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PREDICTING PSYCHOLOGICAL STATE FROM INSTAGRAM PROFILE DATA USING SENTIMENT ANALYSIS AND EMOTION CLASSIFICATION

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***Abstract*— In this social media age, it is more crucial than ever to comprehend consumers' psychological states. This study uses profile data from Instagram users to present a novel approach for predicting their psychological states. Using the Apify API, user profiles are scraped in order to obtain post photos, captions, and comments. Next, a pre-trained Hugging Face model is used to perform sentiment analysis on the comments; the findings are color-coded for simple understanding. The post photographs are simultaneously subjected to an emotion classifier that divides them into groups according to emotions including happiness, sorrow, rage, surprise, disgust, fear, and neutrality.**

A pie chart that shows the frequency of each emotion gives a clear picture of the user's emotional state as it is exhibited through their Instagram activity. The most often identified emotion is then used to forecast the user's psychological state. This novel method has demonstrated promise in offering insightful information on user psychology, with implications for tracking mental health and delivering tailored content. Nevertheless, additional investigation is necessary to corroborate these results using a more extensive sample size and a wider range of user demographics, consequently augmenting the resilience and relevance of this approach.

I. INTRODUCTION

Social media's has completely changed the way we express ourselves and communicate. Social media sites such as Instagram have developed into virtual easels on which people may express their ideas, feelings, and lifestyles. This digital footprint offers an abundance of information that may be examined to learn more about the psychology and behavior of people. As such, our work employs a novel approach that integrates data science, artificial intelligence, and psychology to predict the psychological condition of Instagram users through profile data analysis.

An initial step in our approach is to analyze the sentiment of comments left on Instagram postings. Sentiment analysis, a fundamental component of Natural Language Processing (NLP), is the process of computationally recognizing and classifying viewpoints expressed in a text, particularly with regard to ascertaining the writer's positive, negative, or neutral attitude toward a given subject, item, etc. We may learn more about the opinions stated by the user and their audience by using sentiment analysis to examine the comments on Instagram postings. The emotion distribution is then visually shown by color-coding this data.

Classifying post photos according to their emotions is the second step in our process. The practice of classifying photos according to the emotion they depict is known as emotion classification. A pre-trained model that divides photos into groups like joy, sorrow, rage, surprise, disgust, fear, and neutrality is used to accomplish this. We can determine the emotional content of Instagram postings by using emotion classification on their photos.

Through the integration of sentiment analysis and emotion classification, a full representation of an individual's emotional state as conveyed through their Instagram activity can be generated. A pie chart shows the frequency of each emotion in the comments and the pictures. This enables us to forecast the user's psychological condition by using the emotion that is most frequently identified. A higher frequency of melancholy, for example, may suggest a depressed condition, whereas a higher frequency of happy might suggest a cheerful mood.

There are new opportunities in the fields of psychology and mental health thanks to this creative approach. It may help in the early detection of mental health problems by giving a way to track emotional states through social media activity. Additionally, it might find usage in personalized content delivery, where content is delivered according to the user's emotional state. It's crucial to remember that even if this approach offers insightful information, it shouldn't take the place of a qualified psychiatric evaluation. As we continue reading the paper, we will go into more detail about our approach, share our findings, and talk about the ramifications and possible uses of our findings.

II. LITERATURE SURVEY

Sentiment Analysis and Emotion Detection from Text by Pansy Nandwani & Rupali Verma[1]: This paper provides an understanding of various levels of sentiment analysis, different emotion models, and the process of sentiment analysis and emotion detection from text. It also discusses the challenges faced during sentiment and emotion analysis.

Sentiment Analysis in Social Media Data for Depression Detection Using Artificial Intelligence by Nirmal Varghese Babu & E. Grace Mary Kanaga[2]: This paper reviews sentiment analysis on social media data for apprehensiveness or depression detection utilizing various artificial intelligence techniques. It highlights the use of multi-class classification and deep learning techniques for sentiment analysis.

