IIT KHARAGPUR

FAKE NEWS DETECTION

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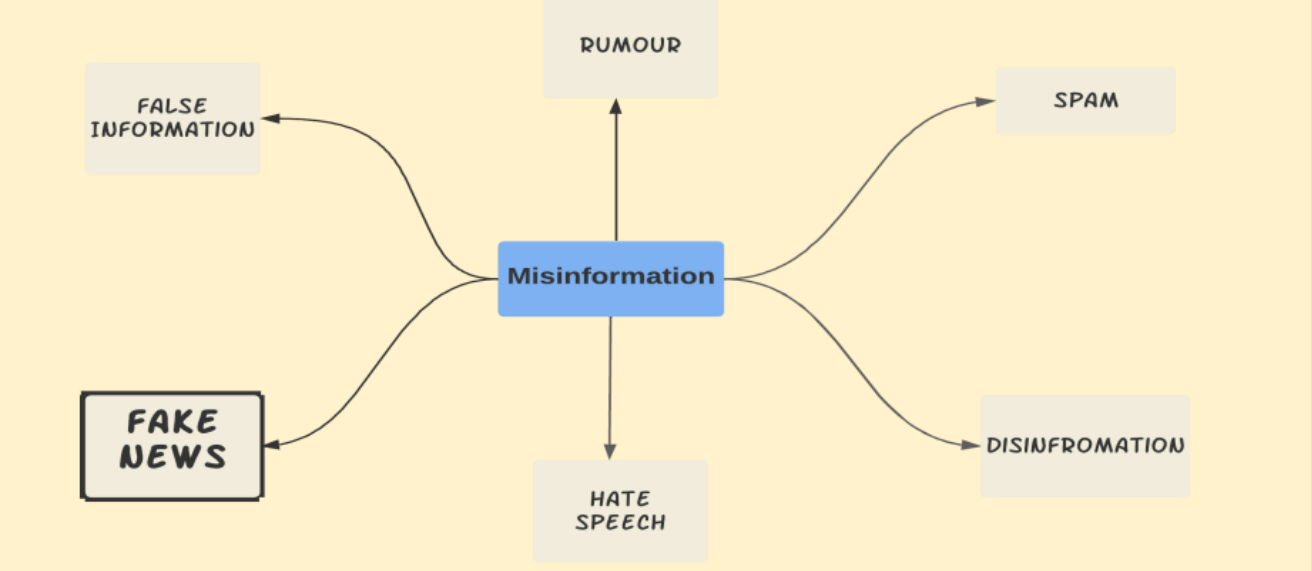
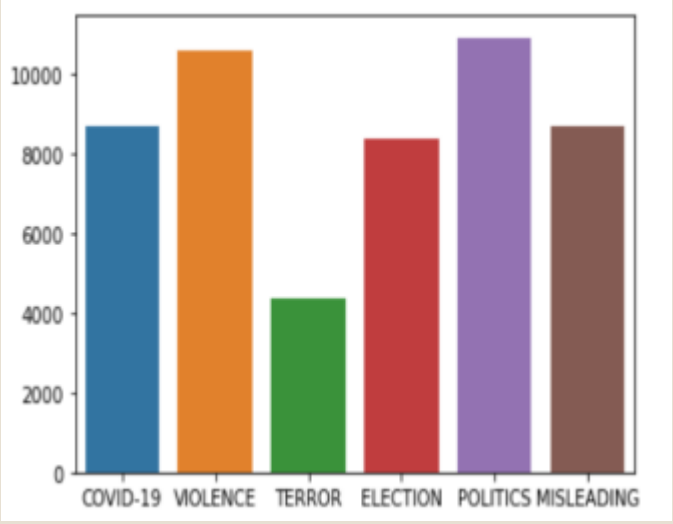
INTRODUCTION

Misinformation is a false statement to lead people astray by hiding the correct facts. It generates feelings of mistrust that subsequently weaken relationships, which is a negative violation of expectations. There are various types of misinformation and we have worked on fake news in this project. Automatic fake news detection is a challenging problem and it has tremendous real-world political and social impacts. There is never a better time to talk about the ability to audit the veracity of online news content, after witnessing the current political turmoil in India and the row of riots that have broken out in the recent past. This paper proposes a new transformer based model DeCNN using deBERTa coupled with CNN layers having different kernel sizes and filters . We have tried our model on three fake news datasets and have achieved appreciable accuracies in them .

