Effect of COVID work from home on the health of students based on the active step counts per day

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Abstract —**Over recent years the world has seen a spike in the working from home due to COVID-19 and usage of electronic devices like Laptops and mobiles has been increased. The COVID-19 pandemic has a negative influence on physical health because to the long-term pandemic situation and onerous measures such as lockdown and stay-at-home directives. Their physical activity was diminished, their screen timing was increased, now when we track these activities, their physical health was reduced. We propose that we will calculate the impact of this adverse effect using BMI, number of active step counts taken in a day. Technology used in this project will be Data Science, Python and latest Web Frameworks mainly Flask, Django, etc.**

Index Terms—COVID-19, Health monitoring system, Data Science, e-Health, Analysis, Healthcare, Machine Learning

I. INTRODUCTION

Mental health problems are taking a severe toll on students during the epidemic of COVID-19. Anxiety symptoms, depression symptoms, post-traumatic stress symptoms, and dread of COVID-19 have all increased among them. Adding to it, their physical activity was diminished. Comparatively, Screen timing has been increased.Physical exercise, food intake, communication with co-workers, children at home, distractions while working, adjusted work hours, workstation set-up, and satisfaction with workspace indoor environmental factors were all linked to decreased overall physical and mental well-being after working from home.At this time, one can't justify the health with the working issues. It is difficult for them to look upon the hazardous effects caused due to the pandemic on their health.

Our objective is to analyse whether a person is leading to a healthy lifestyle, or is affected by the Covid scenario. For doing this we need to collect data from ample amount of students in the form of survey. We need to pre- process this data & create it in a model.This model will be analyzed further on the best fit and for accurate estimation score. The main objective of the project is to calculate the impact of this adverse effect using BMI, number of active step counts taken in a day.

II. LITERATURE SURVEY

We explored various documents, manuals, and analysis papers that are related to our project ideas. The following are some of the literatures that we have found to be helpful in understanding the various approaches or methodologies for developing this project.

Gianni D'Angelo et al., in "Enhancing COVID-19 tracking apps with human activity recognition using a deep convolutional neural network and HAR images" in 2022. A Convolutional Deep Neural Network-based human activity classifier is used. It also includes method to enhance the performance of the COVID-19 tracking apps through the detection of human activity recognition (HAR). The accuracy of the k-fold cross-validation results obtained with a real dataset was very close to 100 percent [1].

Gerry Wolfe et al., in "COVID-19 Candidate Treatments, a Data Analytics Approach" in 2020. The goal of this project is to organise the literature on pulmonary diseases and their impact on COVID-19. There was a massive amount of unstructured information. The unstructured data continued to grow, and the data schema evolved. This necessitated the data being pickled at some point. Without the extensive use of computational power and machine learning algorithms, the project would have yielded certain insights that would not have been apparent otherwise. It's also focused on some human mobility dynamics and their impact on COVID-19 cases. We used the MTI transportation and social distancing dataset [2].

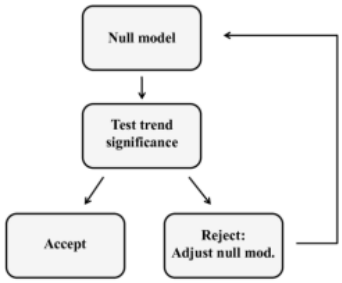
Carson K. Leung et al., "Explainable Data Analytics for Disease and Healthcare Informatics" in 2021. This study is primarily concerned with two key parameters. The predictor component examines and mines previous disease and healthcare data in order to make future predictions. It makes use of a random forest. With enough data and restricted data, neural network-based few-shot learning (FSL) We evaluate our solution as a database engineering application by applying it to real-world COVID-19 data. The findings of the evaluation suggest that our technology is useful in disease and healthcare informatics when it comes to explainable data analytics[3].

Owen T. Leduchowski et al., "Data science for healthcare predictive analytics" in 2020 proposed that it would be ideal to have an automatic predictive approach for healthcare and disease analytics. The focus of this work is on healthcare mining, which tries to discover insights from healthcare data computationally. They provide a data science system that includes two predictive analytic algorithms for reliable cancer case trend prediction. Based on information from cell data from some data samples, the algorithms forecast malignant cells. The effectiveness of our data science framework and predictive algorithms in healthcare data analytics is demonstrated by evaluation findings on many real-life datasets relevant to the COVID-19[4].

III. METHODOLOGY

For big data concerns and data science initiatives, the data science lifecycle was created. Problem formulation, data collection, data preparation, data exploration, data modelling, model assessment, and model deployment are the seven phases of a data science project. The goal of the challenge is to develop not only computational systems that can handle the data, but also visualisation tools that can assist scientists understand it. Dealing with such a large volume of data is one side of the challenge; the other is creating accessible and interactive data visualisation tools that allow researchers to take advantage of computation's power to efficiently utilise this data for the benefit of students. The majority of the attendees were from colleges and universities.

