**Project Proposal: Assessing the Risk of Social Media-Induced Mental Health Issues Using Machine Learning**

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**Introduction**

In the digital age, social media has become a ubiquitous aspect of daily life, influencing not only how people communicate but also their mental and emotional well-being. The constant exposure to social media content can lead to varying emotional and psychological effects, both positive and negative. This project aims to explore the relationship between social media usage and the potential risk of mental health issues by developing machine learning models to predict the level of risk based on usage patterns and self-reported emotional states.

**Problem Statement**

The primary objective of this study is to assess the risk of mental health issues induced by social media usage. The project will involve analyzing various social media usage metrics and self-reported emotional states to build predictive models that can identify individuals at higher risk of developing negative mental health outcomes. This predictive capability can serve as a foundation for targeted interventions to mitigate the adverse effects of social media on mental health.

**Objectives**

* To analyze and understand the relationship between different patterns of social media usage and mental health risks.
* To develop machine learning models that predict the level of mental health risk (low or high) based on social media usage and emotional well-being data.
* To evaluate the performance of different machine learning models, including Random Forest, XGBoost, and Neural Networks, in predicting mental health risk.
* To provide insights that can be used to design interventions aimed at reducing the negative impact of social media on mental health.

**Dataset Description**

The dataset used in this study contains responses to a survey on social media usage and its impact on mental health. It includes the following key features:

* **Demographics:** Age, gender, relationship status, occupation status.
* **Social Media Usage:** Frequency and duration of social media use, types of platforms used.
* **Emotional Well-Being Indicators:** Self-reported feelings of restlessness, depression, distraction, and comparison with others.
* **Mental Health Impact Score:** A computed score representing the cumulative negative impact of social media usage on mental health.
* **Risk Level:** A categorical variable indicating whether the individual is at lower or higher risk of experiencing negative mental health outcomes.

**Methodology**

The project will be carried out using the following steps:

1. **Data Preprocessing:**
   * Cleaning and transforming the data, handling missing values, and encoding categorical variables.
   * Normalizing numerical features to improve model performance.
2. **Feature Engineering:**
   * Creating new features, such as an impact score to quantify the negative effects of social media usage.
   * Identifying and selecting the most relevant features for predicting mental health risks.
3. **Model Development:**
   * Implementing and tuning multiple machine learning models, including Random Forest, XGBoost, and Neural Networks.
   * Conducting hyperparameter optimization using GridSearchCV and evaluating model performance using cross-validation.
4. **Model Evaluation:**
   * Assessing model accuracy, precision, recall, F1-score, and confusion matrices to determine the best-performing model.
   * Comparing the results from different models to select the most effective approach
   * for predicting mental health risks.
5. **Model Interpretation and Insights:**
   * Analyzing the models to understand the key drivers of mental health risk in relation to social media usage.
   * Providing actionable insights that can be used by mental health professionals, social media platforms, and policymakers.

**Expected Outcomes**

* **Predictive Model:** A reliable and validated machine learning model capable of predicting the risk level of mental health issues based on social media usage data.
* **Insights:** Detailed understanding of how specific social media behaviors and emotional responses contribute to mental health risks.
* **Recommendations:** Practical recommendations for mitigating the negative impact of social media on mental health, potentially guiding the development of healthier online environments.

**Conclusion**

This project will contribute to the growing body of research on the impact of social media on mental health by developing a predictive tool that can identify individuals at risk. The findings could have significant implications for the design of social media platforms and mental health interventions, ultimately promoting healthier online behaviors and improving overall well-being.