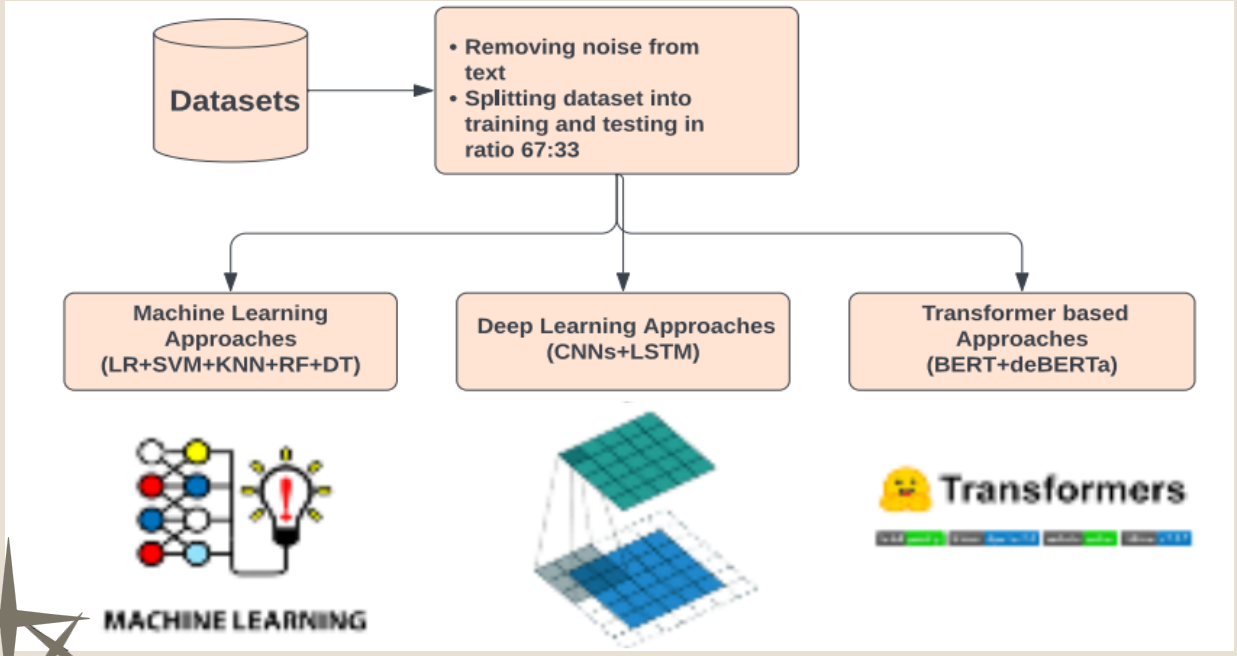


DATASETS

DATASETS	FAKE	TRUE	DESCRIPTION
LIAR(Binary)	7134	5657	One of the first benchmark datasets introduced in 2017.It is originally a 6-class dataset but we convert it into a binary classification problem in this project.
ISOT(Binary)	23481	21417	The ISOT Fake News Dataset is a compilation of several thousand fake news and truthful articles, obtained from different legitimate news sites and sites flagged as unreliable by politifact.com.
IFND(Binary and Multimodal)	37800	18914	This is the first large-scale publicly available dataset in the Indian context. It consists of both images and text.(We have used text only).



