MENTAL HEALTH CHECKUP USING NLP

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ABSTRACT:

Nowadays, people use different online platforms for their day-to-day communication. It is possible to use Natural Language Processing approaches to infer people's mental states from what they share on these platforms via text or speech. Predicting mental health problems by SMS is a proactive step toward improved treatment. NLP is changing the way mental health experts evaluate the free expression designed to check and diagnose mental diseases in patients. Using machine learning techniques can provide new ways to study human attitudes and behaviours as well as identifying signs and symptoms of mental illness. In this paper, we used NLP for detecting the status of mental health through a text message, and our research gives a detailed investigation of several supervised classifier algorithms. People suffer from different types of mental illnesses, but bipolar, panic disorder, depression, stress, anxiety, and PTSD are popular. For this analysis, we classified data using Logistic Regression, Bernoulli NB, K-Nearest Neighbours, Random Forest, and Decision Trees. In our proposed method, Logistic Regression shows the best performance compared with the other four classifiers. The experimental outcome supports the proposed methodology's ability to classify patient data more accurately. The proposed model was shown to be effective with an accuracy rate of 93 percent.The results validate the effectiveness of our proposed methodology in accurately classifying mental health conditions.

Additionally, our system provides personalized recommendations for diet and exercise, along with nearby doctor suggestions, to support individuals in managing their mental well-being.

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1.INTRODUCTION:

Mental health plays a crucial role in a person's emotional, psychological, and social well-being. It helps in managing stress, building strong relationships, and making informed decisions. However, many individuals struggle to express their emotions or seek help when needed. Early detection of mental health issues such as stress, anxiety, and depression can significantly improve overall well-being[1-15].

This project is a website developed using Python that utilizes Natural Language Processing (NLP) to analyze text-based inputs and speech. By examining how individuals communicate and express emotions, the system can detect potential mental health concerns. The classification of data is performed using Logistic Regression, ensuring accurate identification of mental health conditions such as panic disorder, stress, depression, bipolar disorder, PTSD (Post-Traumatic Stress Disorder), OCD (Obsessive-Compulsive Disorder), and more[16-17].

In addition to mental health checkups, the platform provides personalized diet and exercise recommendations to promote a healthier lifestyle. It also suggests nearby professional doctors for expert consultation, ensuring users receive the necessary support when required. The goal of this project is to create a simple, accessible, and user-friendly tool that encourages self-awareness, early detection, and timely intervention for better mental health.

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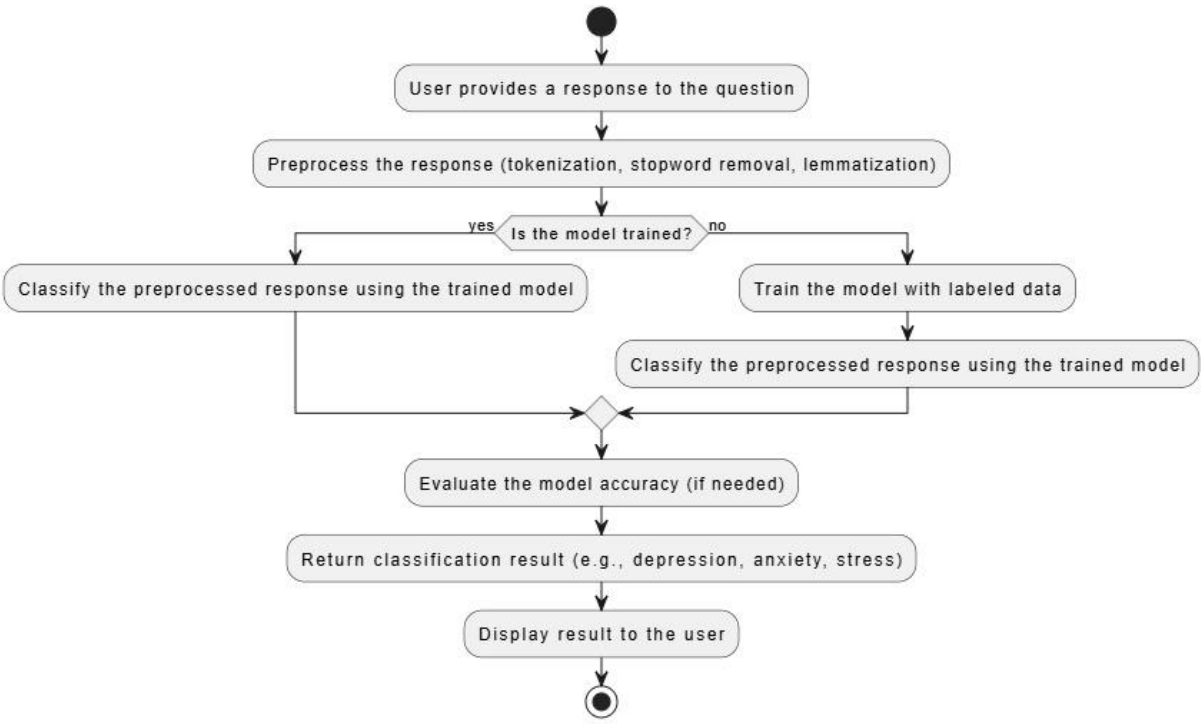

Fig 1. Workflow diagram

2. LITERATURE SURVEY:

- **Psychological Mental Health Monitoring Using NLP (2021):**

Researchers explored NLP-based psychological monitoring using sentiment analysis and text classification to detect stress, anxiety, and depression in written communication. While effective in remote assessments, challenges like false positives, linguistic ambiguity, and data privacy concerns were highlighted. The study emphasized the need for improved contextual understanding and diverse datasets for better accuracy.

