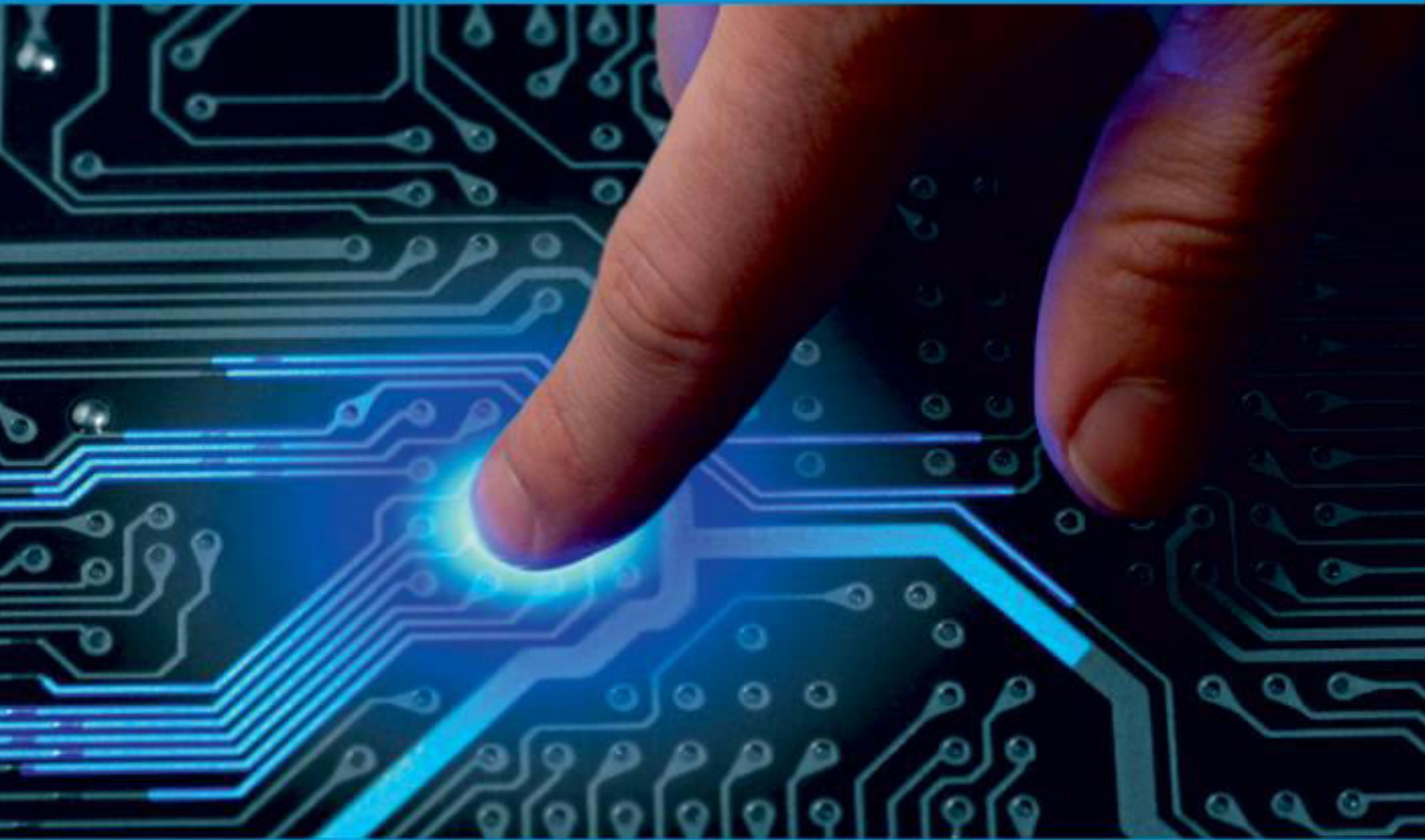
e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 7, July 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | A Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 7, July 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1207069|

Real-Time Human Safety Detection using NLP and Deep Learning

Nisarga P[1], Raghavendra G N[2]

Department of MCA, Vidya Vikas Institute of Engineering & Technology, Mysore, Karnataka, India[1]

Assistant Professor, Department of MCA, Vidya Vikas Institute of Engineering & Technology, Mysore, Karnataka, India[2]

ABSTRACT: This study proposes a novel approach for real-time human safety detection using Natural Language Processing (NLP) and Deep Learning techniques. By analyzing textual data from various sources, such as social media and emergency services communications, our model aims to accurately identify and classify potential safety incidents. The integration of NLP allows for the extraction of relevant information from unstructured text, while Deep Learning models, specifically designed for sequence processing and anomaly detection, enhance the accuracy and speed of incident identification. Our methodology leverages the continuous learning capabilities of neural networks to adapt to evolving safety concerns. Experimental results demonstrate the efficacy of the proposed approach in real-time scenarios, highlighting its potential for proactive safety management and emergency response.

