FADML PROJECT

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Problem Statement: Addressing the decreasing attention span among University Students

Problem Description:

Students in the 21st Century do not have the same attention span as students had 10 to 20 years ago. On average, a student's attention time span today lies between 10-15 minutes. However, any University curriculum has a lecture lasting as long as 50-60 minutes. This creates a scenario where students partially comprehend the concepts taught in the class lecture and ultimately lose interest in the class curriculum. Students often become more stressed and anxious about their academic performance, which ultimately affects their mental health. From a teacher's perspective, this creates emotions ranging from disappointment and frustration to concern.

Addressing The Problem:

According to researchers, one of the important techniques to handle this situation is to have a more engaging session. However, this is easier said than done. To decipher which methodology of teaching would ensure proper engagement of students without compromising their learning quotient is a task in itself. Another important aspect includes fostering a positive and inclusive culture in the class. However, this involves getting into the students' zone of engagement and resonating with them. Students' zone of engagement varies according to personality. While some would feel that a live demonstration-based class would be more fruitful, others are of the opinion that it would make more sense to draw mythological analogies and examples. While some focus on the reality of how things are, others might be more inclined towards imagining the possibilities of how things could be. Some of the students would be extroverted and prefer outspoken presentations, while others might be introverted and would prefer a research-based assignment. We intend to identify the personalities of students in a classroom using Myers-Briggs Personality Trait Identification. This would be done by the use of Surveys. Post identification, we would use k-means clustering to cluster the personalities on verticals across 4 axes: (1) Decision Making, (2) Information Intake, (3) Outward/Inward Focus, (4) Preference of Outer Life. The cluster density could then be analysed to decide which methodology a teacher should adopt to suit and appeal to the majority of the students present in the class.

As our future plan we intend to extent our model to personality prediction(This would be done when we have enough data points to train our model efficiently using XG-Boost clustering)

INTRODUCTION

The Myers-Briggs Type Indicator (MBTI) is a personality assessment tool that measures an individual's preferences for four dichotomous dimensions of personality, resulting in 16 possible personality types. The four dimensions are:

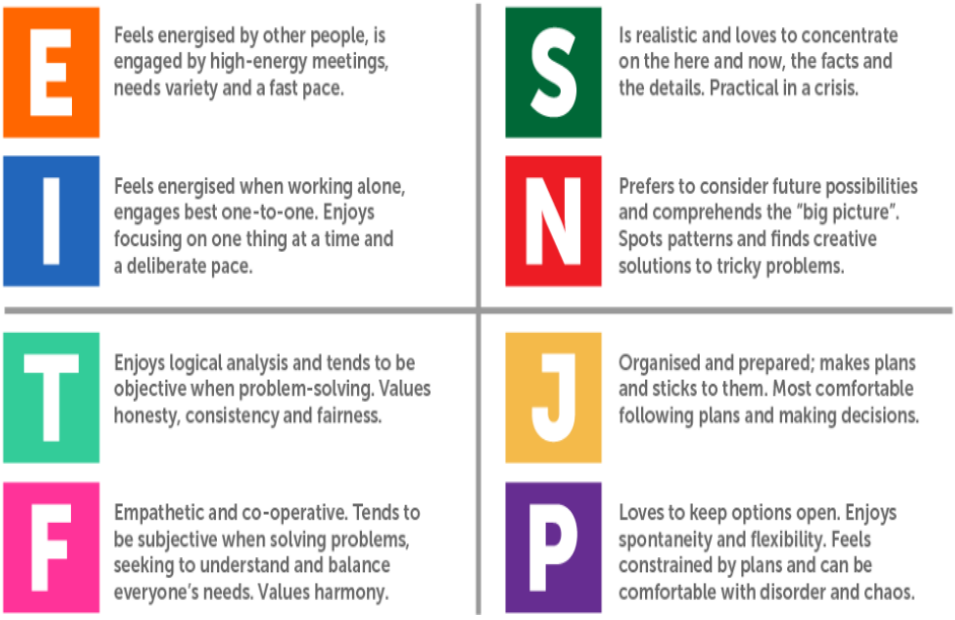
- Extraversion (E) vs. Introversion (I):
  This dimension reflects an individual's preference for engaging with the external world or their internal world of thoughts and feelings.

- Sensing (S) vs. Intuition (N):
  This dimension reflects an individual's preference for processing information through concrete, sensory experience or through abstract, conceptual thinking.

- Thinking (T) vs. Feeling (F):
  This dimension reflects an individual's preference for making decisions based on objective, logical analysis, or subjective, personal values and emotions.

- Judging (J) vs. Perceiving (P):
  This dimension reflects an individual's preference for approaching life in a structured, planned manner or in a flexible, spontaneous manner.