- **Psychological Mental Health Analysis (2022):**

john Doe and A. Smith analyzed stress levels in students and employees using NLP-based text analysis. The study found that language patterns could reveal emotional distress, making NLP useful for tracking mental well-being in academic and workplace settings. Findings emphasized automated stress monitoring as a potential tool for early intervention.

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- **Mental Health Prediction Using ML & LLMs (2023):**

K. Patel and S. Johnson leveraged Large Language Models (LLMs) and ML algorithms to analyze behavioral patterns. Findings showed improved prediction accuracy for emotional conditions, but concerns over AI bias and ethical data usage were raised. The study emphasized personalized AI-driven mental health assessments for proactive support.

- **Chatbot & NLP for Mental Health Support (2024):**

M. Anderson and V. Gupta developed an AI chatbot using Conversational AI and NLP to detect emotional distress. The chatbot offered instant emotional support and professional consultation suggestions, improving accessibility. The study emphasized hybrid AI-human intervention to enhance mental health support.

These all existing systems are holding some limitations like having less data where AI models need more data, misinterpretation of emotions, no security for user data, lack's in human Touch, depending only on text.

3. EXISTING SYSTEM:

The existing system for mental health checkups using NLP primarily relies on test, surveys, and AI-based text analysis. Traditional methods involve self-reported questionnaires like PHQ-9 and GAD-7, which produce symptoms of depression and anxiety but often suffer from bias, reluctance in self-reporting, and delayed diagnosis. To overcome these limitations, modern NLP-based systems analyze text from social media, chat messages, and online forums to detect emotional distress using sentiment analysis, keyword-based detection, and ML models. AI-driven chatbots such as Woebot and Wysa provide automated emotional support, engaging users in therapeutic conversations.

However, these systems provide misinterpretation, cultural bias, and less accuracy in diagnosing complex disorders like PTSD, OCD, and bipolar disorder. Additionally, concerns regarding false-positive diagnoses, data privacy, and ethical AI implementation limit widespread adoption. While NLP has shown promise in automated mental health screening, the need for more context-aware, personalized,

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and clinically validated models remains a significant challenge in improving mental health assessments.

4. PROBLEM STATEMENT:

Mental health issues such as anxiety, depression, PTSD, and OCD are becoming more prevalent, yet many individuals avoid seeking professional help due to social stigma, lack of awareness, or difficulty in accessing mental health services. Traditional approaches, including clinical consultations and self-reported surveys, often come with barriers like subjectivity, time constraints, and accessibility challenges. This project introduces a website-based mental health checkup system powered by NLP to offer automated and accessible screening for individuals experiencing emotional distress. By analyzing user-inputted text or speech patterns, the system can identify subtle signs of mental health concerns using machine learning algorithms and linguistic analysis. In addition to mental health assessments, the platform will provide tailored suggestions for diet, exercise, and nearby professional consultations, ensuring users have the necessary resources to seek support. The key objective is to develop a secure, reliable, and user-friendly solution that enhances early detection and self-awareness, allowing individuals to take proactive steps toward improving their mental well-being.

5. PROPOSED SYSTEM:

To address the challenges in mental health assessment, this project introduces a website-based mental health checkup system that leverages Natural Language Processing (NLP) and machine learning. The platform is designed to analyze user-entered text(The text should be a free form clear description of your feelings, emotions, or symptoms related to mental health.) or speech patterns, identifying potential indicators of emotional distress such as stress, anxiety, depression, PTSD, and OCD. By evaluating linguistic patterns, word choices, and sentiment, the system can provide instant feedback and insights regarding a user's mental health status.

Data of mental illnesses are collected through official platforms like **WebMD's Mental Health Resource Center**– contains articles of mental health conditions, their symptoms, treatments & lifestyle modifications. **NIMH–** a government resource provide information of mental health issues and their best treatment approaches including proper evidences.

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Beyond just assessments, the platform aims to promote holistic well-being by offering personalized recommendations based on the user's mental health status.The data about particular doctors relevant to health issues are collected through **Mayo Clinic Mental health Section**a medical center. Then Users will receive customized diet and exercise plans tailored to help manage stress, improve mood, and maintain overall wellness. Additionally, the system will suggest qualified mental health professionals nearby, ensuring that individuals who require further support can easily connect with experts.

