

Due date : Friday 23rd December 2022 by 11pm.

1 Intro

In this assignment, you will perform transfer learning. You will take a pre-trained VGG16 network and retrain it to recognise traffic signs.

The dataset is available for download at

<https://www.kaggle.com/meowmeowmeowmeowmeow/gtsrb-german-traffic-sign>.

You will need to perform pre-processing on the images to conform with VGG input size and feature range. Set up Train and Validation sets from this data while there is a separate test set. You can do all this with keras data Generators so don't reinvent the wheel.

Learn to fend for yourself and find/use resources to do the job. Learn transfer learning and how to use Keras with TensorFlow.

However, for the report you should write it as if you set out to do transfer learning on this dataset by your own volition and report to the interested reader on your findings.

The main thing we want to find out is how well it performs at classifying these traffic signs.

Any questions are best asked on the forum in Moodle, so that others can enter the discussion and all may benefit.

2 The Dataset

The data set has 43 categories which are not balanced. The folder name works as the numeric category but also you can tell the numeric category from the filename.

The test set does not show a numeric category but there is a `csv` to give you this information.

3 Platform

Use Keras with TensorFlow.

This may be slow to run if you do not have a powerful GPU.

You can program in the Google Colab Environment <https://colab.research.google.com/notebooks/welcome.ipynb> and this may be quicker than your local machine.

4 Resources

- [Transfer Learning in Keras with Computer Vision Models](#) by Jason Brownlee
- [Transfer Learning in Keras](#) by Prakash Jay
- [Deep Learning For Beginners Using Transfer Learning In Keras](#) by Aditya Ananthram
- [Keras data generators and how to use them](#) by Ilya Michlin

5 Deliverables

The deliverables are as follows:

1. A four-page paper
2. A poster
3. A separate *Reflection* on the work and learning.

The paper and poster should be written in an academic style, i.e. in the third person and should reflect the project, not the personal learning.

Use the IMVIP template that is provided on Moodle. **Maximum of 4 pages including all references** for the paper.

The Reflection should be no more than a single page and contain commentary on the individual learning of the student and may be written in the first person.

6 Expectations

- Excellent grammar, spelling and technical writing are all essential skills that you must demonstrate.
- You should be able to explain your findings in a thorough but concise manner.
- You should show evidence of learning/interpretation from the primary sources.
- You should show evidence of your interpretation of others' results. Has anyone worked with this dataset before?
- The poster should be clearly readable from a distance. It should be concise and understandable to anyone who spends 30-60 seconds looking at it. The *Less is more* cliché is very relevant here.
- Consider simple colours and how those colours will look when printed.
- Note: you should set up a separate GitHub page where your code will be stored. Don't insert code into the paper or poster.
- If you need to explain an algorithm, then do so with pseudo code. You can link to your GitHub code in the paper. It is also useful to put a QR code to the GitHub project page on the poster.

7 Requirements

- Upload in PDF only, you will be docked 10% for all other formats. The Poster can be designed in L^AT_EX, Powerpoint or other but should be converted to PDF for final submission.
- You must use the IMVIP template. (Word template and L^AT_EXtemplate is provided on Moodle).
- You will be docked 5% for each day you are late with submission, in accordance with IT Sligo Marks and Standards.
- You will be docked 10% for every page over the page count limit of 4 pages.
- Plagiarised work will receive a mark of 0% for a first offence, see definition of plagiarism below.

8 Suspected Cheating & Plagiarism

Attention is drawn to IT Sligo's definition of plagiarism at <https://vle.itsligo.ie/course/view.php?id=2206>. Student plagiarism occurs when a student presents the work of another as their own work, without appropriate acknowledgement. It can include:

- Presenting work which has been copied from the Internet, books, journals or other sources;
- Presenting work which paraphrases the writings of other authors, without acknowledgement;
- Presenting work which has been written by somebody else, such as another student or a family member;
- Presenting work which has been purchased from an Internet site or other source and submitting as own work;
- Presenting work which has been produced collaboratively as one's own individual work;
- Student plagiarism can also occur where a student submits the same piece of their own work for a number of different assignments;

Plagiarism by students can be deliberate, where a student intentionally attempts to pass off the work of another as their own work. It can also be accidental, where a student fails to use appropriate citation and referencing in their work or is unaware of what constitutes plagiarism.