IEEE CIS/SMC DEEP LEARNING CHALLENGE

Important Dates:

Submission opens: May 1, 2021
Submission deadline: July 15, 2021
Award notification: Aug 15, 2021

Submit report/results to:

cissmc@uwindsor.ca

To register, please visit:

Link

Challenge dataset, please visit:

Link to Download

Chair of CISSMC Chapter:

Dr. Roozbeh Razavi-Far

IEEE Windsor Section

The **IEEE Joint Chapter of Computational Intelligence Society (CIS) and Systems, Man, and Cybernetics (SMC), Windsor Section** welcomes students who are interested in deep learning to participate in the second competition for the IEEE CIS/SMC Challenge.

This competition aims to offer students an opportunity to exercise and improve their problem solving, analytical, programming, and technical writing skills. Only undergraduate and graduate students of the University of Windsor are eligible to participate in the competition.

Instructions for participation:

Interested students should register for the event and download the challenge dataset from the link, to solve a multi-label classification problem, where each sample of data has two labels. The solution must be based on deep learning; however, participants are free to use any deep learning algorithm of their choice or even propose their own architecture. The data is imbalanced and can be processed as desired. Further instructions about this project are given in the next page.

Each participant then requires to submit a report by sending a PDF file along with the zipped project file to **"cissmc@uwindsor.ca"**, until **July 15, 2021**, indicating in the email subject "CISSMC Challenge". The report should contain the name and student ID of the participant, and the project file should contain the source code and a file containing the predicted labels.

The submitted reports and the project codes will be evaluated after the submission deadline. Only the shortlisted participants will be contacted once all submissions are reviewed.

IEEE CIS/SMC Chapter offers the following awards:

Winner for the best solution – Certificate + 500CAD gift card
2nd best solution – Certificate + 300CAD gift card
3rd best solution – Certificate + 200CAD gift card

University of Windsor
IEEE
IEEE Computational Intelligence Society
IEEE SMC Systems, Man, and Cybernetics Society

INSTRUCTIONS

After downloading the challenge dataset from the provided link, students should solve a multi-label classification problem, where each sample of data has two labels.

In the proposed solution, the multi-label classification task must be carried out using deep learning. To do this, students can either propose their own architecture or use available advanced algorithms. The students are allowed to pre-process this imbalanced dataset as desired (e.g., normalization).

Students should repeat their experiments 10 times on the provided Train and Test data. As the names imply, the former is used to train the deep learning model and the latter is used for evaluating the constructed model. In each experiment, the model should be constructed on the same Train data. However, as the network weights are initialized randomly, the results of different experiments might be slightly different. Therefore, a standard deviation should be calculated on the obtained results to assess the stability over these 10 runs.

The trained deep learners should be evaluated using Hamming-Loss and Exact Match Ratio. More information on these performance measures and how to estimate them can be found via this link.

A report should be prepared that consists of two main sections, namely (1) Design and (2) Experimental Results. This report should include your name, student ID, and email. Each section has a number of subsections, which are detailed as follows:

1. **Design:**
    a. **Motivation:** the motivation behind the selected algorithm and the utilized architecture should be explained in this subsection.
    b. **Algorithm:** This subsection explains the employed/proposed deep multi-label classification algorithm.
    c. **Architecture:** The network architecture and its characteristics, including the number of hidden layers and neurons, activation functions, and layer types should be explained here.
2. **Experimental Results:**
    a. **Experimental Setting:** the choice of optimizers and parameters should be clarified. This includes learning rate, batch size, number of epochs, and other parameters specific to the selected algorithm such as regularization parameters. Data preprocessing, if any, should be detailed here.
    b. **Analysis:** the evaluation results on the Test dataset using the 10 different models created on the Train data should be reported in terms of Hamming-Loss and Exact Match Ratio. The obtained results should be analyzed for each performance measure separately. To do this, compare and study the results of each single run and the average of 10 runs and study their standard deviation as well.

Upon completion of the project, send an email containing two files to **"cissmc@uwindsor.ca"**:

1. A single PDF file for the project report.
2. A zipped file containing the source code of the project and a file containing the predicted labels (preferably in .csv format).

If the attachments are too large and have to be shared over a Google Drive or One Drive, make sure to grant the edit permission while doing so.