**Mental Health Prediction using**

**Machine Learning**

**A Project Work Synopsis**

*Submitted in the partial fulfillment for the award of the degree of*

**BACHELOR OF ENGINEERING**

**IN**

**COMPUTER SCIENCE WITH SPECIALIZATION IN**

**INTERNET OF THINGS**

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# Abstract

This project endeavors to create a predictive model for mental health estimation by analyzing diverse lifestyle factors, with a primary emphasis on stress prediction. The data set incorporates a wide array of participant information, spanning age, gender, and occupation (Student, Corporate, Others), along with sleep patterns, physical activity levels, dietary habits, substance use, and more. Employing a machine learning regression model, the project aims to establish correlations between these factors, self-reported stress scale responses, and physiological indicators. Ethical considerations are fundamental to the project's scope, ensuring participant privacy and responsible data handling. By focusing on stress prediction as a proxy for mental well-being, the project addresses the challenges associated with directly predicting mental health outcomes, offering a nuanced approach to ethical concerns. Real-world applications extend to personalized interventions in counseling, corporate wellness programs, and health care strategies. Acknowledging the growing importance of mental health awareness, the project recognizes the critical intersection of technology and mental health, contributing to a more comprehensive understanding of stress factors and mental well-being. This initiative seeks to bridge the gap between technological advancements and holistic mental health support, promoting a nuanced and personalized approach to individual well-being

**Keywords:** Machine Learning **,** Real Time data , Survey , Mental well-being.

# Table of Contents

|  |  |
| --- | --- |
| Title Page | i |
| Abstract | ii |
| 1.    Introduction |  |
| 1.1  Problem Definition |  |
| 1.2 Project Overview |  |
| 1.3 Hardware Specification |  |
| 1.4 Software Specification |  |
| 2.    Literature Survey |  |
| 2.1 Existing System |  |
| 2.2 Proposed System |  |
| 2.3 Literature Review Summary |  |
| 3.    Problem Formulation |  |
| 4.    Research Objective |  |
| 5.    Methodologies |  |
| 6.    Experimental Setup |  |
| 7.    Conclusion |  |
| 8.    Tentative Chapter Plan for the proposed work |  |
| 9.    Reference |  |

# 1. INTRODUCTION

## 1.1 Problem Definition

## In contemporary society, the omnipresence of smart phones has led to concerns about its potential impact on mental health, particularly among students and professionals. Excessive usage has been associated with heightened stress levels and anxiety. The project's problem definition centers on addressing this intricate relationship between technology use, lifestyle factors, and mental well-being. By understanding and predicting stress levels, the project aims to contribute valuable insights to the broader field of mental health analysis.

## 1.2 Problem Overview

## In the contemporary digital landscape, the ubiquitous presence of smart phones has become an integral part of daily life, profoundly influencing various aspects of human behavior and well-being. While these technological advancements offer unparalleled connectivity and convenience, concerns about their impact on mental health, particularly among students and professionals, have gained prominence. The core problem lies in the potential negative effects of excessive smart phone usage on mental well-being, specifically manifesting as increased stress levels and heightened anxiety.

## As individuals increasingly rely on smart phones for communication, information access, and entertainment, understanding the nuanced relationship between their usage patterns and mental health outcomes becomes imperative. Excessive smart phone use has been associated with a range of mental health challenges, including disrupted sleep patterns, decreased physical activity, and potential addiction-like behaviors.

## The problem overview involves a thorough exploration of the intricate connections between lifestyle factors, stress levels, and overall mental well-being. It recognizes the need for a nuanced understanding that goes beyond mere correlation, aiming to provide actionable insights for individuals, mental health professionals, and relevant stakeholders. By predicting stress levels based on a diverse set of lifestyle factors, the project aims to contribute to the early identification of potential mental health challenges and facilitate proactive interventions.

## 1.3 Hardware Specification

The hardware specifications for this project are minimal, requiring standard computing equipment such as laptops or desktops. The emphasis is on accessibility and ease of implementation, ensuring that the project can be executed without the need for specialized or high-performance hardware.