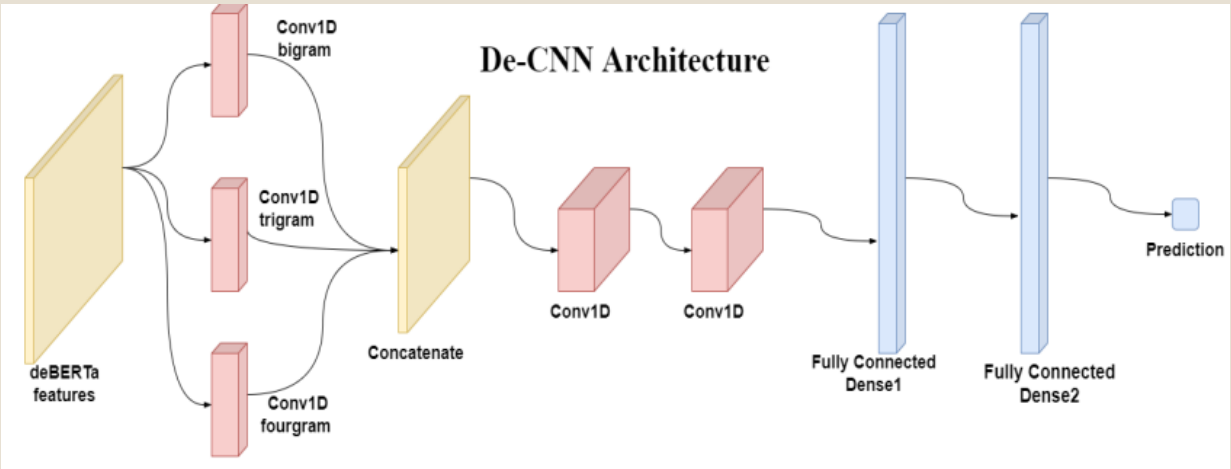
METHODOLOGY



PROPOSED MODEL

DeBERTa is a transformer- based neural language model that aims to improve the BERT and RoBERTa models with two techniques: a distangled attention mechanism and an enhanced mask decoder. This results in better word embeddings which are able to capture subtle features of the text. The deBERTa V3 large model(available on https://huggingface.com/) comes with 24 encoder layers and a hidden size of 24 and is trained on 160GB of data. After getting the word embeddings we applied CNNs as CNNs have shown to work well with text classification tasks. There are three CNN layers in parallel which are then concatenated and passed through a series of convolution and dense layers to predict the output.

The three parallel CNNs have output filters of sizes 128 and the CNNs in series have output filters of size 64.The two dense layers have 448 and 128 units respectively. We have used ELU(Exponential Linear Unit) activation function in CNNs, ReLU(Rectified Linear Unit) in the Dense layers and finally a sigmoid in the prediction step.



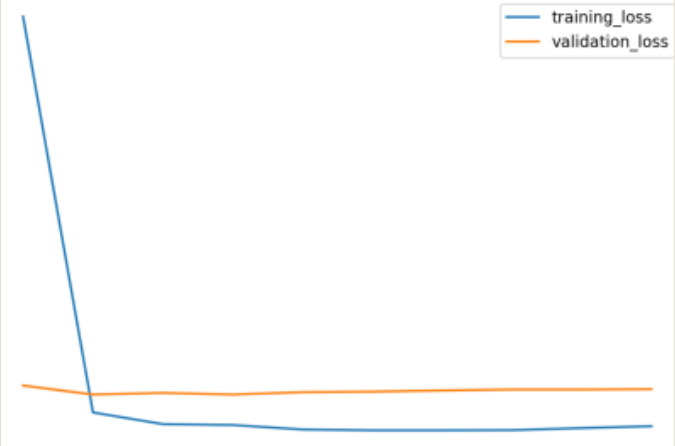
RESULTS

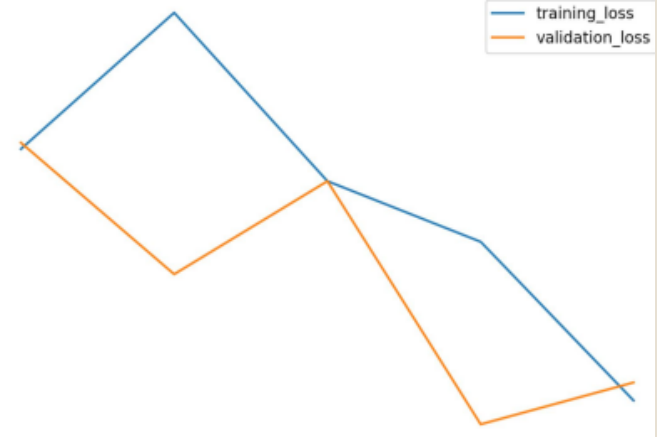
DATASETS	LR	SVM	KNN	RF	DT
LIAR	0.600	0.631	0.595	0.615	0.577
ISOT	0.55	0.921	0.57	0.923	0.910
IFND	0.949	0.945	90.2	0.949	0.920

DT-Decision Tree
LR-Logistic Regression
SVM-Support Vector Machine
KNN-K Nearest Neighbours
RF-Random Forest

DATASETS	CNN	LSTM	BERT+CNN	deBERTa + CNN
LIAR	0.610	0.600	0.657	0.679
ISOT	0.55	0.921	0.57	0.9993
IFND	0.949	0.945	90.2	0.9762

TRAINING LOSS AND VALIDATION LOSS





FUTURE WORK

In the future we will try to implement various permutations of the model and explore different possibilities with which accuracy can be further enhanced. We will also explore the latest models that will get released in the near future. The multimodal feature of datasets need to be taken into consideration where we also consider the image features along with textual