|| 26- 28th March, 2021 ||

INTER IIT TECH MEET'21

IIT Guwahati

HIGH PREP EVENT

(400 Points)

BOSCH'S TRAFFIC SIGN RECOGNITION

With the advancements in AI and the development of computing capabilities in the 21st century, millions of processes around the globe are being automated like never before. The automobile industry is transforming, and the day isn't far when fully autonomous vehicles would make transportation extremely inexpensive and effective. But to reach this ambitious goal, which aims to change the very foundations of transportation as an industry, we need to first solve a few challenging problems which will help a vehicle make decisions by itself. This is one such problem and solving it would take us one step closer to L5 autonomy.

PROBLEM STATEMENT:

1. Use the German Traffic Sign Recognition Benchmark Dataset. Removing images from this dataset at any point will lead to disqualification. All images are to be used either in training or validation.

2. Achieve a benchmark classification score using deep learning -> This should be your baseline ;
Since this is a simple dataset your baseline should have very good f1 scores.

3. Introduce 5 new classes to the dataset, source the images from the internet/any other source

4. Create an interface to systematically generate and add images with different types of augmentations, transformations to the existing dataset to increase the dataset difficulty both for the existing classes as well as for the 5 extra classes

- The interface should have a user-friendly UI
- User should have the ability to add specific images using a level of randomization to the dataset, for every class.
- Users should have reasonable control over the type of augmentations, transformations to be added to the images. User should be able to visualize the additional images to be added to the dataset after augmentations, transformations.
- User should be able to balance the updated dataset, curate it and split it into train and validation using smart segregation

5. Evaluate the results of the existing benchmark network on the new dataset -> It may be very bad.

6. Connect the output of the classifier to a UI where the analyst can visualize the results and the metrics and find out what's wrong.

7. The UI should enable users to easily play with the metrics in such a manner that it can be used to understand and answer the following questions:

- Why is the network failing in particular places?
- What should be changed in the dataset if we cannot change the network?
- What should be changed in the network if we cannot change the dataset?
- What should be my next steps? What should my next experiment look like?
- What is working and what is not working?

8. Make necessary changes in the network/dataset based on the inputs from step 7 and improve the scores.

9. Create a 10 min presentation that guides the judging panel through your work. The presentation will be followed by a set of technical questions from the judges to evaluate your work.

GUIDELINES:

1. Use only open source libraries and datasets
2. Dive deeper into topics over doing everything to your best.
For eg. If the dataset created is not hard enough then the network performance holds no value.

EVALUATION CRITERIA:

1. How difficult is the dataset: number of classes, number of samples with partial information (20% weightage)
2. Ease of use of dataset creation UI (5% weightage)
3. Features of dataset creation UI (0% if no UI else 25% weightage)
4. Performance of Neural Network (0% weightage if the dataset is easy – else 15%)
5. Ease of use of post-experiment evaluation UI (5% weightage)
6. Features of post-experiment evaluation UI (0 % if no UI else 30% weightage)
7. Bonus: if an AI can explain the failures of the system (Between 10-40%)

A maximum of 10 participants (per team) shall be awarded participation /merit certificate.