Postgraduate Seminar Series

Venue: Graduate Seminar Room
Date & Time: September 26, 2024 at 3:00 PM

Speaker Information

Most. Jannatul Ferdous (Std No. 0417052080) is a part-time M.Sc. student in the department of CSE, BUET. She completed her B.Sc. from CSE, Rajshahi University of Engineering and Technology (RUET) in 2014. Her research interest covers Data Mining, Machine Learning, and Deep Learning. She is currently doing her postgraduate thesis under the supervision of Prof. Dr. Rifat Shahriyar. She will be speaking about her ongoing research in this talk.

STROKE PREDICTION USING ENSEMBLE LEARNING WITH TEXT AND IMAGE FEATURES

A stroke is a life-threatening brain attack that disrupts blood flow into the brain. As a result, brain cells start to die due to a lack of oxygen and nutrients. After a stroke, every minute is most important. Approximately, 1.9 million brain cells die per minute. Early diagnosis of stroke can save the life of a stroke patient or can reduce the permanent damage to the brain. For earlier stroke detection, initial investigation is done by using the patient's clinical information which is structured data, or text data then doctors advise computed tomography images of the brain. If doctors delay diagnosis or may make erroneous diagnoses, this can be an issue of life-threatening. For that reason, an automatic diagnosis of stroke from text data initially and then finally from brain CT scan image will be very helpful for stroke patients. For the text data, we have proposed an ensemble machine learning model named stacking classifier where base models are Decision Tree Classifier (DTC), Support Vector Machine (SVM), Random Forest Classifier (RFC), K-nearest neighbor (KNN), Bernoulli naive Bayes(BNB), Gaussian naive Bayes(GNB), and Logistic Regression(LR) is the meta-model. In the case of text data, the stacking classifier outperforms the other models, offering 99.89\% accuracy, 99.79\% precision, 100\% recall, and 99.89\% f1 score during testing time. For the brain CT image data, we have moderated three pre-trained CNN models named Inceptionv3, MobileNetv2, and Xception by updating the top layer of those models using the transfer learning technique. A new ensemble convolutional neural network model named ENSNET is proposed for automatic brain stroke prediction from brain CT scan images. ENSNET is the average of individual two improved CNN models named Inceptionv3 and Xception. As performance evaluation matrices, we have used accuracy, precision, recall, f1-score, confusion matrix, accuracy vs epoch, loss vs epoch, and ROC curve. The accuracy of the moderated Inceptionv3 is 97.48\%, the moderated MobileNetv2 is 83.29\%, and the moderated Xception is 96.11\%. However, when it comes to diagnosing stroke from brain CT scans, the proposed ensemble model ENSNET outperforms the other models, offering 98.86\% accuracy, 97.71\% precision, 98.46\% recall, 98.08\% f1-score, and 98.74\% AUC. So, the proposed stacking classifier and ENSNET model will be beneficial for the health sector to detect stroke from text data and brain computed tomography images of the brain more successfully than other models.