Visual Sentiment Analysis Using Deep Learning Models with Social Media Data by Ganesh Chandrasekaran, Naaji Antoanela, Gabor Andrei, Ciobanu Monica, and Jude Hemanth[3]: This study employed different transfer learning models, including VGG-19, ResNet50V2, and DenseNet-121, to perform sentiment analysis based on images from social media. The study presents a comparative analysis of these pre-trained models in the prediction of image sentiments.

Instagram Sentiment Analysis: Opinion Mining by Shweta Gangrade, Nirvishesh Shrivastava, Jayesh Gangrade[4]: This paper proposes sentiment categories by extracting sentiment keywords for major sentiments using hashtags, which are essential elements of Instagram. The study found that sentiment categories applied to user posts can determine sentiments through similarity measurement between sentiment adjective candidates and sentiment keywords.

Leveraging ParsBERT for cross-domain polarity sentiment classification of Persian social media comments by M Panahandeh Nigjeh, S Ghanbari[5]: This study presents an architecture to analyse a limited resource language, Persian, and focuses on the analysis of social media, consisting of informal comments across different domains. The proposed model applies a transformer-based model, Pars BERT, to classify the sentiments of social media comments.

Multidimension sentiment analysis method on social media data: comparison of emotions during and after the covid-19 pandemic by B Doğan, YS Balcioglu, M Elçi[6]: This study elucidates the dynamics of social media discourse during global health events, specifically investigating how users across different platforms perceive, react to, and engage with information concerning such crises.

Beyond the use of a novel Ensemble based Random Forest-BERT model for the sentiment analysis of the hashtag covid-19 tweets by B Jlifi, C Abidi, C Duvallet[7]: This study investigates the usefulness of hashtag Covid19 tweets in identifying the emotional polarity of the COVID-19 pandemic on Twitter via a sentiment analysis process. The proposed model applies an ensemble voting model based on Random Forest (RF) and the Bidirectional Encoder Representations from Transformers (BERT).

A picture is worth a thousand "Likes": An analysis of engagement with sports network images on Instagram by RG Johnson, M Romney, K John[8]: This study dives deeper into the types of images that generate key social media engagement. Researchers conducted a biometric analysis of randomly sampled Instagram images from sports networks' official feeds. Results indicate that social media images containing metacommunicative themes increase audience engagement.

Sarcasm in Social Media: A Study of Comments on Sam Smith's Instagram Posts by Fadilah, A Wijayanto[9]: This study revealed that four types of sarcasm were used by netizens to comment on Sam Smith's Instagram posts, including propositional,

lexical, like - prefix, and illocutionary sarcasm. The study found five purposes of sarcasm: sophistication, evaluation, politeness, persuasive communication, and retraction.

Sentiment Analysis Through the applications of Machine Learning Algorithm by DG Takale, A Patil, S Jadhav, S Masram, S Masarkar[10]: This paper presents a comprehensive comparative study of several machine learning algorithms applied to sentiment analysis tasks. The performance of these algorithms is evaluated on benchmark datasets, considering factors such as accuracy, precision, recall, F1-score, and computational efficiency.

Social-Media Users Negative Post Analysis Using Machine Learning by T Tahmida, MR Ratin, CAM Marma, MMZ Khan[11]: This paper discusses the application of machine learning techniques in analysing negative posts on social media platforms.

Unravelling energy justice in NYC urban buildings through social media sentiment analysis and Transformers deep learning by M Ashayeri, N Abbasabadi[11]: This paper discusses the use of sentiment analysis and deep learning techniques to understand energy justice issues in urban buildings in New York City.

Sentiment Analysis of social media with AI by A Yadav, S Chhabra[12]: This study article presents a comprehensive review of sentiment analysis using deep learning techniques. It discusses various aspects of sentiment analysis, including data preprocessing, feature extraction, model architectures, and evaluation metrics.