## 1.4 Software Specification

The software specification for this project includes:

**Google Colab:**

Google Colaboratory (Colab) is a cloud-based platform that facilitates collaborative and interactive development of machine learning models. With its seamless integration with Google Drive, it provides a free and convenient environment for running Jupyter notebooks, enabling easy access to shared resources and collaborative work on machine learning projects.

**Visual Studio Code (VSCode):**

Visual Studio Code is a versatile and lightweight code editor that supports various programming languages, including Python. Its rich set of features, extensions, and integrated Git support make it an ideal choice for coding, debugging, and version control in machine learning projects. VSCode provides a user-friendly interface and extensibility for enhancing the development experience.

**Jupyter Notebook:**

Jupyter Notebook is an open-source web application that allows the creation and sharing of live code, equations, visualizations, and narrative text. Widely used in data science and machine learning, Jupyter Notebooks provide an interactive environment for prototyping and presenting code, making it an indispensable tool for exploratory data analysis, model development, and collaborative research.

# 2. LITERATURE SURVEY

## 2.1 Existing System

## 2.2 Proposed System

## 2.3 Literature Review Summary (Minimum 7 articles should refer)

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# 3. PROBLEM FORMULATION

# 4. OBJECTIVES

The objectives of this project are as follows:

**Develop a Predictive Model:** Design and implement a machine learning regression model capable of predicting stress levels based on diverse lifestyle factors. The model will serve as a tool to estimate an individual's mental well-being indirectly through stress predictions.

**Data Collection and Diversity:** Gather a comprehensive dataset by designing detailed questionnaires and ensuring participation across diverse demographic groups, including various age ranges, genders, and occupations. This objective aims to capture a representative sample for robust model training.

**Real-world Applicability:** Integrate the predictive model into practical applications by collaborating with counseling departments, psychologists, and healthcare professionals. Develop personalized interventions, wellness programs, and healthcare strategies based on the stress predictions to address real-world mental health challenges.

**Focus on Stress as a Proxy:** Concentrate on stress prediction as a valuable proxy for mental well-being assessment. By avoiding direct mental health predictions, the project aims to navigate ethical concerns while still providing meaningful insights for mental health professionals and individuals.

**Technology and Mental Health Intersection**: Recognize and explore the critical intersection of technology and mental health. Leverage technological advancements to contribute to a deeper understanding of stress factors, offering insights that can be applied in counseling, psychology, and medical science.

# 5. METHODOLOGY

# 6.EXPERIMENTAL SETUP

# 7.CONCLUSION

In conclusion, this project addresses the pressing issue of understanding and mitigating the impact of smartphone usage on mental well-being. The developed predictive model, centered on stress prediction as a proxy for mental health, offers a valuable tool for estimating individuals' psychological states. Ethical considerations have been paramount throughout the project, ensuring participant privacy and responsible data handling.

The real-world applications of the predictive model extend to personalized interventions in counseling, wellness programs, and health care strategies. The iterative refinement process, guided by stakeholder feedback, underscores the commitment to continuous improvement and adaptability. By navigating the ethical challenges associated with mental health predictions and prioritizing collaboration with mental health professionals, this project strives to contribute meaningfully to mental health awareness.

The intersection of technology and mental health is a key focus, leveraging advancements for a more comprehensive understanding of the intricate relationship between lifestyle factors and psychological well-being. Ultimately, this project stands as a step forward in fostering a healthier and more informed approach to mental health in the digital age.

In essence, this project aspires to bridge the gap between technology and mental health, providing a nuanced and actionable approach to mental well-being in an increasingly digital world. Through responsible research practices, ethical considerations, and collaborative efforts with mental health professionals, it endeavors to contribute to a holistic understanding of the factors influencing our mental health and pave the way for improved interventions and support systems.

## 8. TENTATIVE CHAPTER PLAN FOR THE PROPOSED WORK

**CHAPTER 1: INTRODUCTION**

**CHAPTER 2: LITERATURE REVIEW**

**CHAPTER 3: OBJECTIVE**

**CHAPTER 4: METHODOLOGIES**

**CHAPTER 5: EXPERIMENTAL SETUP**

**CHAPTER 6: CONCLUSION AND FUTURE SCOPE**

## REFERENCES