

Gesture recognition in Traffic Systems

Husam Mahmoud (MCE)

Ahmed Ahmed (COE)

Muna AlHilali(ELE)

Situation

Traffic congestion in Dubai is on a par with most major cities in the world, costing the economy Dh771,147.388 per kilometer in fuel and time lost, Gulf News can reveal. [1] Due to extensive traffic jams, a gesture recognition system should be implemented at traffic lights. Furthermore, this system is one where the police officer can control the traffic lights using simple hand gestures. Also, this new technology will help officer navigate heavy traffic at rush hour or during the times of accidents in order to avoid traffic jams.



Figure 1: Traffic jam[2]

Problems

There are three major problems associated with traffic congestion:

- Ambulances can be delayed by traffic congestions.
- When traffic signals are damaged, lanes lose their priorities.
- Unusual delays for some signals to blink green from red.
- The graph below shows the Economic losses in Dubai from 2011-2016.

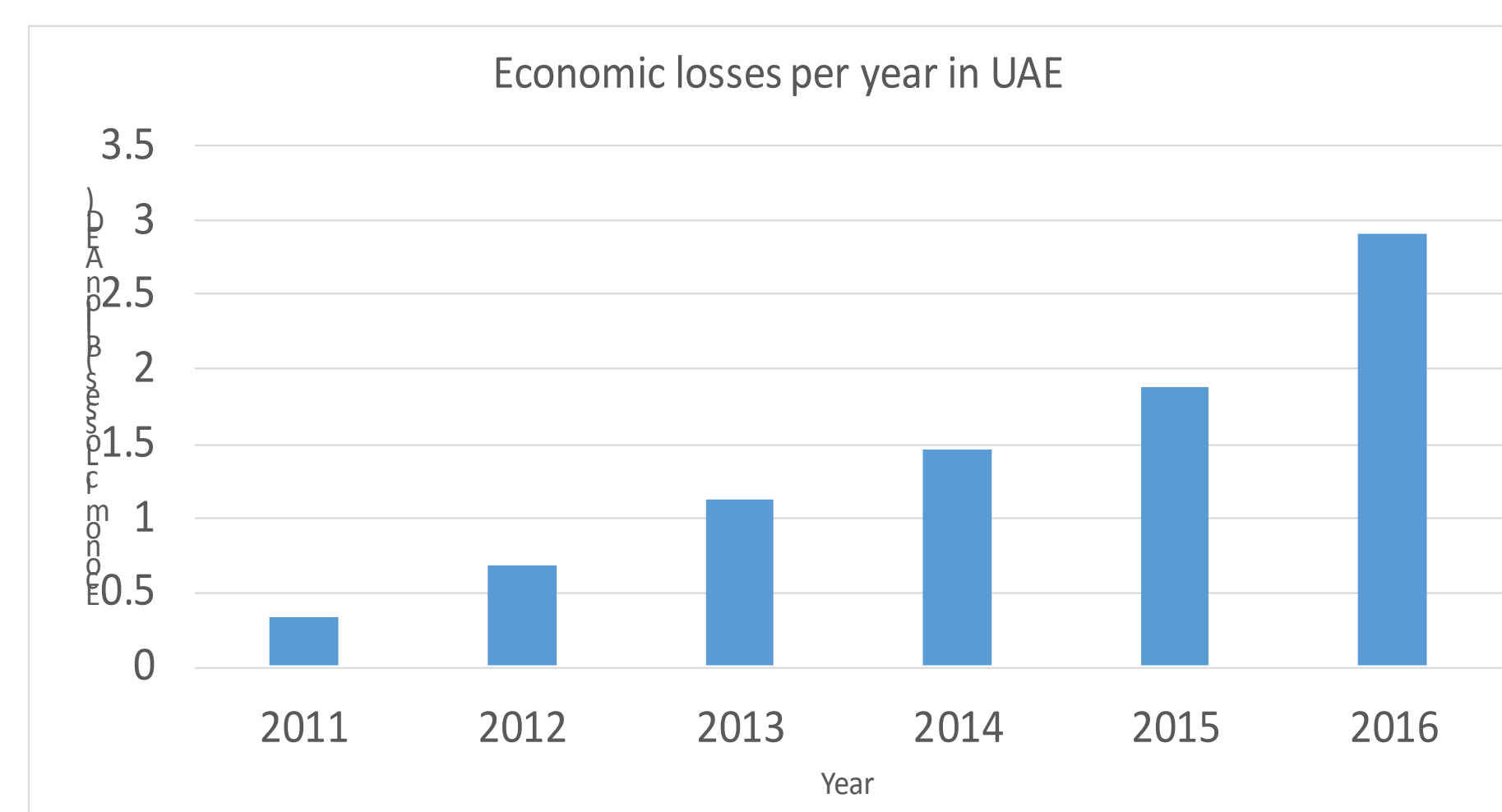


Figure 1: Analysis of traffic congestion losses[3]

Solutions

Those three problems can be tackled with a help of a microcontroller:

- A Photon microcontroller connected to a u-Wave tri-axes accelerometer will be placed in a glove worn by a police officer. [4].



Figure 2: Photon embedded in a Glove[5]

- The Photon interface will be used to compile the microcontroller wirelessly based on the situation.
- The microcontroller will be powered by a power bank placed in pocket bag.
- The traffic signal will also have a Photon attached to it to receive signals.
- The accelerometer will read gestures made by the officer and based on the values the photon will send the instruction.



Figure 3: Traffic signal operated by hand gestures[6]

- The officer can easily modify the delay values in the code to reduce the traffic in a road.
- A programmed panel at the middle of each road can be used to notify drivers about making space for Ambulances.
- A chargeable panel resembling the traffic signal can be used if a traffic signal on the same road gets damaged or malfunctions.

Evaluation

- Instantaneous responses to different traffic situations
- Less carbon footprint, fuel consumption, environment pollution, noise.
- Higher quality of life, less delay and stress
- Trial period for testing and updating the gesture library
- If a problem occurs it will not lead to more congestion or accidents
- Crash frequency increases with increasing congestion levels, we will be measuring the efficiency of the system by the percentage decrease in crash frequency.
- The microcontroller is relatively cheap, as well as the accelerometer.

Table1: Future Research plans

Future Research Plan	
-Address traffic jams in Highways	- Research on how using gesture recognition in highways can reduce congestions. - Discover how to make use of the technology at low costs.
-Look into more effective ways to reduce accidents	-Study more about the causes of accidents to figure out how to eliminate them.

References

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