III. METHODOLOGY

In this work we employs a novel approach to predict the psychological states of Instagram users by analysing their profile data. The methodology for this project is divided into several key steps:

Data Collection: The first step involves data collection. We utilize the Apify API to scrape Instagram user profiles. The data collected includes the number of posts, the number of followers, post images, captions, and all comments on each post.

Sentiment Analysis: After data collection, we perform sentiment analysis on the comments. This is achieved using a pre-trained model from Hugging Face. Each comment is categorized as either positive or negative. The results are then visually represented, with positive comments displayed in green and negative comments in red.

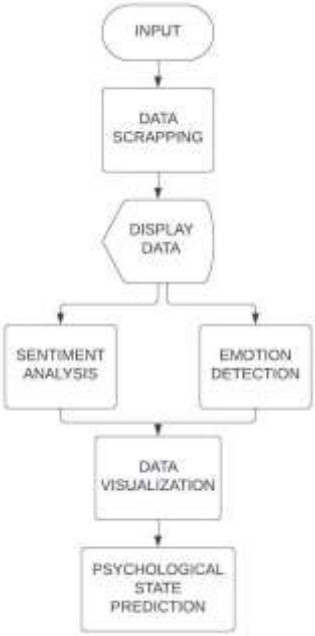
Emotion Classification: Simultaneously with the sentiment analysis, we perform emotion classification on the post images. This is done using another pre-trained model from Hugging Face. The model classifies each image based on the emotion it represents, such as happiness, sadness, anger, surprise, disgust, fear, and neutrality.

Data Visualization: The results of both the sentiment analysis and emotion classification are visually represented using pie charts. One pie chart displays the results of the sentiment analysis, and another displays the results of the emotion classification. These charts provide a clear visual representation of the emotional content of the user's Instagram profile.

Psychological State Prediction: The final step involves predicting the user's psychological state. This is determined by the emotion that has the highest count in the user's profile. For example, if the emotion 'happy' is detected more frequently, the user's psychological state is predicted to be 'cheerful'. If the emotion 'sad' is detected more frequently, the user's psychological state is predicted to be 'depressed'.

This methodology provides a comprehensive approach to understanding user psychology in the digital age. It combines techniques from data scraping, natural language processing, image categorization, data visualization, and psychology. However, it's important to note that while this method provides valuable insights, it should not replace a professional psychiatric evaluation. Further research is needed to validate these results with a larger sample size and diverse demographics.

FIGURE 1: ARCHITECTURE DIAGRAM



IV. RESULTS

This section showcases the output generated by the Data Scrapped and real time analysis phase (as shown in FIGURE 2), Plotting Pie chart (as shown in FIGURE 3) and Profile information (as shown in FIGURE 4).

FIGURE 2: SCRAPPED DATA

FIGURE 3: PIE CHART

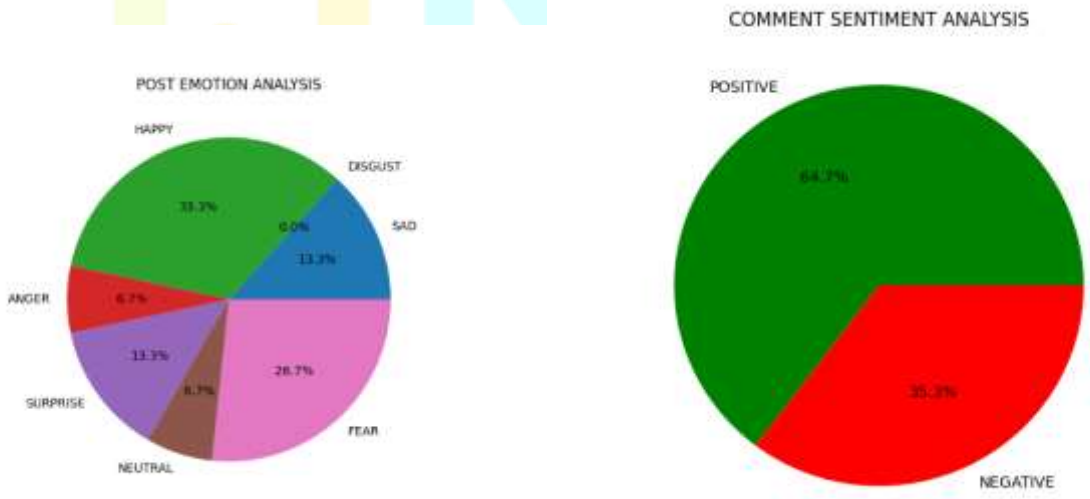
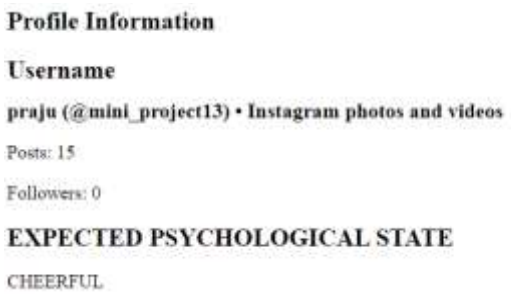


