:

A status display is installed next to each panel to show the status of the front and rear panels. In this way, he can understand the condition of the road on the road ahead.

10) LEDs to display the general status:

Next to each panel, in addition to the displays that show the status, there are 4-color lights based on the condition of the road, which are green to open the road and no traffic, yellow means open the road and light traffic, red means open Being on the road and heavy and blue traffic means that the road is blocked.
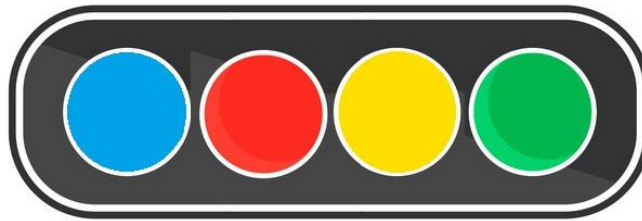
Applications:

The system is designed with urban and intercity applications to display the online status of all available routes, so that by installing it in the route and intersections, information related to the status of the before and after panels can be seen in each panel. The system has intelligent detection using image processing and neural networks to identify specific parameters that can be mentioned as follows:

1- Flood detection

2- Earthquake detection

3- Accident diagnosis

4- Diagnosis of obstruction

5- Fire detection

6- Detection of mountain fall

7- Fog detection

8- Traffic detection

9- Rainfall detection (snow - rain)

10- Blocked forecast due to heavy rainfall

11- Traffic forecast according to the traffic in the position of the previous and next panels

Benefits of the plan:

- Easy to install

- High analysis speed

- Data processing and analysis at the location of each station

- Network and online information

- Detailed information on road conditions

- Intelligent traffic control

- Ability to enter information in the station manually by a specified user

- Manual control of data from the center

- Analyze stored data and calculate monthly and daily information

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