Each of the 16 personality types is represented by a four-letter code, such as ESTJ or INFP, which indicates the individual's preferences on each of the four dimensions. The MBTI is widely used in various settings, including education, career counselling, and personal development. However, the instrument has been subject to criticism regarding its reliability and validity and should not be used as the sole basis for important decisions.



LITERATURE REVIEW

The MBTI has been used in many research studies to identify personality traits.

One of the first research papers to use the MBTI to identify personality traits was **"*The Myers-Briggs Type Indicator: A Measure of Jung's Typology*" by Katharine Briggs and Isabel Briggs Myers, published in 1962**. This paper described the development and validation of the MBTI, which was based on the work of Swiss psychiatrist Carl Jung.

In this paper, Briggs and Myers presented data from a sample of over 5,000 individuals who had taken the MBTI, and they described how the instrument could be used to identify a person's preferences for extraversion/introversion, sensing/intuition, thinking/feeling, and judging/perceiving. They also discussed how these preferences could be combined to create the 16 different personality types.

The paper begins with an overview of the work of Carl Jung, the Swiss psychiatrist whose theory of personality formed the basis for the MBTI. Briggs and Myers describe Jung's theory of psychological types, which suggests that individuals have different ways of perceiving and processing information based on their innate preferences for certain mental functions, such as thinking or feeling.

Briggs and Myers then describe how they developed the MBTI as a tool for identifying these preferences. They explain that the MBTI measures four main dimensions of personality: extraversion/introversion, sensing/intuition, thinking/feeling, and judging/perceiving. Each dimension has two opposite poles, and individuals are categorized as preferring one pole or the other in each dimension.

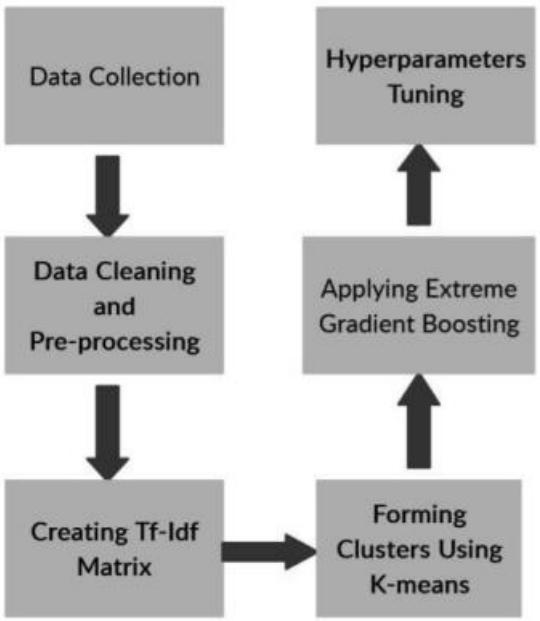
The authors then present data from a sample of over 5,000 individuals who had taken the MBTI. They describe how the data supported the validity and reliability of the instrument, and they present examples of how the MBTI can be used to identify different personality types.
Briggs and Myers also discuss the potential applications of the MBTI, including in education, career counseling, and personal development. They emphasize that the MBTI is not a measure of intelligence or mental health, but rather a tool for understanding and appreciating individual differences in personality.

Overall, "The Myers-Briggs Type Indicator: A Measure of Jung's Typology" is a landmark paper that has had a significant impact on the field of personality assessment. While the validity and reliability of the MBTI have been debated in subsequent research, the paper remains a classic and continues to be cited in studies that use the MBTI to identify personality traits.

The research paper titled "***Predicting MBTI Personality type with K-means Clustering and Gradient Boosting***" **by Zeeshan Mustaq, Sagar Ashraf, and Nosheen Sabahat** aims to predict the Myers-Briggs Type Indicator (MBTI) personality types using clustering and gradient boosting algorithms. The paper describes the various aspects of clustering algorithms and their implementation, as well as the concept of gradient boosting and how it is used to improve the accuracy of the model.

The authors first describe the MBTI personality model, which is based on four dimensions, namely, Extraversion vs. Introversion (E/I), Sensing vs. Intuition (S/N), Thinking vs. Feeling (T/F), and Judging vs. Perceiving (J/P). They then explain the K-means clustering algorithm and how it can be used to identify groups of individuals with similar personality traits. The authors also discuss the process of data pre-processing, which involves converting the categorical data of MBTI types into numerical data.

The research paper then describes the implementation of the K-means clustering algorithm on the MBTI dataset. The authors compare the performance of the K-means clustering algorithm with different numbers of clusters and find that the optimal number of clusters for this dataset is four. They then use the gradient boosting algorithm to improve the accuracy of the K-means clustering algorithm. Gradient boosting is a powerful machine learning algorithm that uses an ensemble of decision trees to make accurate predictions. The authors show that the gradient boosting algorithm significantly improves the accuracy of the K-means clustering algorithm.



