

DENSITY BASED SYNCHRONISED

TRAFFIC CONTROL SYSTEM

TEAM: TECH DEVELOPERS

Approved

TEAM MEMBERS:

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MOTIVATION:

- Traffic congestion problems in the major cities of India
- Unoptimised traffic management leading to large waiting times
- Archaic methods of traffic control used
- The major advantage of adopting this technology is that, there is no need for any centralized body to monitor the direction of traffic flow. As human involvement is negligible, there will be little scope of human error. //what about traffic policemen?
- Vehicles produce more pollution if the journey involves lots of pauses and high acceleration directly after that.^[1]

IDEA:

- To Minimize time of travel.
- To reduce traffic congestion at major city intersections.
- A synchronized array of traffic signals to ease traffic movement on major highways for cities like Mumbai.
 - CCTV cameras nowadays are anyways installed on traffic signals for security purposes which can be used to obtain video feeds.

METHOD OF APPROACH

- Recognising vehicles using image processing.
- Set the traffic signal timings according to the density of traffic at that road.
- Smart algorithm to track traffic movement.
- Averaging out the speed of all vehicles to find the time required by vehicles to reach the next signal and accordingly switch the light green or red at next signal(Phase 2)

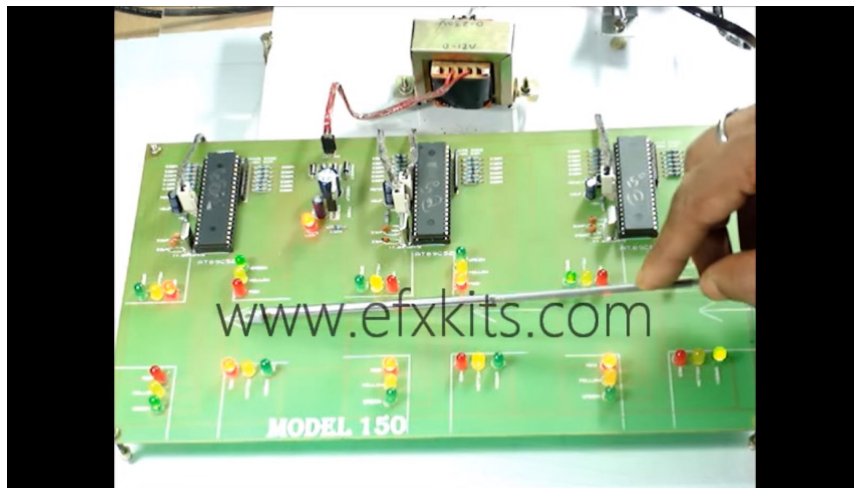
Consider the pointer to be a group of vehicles approaching from the right



When the vehicles arrive at the next intersection the signal turns green



Similarly at the next intersection



(The image are screenshots of the video :
<https://www.youtube.com/watch?v=GoDeMb6obvg>)

Pictures are just for visual understanding, our output will be on laptop.

- By this method we can reduce the time of halt of vehicles.
- Making the consecutive traffic synchronous.
- Using live video feed.
- To minimize time of stoppage at consecutive red signals on straight road
- Image processing to be done in Code Blocks using OpenCV library

PHASE 1:

Controlling the signal switching based on current traffic density

PHASE 2:

Synchronising the signals at consecutive cross roads based on the average velocity of most of the vehicles and distance between two consecutive signals on the same road and hence estimating the time, signal will switch.

ESTIMATED TIME OF COMPLETION :

Phase 1 :: 20 days

Phase 2 :: 15-20 days

TIMELINE

- 20th-31st May :Collecting , organizing and understanding OpenCV and its functions enough to start programming
- 1st June-12th June :Complete Phase 1
- 12th June+ : Commence Phase 2 complete it by 27th
- Till 30th : Debugging and finishing corrections

Requirements

- Camera footage
- OpenCV

Reference:

Last year ITSP project Automatic traffic signal controller by group
OPTIMUS PRIMATES

Their abstract link :

https://stab-iitb.org/media/ITSP2015/qwrerttfaytfdyagadsaghgadugye2363613b/abstract/Electronics%20Club/Optimus%20Primates_Smart%20Traffic%20Signal_39.pdf

Youtube and other links

- <https://www.youtube.com/watch?v=GoDeMb6obvg>
- <http://www.edgefxkits.com/synchronized-traffic-signals>
- <http://www.slideshare.net/MuzzamilShaikh/smart-traffic-congestion-control-system>
- <http://nation.com.pk/national/03-Oct-2011/Modern-traffic-signal-system-installed-at-21-intersections>
- <https://stab-iitb.org/itsprandomap/documentation?id=39>
- <http://news.mit.edu/2015/smarter-stoplights-cut-greenhouse-gas-0331>
- [1]http://www.fhwa.dot.gov/environment/air_quality/publications/fact_book/page15.cfm