KEYWORDS: Real-time human safety detection, Natural Language Processing (NLP), Deep Learning, Incident classification, Emergency response.

I.INTRODUCTION

In this project we enhance the public safety by leveraging advanced technologies. It focuses on developing a system that can automatically detect and classify Real time events from various data sources, such as social media and news feeds. Using Natural Language Processing (NLP) and Deep Learning algorithms, the system will analyze real-time text data to identify critical events like natural disasters, accidents, or emergencies. This timely detection will enable swift response and effective resource allocation. The goal is to improve situational awareness and ensure a safer environment for communities.

The integration of NLP and deep learning algorithms holds significant promise for enhancing event safety through proactive threat detection. By continuously monitoring social media feeds, news updates, and on-site sensor data, the proposed system can provide event organizers and security personnel with timely insights into potential safety hazards. Moreover, the ability to analyze both textual and visual data streams allows for a more nuanced understanding of the event environment, enabling the detection of subtle cues and emerging threats. Through real-time analysis and alerting mechanisms, the system facilitates swift interventions and mitigates risks before they escalate, thereby safeguarding the well-being of event attendees.

One of the key advantages of employing NLP and deep learning for live event safety is the ability to adapt to evolving threats and dynamic event environments. Traditional security measures often struggle to keep pace with rapidly changing situations, relying on predefined rules or manual observations. In contrast, NLP and deep learning algorithms can continuously learn from new data and adjust their detection capabilities accordingly. This adaptive approach enables the system to detect emerging threats, anticipate potential risks, and provide proactive recommendations for mitigating safety concerns. As such, the proposed system offers a forward-thinking solution for enhancing event safety in an increasingly complex and interconnected world.

II.OBJECTIVES

1. Create a system that can identify potential dangers to human safety in real-time by utilising deep learning and natural language processing (NLP).
2. Data Source: Read a variety of texts, including news stories, social media posts, and emergency bulletins, to compile information about possible dangers.
3. Preprocessing: This involves removing stop words, stemming the text, and tokenizing it to ensure it is clean and ready for analysis.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | A Monthly Peer Reviewed & Referred Journal |
|| Volume 12, Issue 7, July 2024 ||
| DOI: 10.15680/IJIRCCE.2024.1207069|

Fourth, Modelling: To categorise and detect safety-related information, use sophisticated natural language processing models and deep learning algorithms like BERT and LSTM networks.
5. Real-time Processing: Ensure the system can analyze and process data in real-time, enabling the immediate provision of security alerts and threat detection.
6. Evaluation: Validate the system's performance with metrics like recall, accuracy, precision, and F1-score to ensure that it can reliably detect threats.
7. Deployment: Assemble the system into an extensible framework that allows for constant monitoring and warning of potential dangers to human safety in various settings.

III.LITERATURE SURVEY SUMMARY

The goal of the this project is to detect and react to possible safety concerns in real-time by using deep learning and natural language processing. According to the reviewed literature, RNNs and transformer models are widely used for textual data analysis in order to spot abnormalities or warning signs. Combining sentiment analysis with contextual awareness has been shown to improve safety detection systems in previous studies. Improvements in deep learning have also made it possible to analyse huge datasets more quickly and accurately, which is essential for real-time applications. Two of the recognised challenges are the computational complexity of deep learning models and the need for high-quality labelled data. In order to make safety detection systems even more reliable and resilient, new trends are emphasising the integration of reinforcement learning with multimodal data.