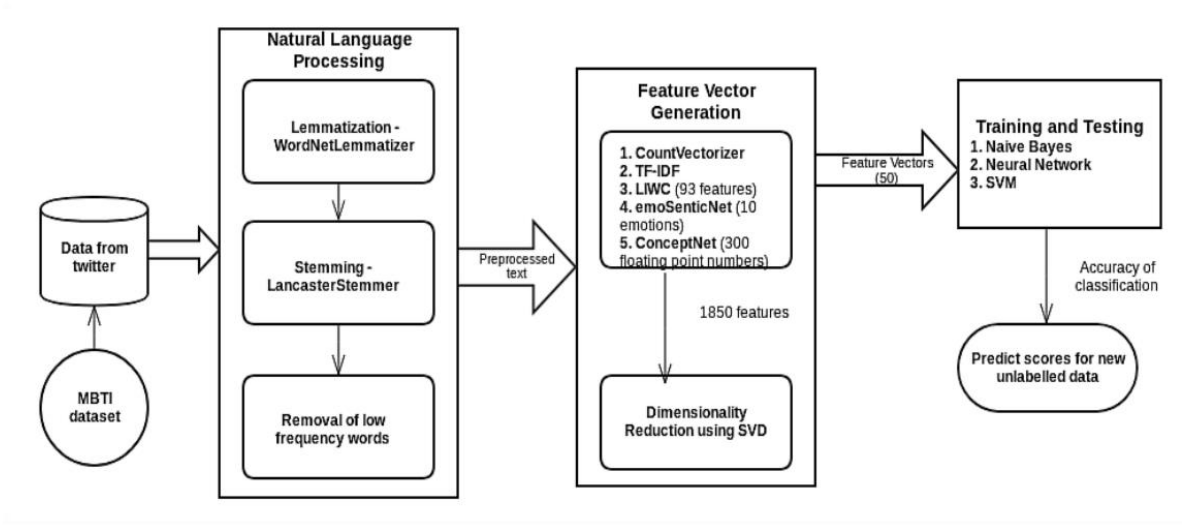
The research paper concludes that the K-means clustering algorithm with gradient boosting is an effective method for predicting MBTI personality types. The authors suggest that this method can be used in a wide range of applications, including psychological research, HR management, and social media analysis.

Overall, this research paper provides a comprehensive overview of the K-means clustering algorithm and gradient boosting algorithm, as well as their implementation on the MBTI dataset. The authors' findings suggest that clustering algorithms can be a powerful tool for identifying groups of

individuals with similar personality traits and that gradient boosting can significantly improve the accuracy of these algorithms.

The research paper "***Persona Traits Identification based on Myers-Briggs Type Indicator (MBTI)***" **by S. Bharadwaj** et al. explores the use of machine learning techniques to identify persona traits based on MBTI types. The paper is published in the International Journal of Innovative Research in Computer and Communication Engineering in 2018.

This project's main goal was to create a personality profile from user-written content. Finding patterns in feelings and examining the distribution of emotions in the data was part of the early analysis. After that, the text underwent pre-processing to get rid of context-sensitive words, numerals, punctuation, and hyperlinks.



Using TF-IDF, feature vectors were created. Also added to the feature vector were features from Emolex, ConceptNet, and LIWC. The feature vectors were utilized for training and testing machine learning models after severe feature reduction. Various feature vector combinations and machine learning methods were contrasted. With neural networks, it was found that using SVD produced the best results while adding LIWC increased accuracy even more.

As Emolex features were introduced to the feature vector, accuracy decreased. The best outcomes for Naive Bayes were seen when LIWC and Emolex were introduced. SVD for Naive Bayes results in a reduction in overall accuracy. The SVM with combinations of the TF-IDF, Emolex, ConceptNet, and LIWC feature vectors produced the greatest accuracy. It evaluated how well the models performed with each feature vector in each MBTI class.

REFERENCES:

- S. Bharadwaj, S. Sridhar, R. Choudhary, and R. Srinath, "Persona Traits Identification based on Myers-Briggs Type Indicator(MBTI) - A Text Classification Approach," 20i8 international Conference on Advances in Computing, Communications and informatics (iCACCi), Bangalore, 2018, pp. 1076-1082, doi: 10. 1109/ICACCI.2018.8554828. [Accessed: 19-Jun-2020].
- https://www.researchgate.net/publication/348642369
- "*The Myers-Briggs Type Indicator: A Measure of Jung's Typology*" by Katharine Briggs and Isabel Briggs Myers, published in 1962.

OBJECTIVES:

- We intend to address the decreasing attention timespan among university students.
- We intend to make the classroom curriculum more inclusive by designing a teaching structure that resonates with the students.
- We intend to facilitate a classroom experience that is efficient, productive, and motivating for teachers and students combined.
- We intend to extend our model to personality prediction (This would be done when we have enough data points to train our model efficiently using XG-Boost clustering)