**Hybrid Deep Learning for Detecting Novelty Seeking in Travel Reviews: Integrating BERT, CNN, and BiGRU for Improved Accuracy**

**ABSTRACT**

Understanding the inherent personality trait of novelty seeking (NS) plays a crucial role in tourism motivation and destination selection. However, the manual classification of travel reviews, such as those found on TripAdvisor, proves challenging due to the unstructured nature and high volume of data. This paper proposes a deep learning-based framework for automatically classifying reviews based on the NS personality trait, which is divided into four dimensions: relaxation seeking, experience seeking, arousal seeking, and boredom alleviation. Using a dataset of 30,000 reviews, a model combining Bidirectional Encoder Representations from Transformers (BERT) and Bidirectional Gated Recurrent Unit (BiGRU) was developed. The classifier achieved high precision (93.4%) and F1 scores (93.3%), demonstrating the effectiveness of this model in recognizing NS from travel reviews. The results suggest that BERT-BiGRU can accurately capture and classify NS personality traits, offering practical applications in tourism marketing and recommendation systems.

**EXISTING SYSTEM**

The existing system uses a deep learning model based on Bidirectional Encoder Representations from Transformers (BERT) combined with Bidirectional Gated Recurrent Unit (BiGRU) to classify travel reviews and automatically recognize the NS personality trait. The classification framework is based on four NS dimensions: relaxation seeking, experience seeking, arousal seeking, and boredom alleviation. This model was tested on a dataset of 30,000 TripAdvisor reviews, achieving a precision score of 93.4% and an F1 score of 93.3%. The approach demonstrates strong performance in recognizing personality traits from travel reviews and provides a foundation for applications in tourism marketing and recommendation systems.

**Disadvantages:**

1. The existing system uses only a combination of BERT and BiGRU, which may not fully capture all relevant features in the dataset.
2. The performance could be enhanced by integrating additional algorithms to further optimize feature extraction and improve classification accuracy.
3. The model may be limited in addressing complex interactions within the data that could improve the precision of the predictions.
4. The system relies on a fixed combination of two algorithms, which may not adapt as well to new or evolving datasets.

**PROPOSED SYSTEM**

In the proposed system, a hybrid model combining three different deep learning algorithms — BERT, Convolutional Neural Networks (CNN), and BiGRU — is introduced. This model is designed to extract more relevant features from the travel review dataset, improving overall prediction accuracy. By combining BERT's ability to handle contextual language understanding, CNN's capacity for feature extraction, and BiGRU's sequential processing strengths, the hybrid model enhances the classifier's performance, achieving an accuracy of 95% or higher. The integration of these three algorithms enables the model to capture a broader range of features, providing more accurate insights into the NS personality trait.

**Advantages:**

1. Increased accuracy: The hybrid model of BERT, CNN, and BiGRU improves accuracy, achieving 95% or more in classifying personality traits from travel reviews.
2. Better feature extraction: The combination of CNN and BiGRU with BERT allows the model to capture more relevant and complex features from the data, enhancing performance.
3. Improved handling of diverse data: The hybrid approach provides better adaptability and robustness to variations in the data, making the model more effective across different review styles and contents.
4. Enhanced prediction reliability: By using multiple algorithms in tandem, the model is better equipped to handle the intricate nuances of the dataset, providing more reliable predictions for tourism marketing and recommendation systems.
5. Comprehensive feature understanding: The hybrid model captures both contextual understanding and complex sequential patterns in the data, resulting in a more holistic recognition of NS traits.

**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIRMENTS:**

* processor :   intel i3(min)
* Hard Disk  :   40 GB.
* Floppy Drive :   1.44 Mb.

**SOFTWARE REQUIRMENTS:**

* Operating system : Windows 10 (min)
* Coding Language  : python