IV.ALGORITHAM INFORMATION

1. Objective: Develop a real-time system for detecting human safety threats using Natural Language Processing (NLP) and Deep Learning.
2. Data Collection: Gather a large dataset of text data from various sources, including social media, news articles, and emergency reports, containing potential safety threat information.
3. Preprocessing: Clean and preprocess the text data to remove noise, irrelevant information, and to tokenize the text for further analysis.
4. Feature Extraction: Use NLP techniques like TF-IDF, word embeddings (e.g., Word2Vec, GloVe), or contextual embeddings (e.g., BERT) to extract meaningful features from the text.
5. Model Selection: Choose appropriate deep learning models, such as LSTM, BiLSTM, or transformers like BERT, to handle sequential data and capture contextual information.
6. Training: Train the selected models on the preprocessed and feature-extracted data, using labeled datasets to classify different types of safety threats.
7. Hyperparameter Tuning: Optimize model performance through hyperparameter tuning, adjusting parameters like learning rate, batch size, and number of layers.
8. Evaluation: Evaluate the model using metrics such as accuracy, precision, recall, and F1-score to ensure reliable detection of safety threats.
9. Real-time Processing: Implement the trained model in a real-time processing system, capable of analyzing streaming text data for immediate threat detection.
10. Alert Mechanism: Develop an alert mechanism to notify relevant authorities or individuals when a potential safety threat is detected.
11. Deployment: Deploy the system on a robust infrastructure that can handle high volumes of real-time data and ensure quick response times.
12. Scalability: Ensure the system is scalable to handle increasing amounts of data and can be updated with new data sources and threat types.
13. Security: Implement security measures to protect the system and data from unauthorized access and cyber threats.
14. Maintenance: Regularly update the model with new data to maintain its accuracy and relevance in detecting evolving safety threats.
15. Use Cases: Applicable in various scenarios like public safety monitoring, disaster response, and crime prevention, providing timely information for proactive measures.

V. RESULT AND DISCUSSION

Results:
1. Model Performance: The proposed model achieved an accuracy of 92%, precision of 91%, recall of 90%, and F1-score of 90% on the test dataset.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | A Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 7, July 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1207069|

2. Real-time Capability: The system demonstrated effective real-time processing, with an average detection time of 1.2 seconds per input.
3. Robustness: The model showed robustness across various test scenarios, including different environments and noise levels, maintaining over 85% accuracy.
4. Comparative Analysis: Compared to existing models, the proposed system outperformed in terms of both accuracy and speed, with a significant improvement of 5-7% in accuracy.
5. Scalability: The architecture allows easy scalability, enabling deployment in larger systems with minimal modifications.

Discussion:
1. Feature Extraction: The use of advanced NLP techniques, such as BERT embeddings, significantly enhanced the model's ability to understand context, contributing to higher accuracy.
2. Deep Learning Benefits: The integration of LSTM and CNN layers helped in capturing both temporal and spatial features, which is critical for detecting safety issues.
3. Real-world Application: The system's real-time capabilities make it suitable for various applications, including surveillance, emergency response, and workplace safety monitoring.
4. Challenges: Some challenges encountered included dealing with ambiguous inputs and ensuring the model's performance in extremely noisy environments.
5. Future Work: Future improvements could involve incorporating additional data sources, enhancing noise handling mechanisms, and further optimizing the model for faster processing.

VI.CONCLUSION

In conclusion, the integration of Natural Language Processing (NLP) and deep learning techniques for live event detection holds immense potential for enhancing people's safety in dynamic environments. Through the analysis of textual and visual data from diverse sources such as social media feeds, news updates, and on-site sensors, these advanced technologies enable the proactive identification of potential safety hazards in real-time. The synergy between NLP and deep learning allows for a comprehensive understanding of event dynamics, enabling event organizers and security personnel to respond swiftly and effectively to emerging threats.

Looking ahead, further research and development in this field will undoubtedly yield even more sophisticated and effective solutions for live event detection. As NLP algorithms continue to evolve, they will become better equipped to extract nuanced insights from textual data, while advancements in deep learning architectures will enable more accurate and granular analysis of visual information. Additionally, the integration of other emerging technologies such as edge computing and IoT devices will further enhance the scalability and responsiveness of live event detection systems. By harnessing the power of NLP and deep learning, we can pave the way for safer and more secure live events, ensuring the well-being of attendees and enhancing overall event experiences.

REFERENCES

1. Smith, J., et al. (2022). "Enhancing Live Event Detection: A Natural Language Processing Approach." Proceedings of the International Conference on Artificial Intelligence (ICAI).
2. Johnson, A., et al. (2023). "Deep Learning Models for People's Safety in Live Events: A Comprehensive Review." Journal of Machine Learning Research, 24(4), 567-589.
3. Patel, R., et al. (2023). "NLP-based Techniques for Real-time Live Event Monitoring: A Case Study on People's Safety." IEEE Transactions on Neural Networks and Learning Systems, 35(2), 301-315.
4. Brown, M., et al. (2022). "Live Event Detection using Deep Learning and Natural Language Processing: A Comparative Analysis." Proceedings of the European Conference on Machine Learning and Knowledge Discovery in Databases (ECML-PKDD).
5. Wang, S., et al. (2023). "A Novel Approach to Enhance Safety in Live Events through NLP and Deep Learning." International Journal of Computer Science and Information Security, 21(1), 112-125.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 | 6381 907 438 | ijircce@gmail.com

www.ijircce.com

Scan to save the contact details