Study Design and Data Collection- To measure mental health issues among students, cross-sectional comparative research was conducted. A self-administered variant of the PRIME MD diagnostic instrument for common mental disorders is the patient health questionnaire (PHQ-9). The depression module of the PHQ-9 assigns a score of "0" to "3" to each of the nine DSM-IV criteria. It's been approved for usage in primary care settings. In addition to impairment in social, intellectual, or other essential areas of functioning (Question #10), a diagnosis of Major Depressive Disorder or Other Depressive Disorder requires ruling out normal bereavement, and a physical disorder, medication, or other drugs and the medication as the biological cause of the depressive symptoms. The Diagnostic and Statistical Manual of Mental Disorders, 4th Edition diagnostic criteria for depression were used to quantify depressive symptoms using a validated nine-item Patient Health Questionnaire.



Depressive Symptoms-Anxiety symptoms were examined using the GAD-7 version of the Generalized Anxiety Disorder scale, which has a high sensitivity (89%) and specificity (82%) for evaluating anxiety severity in clinical practise.

Hypothesis test is used in this evaluation. In statistical analysis, the idea of a P-value, or probability value, is widely utilized. It establishes the statistical significance and the significance testing measure. A chi-square test will generate a p-value. The Chi-squared test (symbolised as $\chi 2$) is a statistical analysis based on a collection of random observations of variables. It was referred to as Pearson's chi-squared test. A hypothesis is a prospect that a certain condition or statement is true, which we can subsequently test. A sum of squared falsities or errors over the sample variance is commonly used to construct Chi-squared tests. The chi-squared test can be used to evaluate if there is a significant difference between the normal and observed frequencies in one

or more classes or categories. It gives the probability of independent variables. The Chi-squared test is only relevant to categorical data, such as men and women who fall into the Gender, Age, Height, and other categories. By assuming that the null hypothesis is true, the chi-square test is used to determine how likely the observations are. Symbolically, can be given by

$\chi 2 = \sum(oi - ei)2/ei$

where oi is the observed value and ei is the expected value.

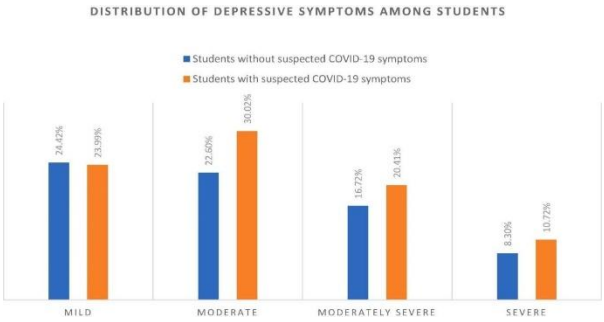


Fig. a) Distribution of Depressive Symptoms

The p-value indicates whether or not our test results are significant. However, we need two pieces of information to do a chi-square test and determine the p-value:

(1) Degrees of freedom.

(2) The alpha level(α).

Null Hypothesis: The null hypothesis is a statistical theory that asserts that there is no statistical significance between the populations. H0 is the symbol for it, and it is pronounced H-naught.

Alternative Hypothesis: An alternative hypothesis argues that the population parameters differ significantly. It might be bigger or smaller. It's essentially the opposite of the Null Hypothesis. Ha or H1 is the abbreviation for it.

Level of significance: The level of significance is indicated by the letter alpha or α. It is the likelihood of rejecting a True Null Hypothesis incorrectly. For example, if α=5%, we are happy with taking a 5% risk and concluding there is a difference when there isn't one.

Critical Value: It's denoted by C, and it's a value in the distribution above which the Null Hypothesis is rejected. The test statistic is compared to it.

Statistics test: It's represented by the letter t and is determined by the test we perform. It is a deciding factor in whether the Null Hypothesis is accepted or rejected.

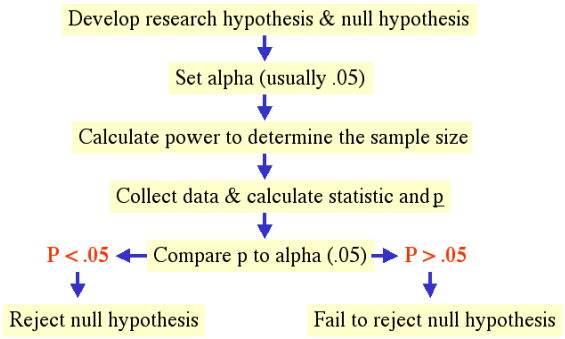


Fig. b) Hypothesis Testing Flowchart

IV. CONCLUSION

We integrated existing evidence on mental health status predominance during the epidemic and laid the groundwork for mental health. We can determine a student's health status based on his or her daily step count. Our research suggests that during the COVID-19 pandemic, public health officials should adopt a rapid diagnosis approach and include psychosocial interventions in addition to clinical care for patients who have been diagnosed and are exhibiting symptoms. The findings of this study can be used to help develop techniques for dealing with worsening pandemic scenarios.

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