FIGURE 4: PROFILE DETAILS



In FIGURE 2 we are displaying the data acquired by scrapping the data and displayed in a grid pattern, The post image is dispalyed in the first along with the caption of the post followed by all the comments of each post, every comment available in the profile is displayed in order with its images and comments and sentiment analysis results are displayed simultaneously if the comments is determined to be a positive comments then the comments are displayed in green colour, If the comments are determined to be negative comments then the comments are displayed in red colour and the emotion detection result is displayed according to the prediction. The emotions are labelled as happy, sad, anger, disghust, fear or neutral.

In FIGURE 3 we have displayed the pie charts of the post emotion detection and comment sentimen analysis, The pie chart is displayed according to the overall analysis and plotted the chart.

In FIGURE 4 we are displaying the predicted psychologicak state of the Instagram profile alone with all the profile information like username, number of posts, number of followers.

V. CONCLUSION

In this project demonstrates how sentiment analysis and emotion classification methods can be used to anticipate Instagram users' psychological states. We have analyzed Instagram profile data in a novel way by utilizing the power of machine learning models and data scraping tools. The findings provide new light on the emotional content of user profiles and a novel framework for comprehending user psychology in the digital age. The project's methods could have a big impact on a lot of different areas, such targeted content distribution and mental health monitoring. It's important to remember that even if this approach offers insightful information, it shouldn't take the place of a qualified psychiatric evaluation. Additional investigation is necessary to corroborate these results using a more extensive sample size and a wider range of user demographics, thus augmenting the resilience and relevance of this approach. This study lays the groundwork for a time when social media platforms will be used as a tool for understanding and enhancing mental health in addition to being a means of communication and self-expression. We look forward to learning more from our digital footprints as we explore this fascinating nexus of data science and psychology.

VI. FUTURE ENHANCEMENTS

1. Ethical Considerations: Implement a robust ethical framework to ensure user consent and privacy are respected. This could involve anonymizing data and obtaining explicit permission from users whose data is being analyzed.

2. Algorithmic Transparency: Develop a system to explain the AI's decision-making process to users, providing transparency on how conclusions about psychological states are drawn.

3. Multimodal Analysis: Integrate additional data points such as the tone of voice in videos or the frequency of posts to provide a more comprehensive analysis of psychological states.

4. User Feedback Loop: Create a mechanism for users to provide feedback on the accuracy of the psychological state predictions, which can be used to refine the models further.

5. Cultural Sensitivity: Adapt the emotion classifiers to account for cultural differences in expressing emotions, as sentiment and emotion can be highly context-dependent.

6. Longitudinal Studies: Implement tracking over time to observe changes in psychological states, providing insights into long-term patterns and trends.

7. Professional Collaboration: Work with mental health professionals to validate the predictions and potentially offer support or resources to users identified as at-risk.

8. Enhanced Visualization: Develop more sophisticated visualization tools to represent the data, making it easier for users to understand the sentiment and emotion analysis results.

VII.REFERENCES

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