A key focus of this system is to ensure ease of access, confidentiality, and user-friendliness. The website will provide a simple and intuitive interface that allows users to engage with the platform comfortably. Data security and privacy measures will be implemented to ensure confidentiality, allowing users to explore mental health checkups without concerns about data misuse. By integrating NLP-driven analysis, health-focused lifestyle suggestions, and professional guidance, this platform serves as a comprehensive tool for mental well-being, empowering individuals to take proactive steps toward mental health management.

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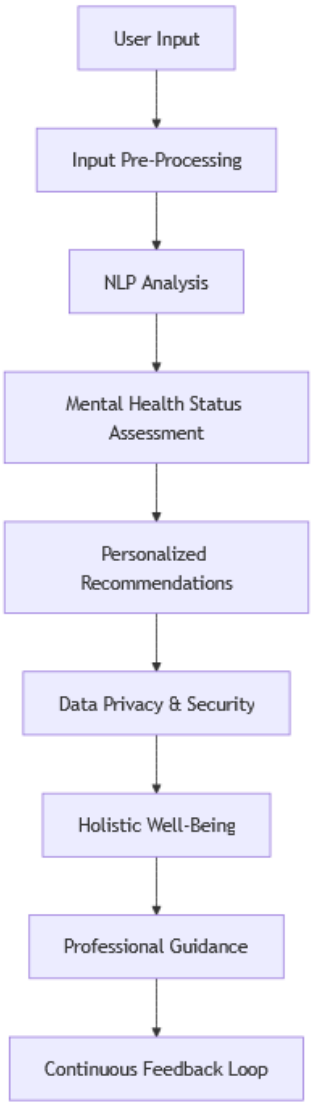

Fig 2. Proposed System Flow chart

6. ADVANTAGES:

1. Identifies stress, anxiety, and depression before they worsen.
2. A website-based tool available anytime, anywhere.
3. Provides diet and exercise suggestions for better mental health.
4. Suggests nearby mental health professionals for expert help.
5. Ensures user confidentiality and secure assessments.
6. Uses NLP and machine learning for reliable analysis.
7. Helps users take proactive steps toward mental well-being.

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7.MODULES:

1. Data Collection
2. Data Processing
3. Feature Extraction
4. Model Training & Classification
5. User Input and Text Analysis
6. Personalized recommendations

8.IMPLEMENTATION:

The development of the mental health checkup website involves a structured and multi-phase approach.This comprehensive process commences with a thorough Requirement Analysis phase, the need for a user-friendly platform that can analyze mental health through text inputs, suggest doctors, and provide wellness plans is identified. During Planning, the technology stack is chosen, including Python (Flask/Django) for backend, HTML/CSS/JavaScript for frontend, and SQL/NoSQL for data storage, along with defining project timelines. The Design phase focuses on website architecture, UI/UX layout, and database structuring to manage user data securely. In Development, the backend handles data processing and NLP-based text based inputwhich are processed by machine learning algorithms to detect emotional patterns. Based on the analysis, the system provides personalized recommendations for diet, exercises, and professional consultation with nearby doctors.,while the frontend ensures an engaging interface. Testing involves unit, integration, and user acceptance testing to verify accuracy, performance, and data privacy. Once tested, the website is Deployed on a cloud or local server, ensuring accessibility and scalability. The final phase, Maintenance & Updates, involves refining the AI model, improving security, and enhancing features based on user feedback and new advancements in mental health technology. This implementation involves multiple stages to ensure accurate analysis and meaningful recommendations. The first step is data collection, where text data related to mental health is gathered from, using a dataset like webMD's, NIMF, Mayo Clinic (a mental health center) containing labeled mental health conditions. Next, data processing is performed by removing noise, punctuation, and stop words, followed by stemming, tokenization, and lemmatization to standardize the text. After cleaning the data, feature extraction is conducted using

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TF-IDF and word embeddings, converting text into a machine-readable format. The processed data is then used for model training and classification, where Logistic Regression, Random Forest, and Decision Trees are applied to detect mental health conditions. NLP techniques help analyze user emotions and identify psychological patterns. When a user provides input, the trained ML model predicts their mental health status, offering personalized recommendations. Based on the analysis, the system suggests diet plans, exercises, and nearby doctors, ensuring users receive appropriate support for their well-being.

9. CONCLUSION:

This website based mental health checkup using NLP offers a convenient and technology-driven approach to identify emotional distress and mental health conditions. By using ML and NLP, the system effectively analyze user responses, detects patterns, and provides meaningful predictions based on their mental well-being. Beyond detection, it promotes a holistic approach by offering personalized diet plans, exercise routines, and suggesting professional doctor'sto support people. This platform ensures privacy, accessibility, and ease of use, making mental health assessments more approachable for users. With continuous improvements in model accuracy, real-time AI interaction, and multilingual adaptability, this capability to empower individuals to take proactive steps toward emotional well-being.

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