A

MAJOR PROJECT

ON

Hate Classify : A Spam Transformer Model for SMS Spam Detection

(Submitted in partial fulfilment of the requirements for the award of Degree)

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

BY

K.Sai Chandu	207R1A0520
K.Monica	207R1A0532
M.Srinath	207R1A0539

Under the Guidance of

Uday kiran

(Assistant Professor)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

(Accredited by NAAC, NBA, Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi) Recognized Under Section 2(f) & 12(B) of the UGC Act.1956, Kandlakoya (V), Medchal Road, Hyderabad-501401.

2020-2024

ABSTRACT

In this paper, we aim to explore the possibility of the Transformer model in detecting the spam Short Message Service (SMS) messages by proposing a modified Transformer model that is designed for detecting SMS spam messages. The evaluation of our proposed spam Transformer is performed on SMS Spam Collection
v.1 dataset and UtkMl's Twitter Spam Detection Competition dataset, with the benchmark of multiple established machine learning classifiers and state-of-the-art SMS spam detection approaches. In comparison to all other candidates, our experiments on SMS spam detection show that the proposed modified spam Transformer has the optimal results on the accuracy, recall, and F1-Score with the values of 98.92%, 0.9451, and 0.9613, respectively. Besides, the proposed model also achieves good performance on the UtkMl's Twitter dataset, which indicates a promising possibility of adapting the model to other similar problems.

EXISTING SYSTEM

In [12], Gupta *et al.* compared the performance of 8 different classi_ers including SVM, NB, DT, LR, RF, AdaBoost, Neural Network, and CNN. The experimental tests on the SMS Spam Collection v.1 [13] dataset that was conducted by the authors shows that the CNN and Neural Network are better compared to other machine learning classifiers, and the CNN and Neural Network achieved an accuracy of 98.25% and 98.00%, respectively.

In [14], Jain *et al.* proposed a method to apply rule-based models on the SMS spam detection problem. The authors extracted 9 rules and implemented Decision Tree (DT), RIPPER [15], and PRISM [16] to identify the spam messages. According to the experimental results from the authors, the RIPPER outperformed the PRISM and the DT, yielding a 99.01% True Negative Rate (TNR) and a 92.82% True
Positive Rate (TPR).

In [1], Roy *et al.* aimed to adapt the CNN and LSTM to the SMS spam messages detection problem. The authors evaluated the performance of CNN and LSTM by comparing them with Naïve Bayes (NB), Random Forest (RF), Gradient Boosting (GB) [17], Logistic Regression (LR), and Stochastic Gradient Descent (SGD) [18]. The experiments that were conducted by the authors showed that the CNN and LSTM perform signi_cantly better than the tested traditional machine learning approaches when it comes to SMS spam detection.

In [2], the authors proposed the Semantic Long Short-Term Memory (SLSTM), a variant of LSTM with an additional semantic layer. The authors employed the Word2vec [19], the WordNet [20], and the ConceptNet [21] as the semantic layer, and combined the semantic layer with the LSTM to train an SMS spam detection model. The experimental evaluation that was conducted by the authors claimed that the SLSTM achieved an accuracy of 99% on the SMS Spam Collection v.1 dataset.

In [22], Ghourabi *et al.* proposed the CNN-LSTM model that consists of a CNN layer and an LSTM layer in order to identify SMS spam messages in English and Arabic. The authors evaluated the CNN-LSTM by comparing it with the CNN, LSTM, and 9 traditional machine learning solutions. The experimental tests that were conducted by the authors showed that the CNN-LSTM solution performed better than other approaches and yield an accuracy of 98.3% and an F1-Score of 0.914.

PROPOSED SYSTEM

The Transformer [3] is an attention-based sequence-to sequence model that was originally designated for translation task, and it achieved great success in English-German and English-French translation. Moreover, there are multiple improved Transformer-based models such as GPT-3 [4] and BERT [5] proposed

recently to address different Natural Language Process (NLP) problems. The accomplishments of the Transformer and its successors have proved how powerful and promising they are. In this paper, we aim to explore whether it is possible to adapt the Transformer model to the SMS spam detection problem. Therefore, we propose a modified model based on the vanilla Transformer to identify SMS spam messages. Additionally, we analyze and compare the performance of SMS spam detection between traditional m achine learning classifiers, an LSTM deep learning solution,and our proposed spam Transformer model.

Advantages

The system is more effective due to Long Short-Term Memory (LSTM).
The gives accurate results due to presence of HYPER-PARAMETERS TUNING.

Software Requirements:

- **H/W System Configuration:-**
- Processor - Pentium –IV
- RAM - 4 GB (min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

SOFTWARE REQUIREMENTS:

- **Operating system** : Windows 7 Ultimate.
- **Coding Language** : Python.
- **Front-End** : Python.
- **Back-End** : Django-ORM
- **Designing** : Html, css, javascript.
- **Data Base** : MySQL (WAMP Server).

CONCLUSION

In conclusion, the Spam Transformer Model for SMS Spam Detection represents a significant step forward in combating unwanted text messages. Its high accuracy, adaptability, and efficiency make it a valuable asset for enhancing user experiences and security in the digital communication landscape. As spam continues to evolve, so too will the need for advanced and adaptable detection methods like the Spam Transformer Model.