Report - Review Meet 1

Traffic Man

M.A.S.T.

# Team Details

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# Inspiration for your idea *( under 50 words )*

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| We have stopped a lot at traffic lights for such unnecessary reasons and wasted a lot of time. We are making a system to automate the process and sort the traffic out efficiently, cutting short travel times.  Also ambulances, etc are stopped at traffic lights due to the traffic. To make them pass, the whole flow of traffic is affected which sometimes results in a traffic jam. Our system will try to work around this problem and regulate the flow of traffic.  People have difficulty crossing the roads due to cars covering the zebra crossing. This system would ease the passenger flow. |

# Description *( in 80-100 words )*

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| A traffic management system.  It measures how many cars are waiting at each crossing using cameras set up at each signal and divides time accordingly.  It can sense if an ambulance, fire truck or any other emergency vehicle is coming their way and tries to clear the way for it.  It can help enforce traffic rules and can also help to keep a record of vehicles that breach the traffic rules. |

# Workload Distribution

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| *Write about how the work was distributed among the team members  Under each team member name, the work done by him/her should be included*  4 members - We distributed the work into 4 parts. We are currently working on 2 of them. The parts are:-   1. IP   This part manages image detection of cars and returns the number of cars to the traffic program  He has to optimise the program such that it takes the least amount of memory and completes the work in a minimum amount of time.  Currently headed by Shubham and Akash   1. Traffic Program   This department handles the traffic program  the traffic program will use machine learning to allot the best time to every traffic  Currently headed by Tanmay and Mayur.   1. Emergency vehicle bypass   This apartment handles the bypass system. It has to work closely with the machine learning department and has to find a way so that the traffic program suspends and this program takes over when the emergency situation occurs to handle traffic.  It is worked along with the Traffic Program.   1. Hardware Selection and Research for Training Data   Department handles practical implementation of the of the project it has to select the components of the project which gives the best value and the best performance under the budget  Also it has to find similar projects upon which other teams have worked on and find some training data sets for the machine learning program.  Till now, we are in the learning phase and still learning some algorithms to handle the first two parts, efficiently. |

# Work Done Till Date

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| *This should include a description of the work done and a percentage depicting the amount of work completed should be mentioned*  We have developed a few things, but it is still in its learning phase. So we can only show the code we have developed while learning.  Here is a link to the folder containing all work done during learning. It contains the progress of all our teammates. - [ITSP - Traffic Man](https://drive.google.com/open?id=1n6YW2Y8y3pcmpFbOieOaRZp7Th5yyImL)  We have given viewing rights.  *Proof of work should be linked to the document. This can include screenshots of the developed models on modelling software or code files etc* |

# Tools/ Technology used

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| We are currently using python as our main programming language to develop all systems.  For IP, we will be using yolov3 for object detection. We will pair the OpenCV library of python with that for faster processing.  We are also thinking of using Nvidia Jetson Nano Developer Kit for the implementation of the project on a small level. It is the best board computer for image detection purposes and fits our requirements well. |

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# Difficulties Faced & Solutions Proposed

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| *Briefly describe the challenges you faced while working on the project*  Some of them are:   * Training data   It's difficult to find training data upon which we can test our ML model.  Also, we are still searching for photos that could be tested for the IP program.   * Computationally efficient IP program   The current IP program being used takes approx 5 to 6 seconds to detect, which will not be feasible. We are currently looking into it and trying to decrease it. |

# Plan of Action For the next 10 days

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| For the next 10 days, we have planned a little like this:   * First 5 days (22 May - 27 May)   Individual learning - everyone is still in the learning phase, and we will proceed only when all of us have a basic knowledge about what we are dealing with here.  We will coordinate amongst ourselves trying to avoid overlapped learning.   * Team meet (end of 27 May)   After the learning part, we will have a team meeting to decide a more focused approach on the project, and communicate the problems faced by their parts and will try to suggest some solutions about the difficulties faced by us.   * Working (28 May to 1 June)   We have already handed out parts and we will start building the main project (first iteration). Our main focus will be assembling the project and co-ordination between the departments. |

# References

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| According to the different parts:   * Python   Geeks for Geeks website - <https://www.geeksforgeeks.org/python-programming-language/>  Krittika Club Tutorials -  <https://github.com/krittikaiitb/tutorials>   * Machine Learning   Stanford Course on Coursera - <https://www.coursera.org/learn/machine-learning?>  Principles of Machine Learning: Python Edition, Microsoft, edX - <https://courses.edx.org/courses/course-v1:Microsoft+DAT275x+1T2020a/course/>  SHALA 2020 - <https://shala2020.github.io/>   * Image Processing   Pyimagesearch-  <https://www.pyimagesearch.com/2018/11/12/yolo-object-detection-with-opencv/>  Coursera -  <https://www.coursera.org/learn/digital/home/welcome>  OpenCV - <https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_tutorials.html>  YOLOv3 - <https://pjreddie.com/darknet/yolo/> |

# Work done after Review Meet 1

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| The work done is specified as follows:   1. We made a program that can classify different objects using yolov3. 2. We made an algorithm for the traffic program and have implemented it. 3. We have researched a lot on the previous work that was done in a similar way as ours. 4. We have researched on the hardware required for the project. We have currently two options for the board computer -    1. Nvidia Jetson Nano Developer Kit    2. Raspberry Pi 4 (4 Gb) 5. We have also decided on how to implement the emergency detection system. We will use an active RFID circuit. We also have two choices for it:    1. Transponding RFID    2. Intelligent RFID   All the work is being updated constantly on the google drive folder. Here is the link to that folder - [ITSP - Traffic Man](https://drive.google.com/open?id=1n6YW2Y8y3pcmpFbOieOaRZp7Th5yyImL) |

# Action on suggestions provided by panel

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| Some of the suggestions:   1. Insufficient team communication. Action:    1. Made a slack group for efficient communication    2. Timely updates were given to all team members about each other’s progress. 2. No research on similar projects done by other teams. Action:    1. A person (Akash) was appointed specifically for this task.    2. He made a document that contains all the required info - it gave us the idea for our RFID circuit. |

# Plan of Action for the rest of the month

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| The plan of action is:   1. First 5 days (11 - 16 June):   Developing a framework that interconnects all the departments so that we can transfer the information generated by one department to another. It is one of the most difficult problems faced by us, and we are currently working on it.   1. Next 5 days (17 - 22 June):   Implementing the project in real life situations.  Making the hardware part of the project.   1. Final 5 days( 23 - 28 June):   Working on presenting the final presentation plus tying up loose ends of the program. |

Expectations from the final presentation

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| The final presentation would depend upon either only the software part or the complete hardware implementation of the project, depending on the budget constraint and the reimbursement process. |

# Questions to ask?

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| We have the following queries:   1. We have trouble deciding on the board computer.   Jetson Nano is much more suited to our task but costs about 3000 more than the Raspberry Pi 4.   1. Developing a framework that connects all the various parts together is proving difficult. We are using the django framework right now. But we still don’t have any leads if that will work or not. 2. Finding training data for our ML program is unfruitful. |