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ANALYSING THE EFFECTIVENESS OF COVID-19 ON EDUCATION USING MACHINE LEARNING TECHNIQUES

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1. BACKGROUND

According to Alghamdi (2021), the Covid-19 pandemic has disrupted nearly every aspect of daily life, including the education system. The sudden closure of schools and universities has forced educators and policymakers to rethink traditional teaching methods and adopt new strategies to ensure continuity of Learning. As the pandemic continues to evolve, it is important to assess its impact on the education system and find ways to mitigate its effects. Machine learning techniques offer a powerful tool for analyzing complex data and identifying patterns that might not be apparent through traditional analysis methods. In Covid-19 and Education, machine learning can be used to analyze the vast amounts of data generated by online learning platforms, educational institutions, and government statistics to gain insights into how the pandemic has affected different aspects of Education. For example, machine learning techniques can analyze student performance, attendance, and engagement data during remote Learning. By identifying patterns in this data, educators can gain insights into which teaching strategies are most effective in a virtual setting and develop interventions to support struggling students. Machine learning can also be used to analyze data on the impact of the pandemic on the education system as a whole. This includes data on school closures, enrollment, and teacher retention rates. By analyzing this data, policymakers can gain insights into the long-term effects of the pandemic on the education system and develop strategies to mitigate its impact (Faisal et al. 2021).

1.1 Aims and objectives:

This project aims to analyze the impact of COVID-19 on Education using machine learning techniques. The specific objectives are as follows:

- To collect and preprocess education-related data before and during the pandemic from various sources.
- To develop machine learning models that can predict the impact of COVID-19 on different aspects of Education, such as student performance, enrollment, and teacher retention rates.
- To evaluate the performance of the machine learning models using appropriate Accuracy metrics and compare them to traditional statistical analysis methods.
- Based on the analysis results, provide insights into how the education system can be improved in the future.

1.2 Research question:

- What are the most significant factors that have affected Education during the pandemic, and how have they changed over time?

- How do machine learning models accurately predict the impact of COVID-19 on different aspects of Education, such as student performance, enrollment, and teacher retention rates?
- How do the results of the machine learning models compare to traditional statistical analysis methods in terms of accuracy and reliability?

1.3 Problem statement:

According to Almodaresi et al. (2021), the COVID-19 pandemic has significantly impacted the education system, forcing educators and policymakers to adapt rapidly to new teaching methods and overcome numerous challenges. The sudden shift to remote Learning has created significant barriers for many students, including a lack of access to technology, reduced social interaction, and decreased motivation. At the same time, schools and universities face unprecedented financial pressures and increased uncertainty about the future of Education. To address these challenges, there is a need for a comprehensive analysis of the impact of COVID-19 on Education using advanced analytical methods, such as machine learning techniques. However, research on this topic has been limited, and systematic and rigorous data analysis is lacking.

Additionally, there is a need for a practical framework that educators and policymakers can use to guide decision-making and improve the education system. This project is to develop a machine learning-based framework that can analyze the impact of COVID-19 on Education and provide actionable insights to improve the education system. The proposed framework aims to address the problems that education systems encountered during the COVID-19 pandemic, such as the lack of thorough analysis using cutting-edge analytical techniques, the limited comprehension of the factors affecting Education during the pandemic and their changes over time, and the lack of a workable framework that can direct decision-making and enhance the educational system. By addressing these issues, the framework can help create evidence-based policies and practices that can raise the standard of Education both during and after crises. To make wise choices and adjust to changing conditions, it can also be a useful resource for educators, policymakers, and other stakeholders in the education system.

1.4 Significance:

According to Dogan and Birant (2021), the COVID-19 pandemic has created unprecedented challenges for the education system worldwide, and there is an urgent need for solutions that can help address these challenges. The significance of this project lies in its ability to provide a comprehensive analysis of the impact of COVID-19 on Education and develop a machine learning-based framework that can provide actionable insights to improve the education system. This study has the potential to inform policy choices and direct the creation of efficient ways to overcome the issues faced by the school system during the pandemic and beyond by expanding our understanding of the effects of COVID-19 on Education. Educators and policymakers can use the framework created as part of this project to make data-driven decisions and enhance the effectiveness of Education both during and after the epidemic. The project's importance goes beyond the COVID-19 epidemic, as well. The framework created for this study can be used to examine various aspects of Education, such as demographic changes, sociological trends, and technological advancements. As a result, the

information gleaned from this study aids in the growth of the educational system and serves as a basis for evidence-based.

2. LITERATURE REVIEW

According to Safdari et al. (2021), the COVID-19 pandemic has significantly impacted academic research areas, particularly in the field of Education. Researchers have focused on the effects of the pandemic on online teaching and Learning and have analyzed various techniques to improve the education system. Li and Jiang (2021) conducted a study to re-examine the Internet Plus education system and highlighted the importance of Educational Big Data (EBD) analysis for a more precise pattern. They identified the most reliable research parameters for EBD and discussed the positive psychological path variables for the stress handled by less controlled teachers. Their study demonstrated that the information base had gathered emphatically after many states' drives starting around 2012, speeding up yearly development and diminishing geographic lopsidedness. This shift highlighted the significant integration of educational psychology and technology during critical times of educational development.

In order to understand the significance of data mining techniques in public health sectors, Safdari et al. (2021) also went through the literature and looked at published research publications. They analyzed various data mining approaches to uncover buried data about the COVID-19 pandemic. In their systematic review, 335 citations were found, but only 50 research papers were determined to be eligible. The examined results showed that natural language processing was the most widely used D.M., and the most frequently used approach was revealing illness features. COVID-19 was the most discussed illness in the context of illnesses. The researchers also discovered previously unknown illness pathways in pandemics through a thorough investigation.

According to Almodaresi et al. 2021, the influence of COVID-19 on Education and the suggestion of a machine learning-based method to assess the efficacy of online instruction. To analyze the data, they used machine learning techniques such as principle component analysis (P.C.A.), support vector regression (S.V.R.), and decision tree (D.T.) on 64 undergraduate students who took an online course during the COVID-19 pandemic. The findings demonstrated a clear correlation between student satisfaction, the caliber of the course material, and teacher engagement with online teaching effectiveness. The authors claimed that online education quality might be assessed and improved using their methodology in the future. Like this study, Patil et al. (2021) employed machine learning methods to assess how the COVID-19 pandemic affected employment and Education in India. They gathered data from various sources, including official documents, news stories, and social networking platforms, and utilized sentiment analysis and natural language processing (N.L.P.) to analyze the information. The findings indicated that the pandemic considerably influenced employment and Education, with many students and job seekers encountering various difficulties. The authors proposed that their method might be used to pinpoint the precise areas on which the government and educational institutions should concentrate their efforts to lessen the pandemic's effects on employment and Education.

The value of Parthiban et al.'s (2021) research is found in its contribution to the creation of online learning platforms and technologies that can assist instructors and students in

overcoming the obstacles presented by the COVID-19 pandemic. Due to the closing of schools and universities, it was crucial to develop an online education system that could give students access to materials and high-quality Education. The study emphasized the significance of creating an appropriate online learning environment, which involves utilizing cutting-edge tools and technology that can aid students in learning as effectively as possible. The research also highlighted the significance of online testing procedures, which call for a different strategy than traditional exams. The study aims to guarantee that students obtain the finest Education possible, even during the epidemic, by giving teachers instructions and resources for efficient online teaching. Additionally, the study's machine learning techniques can aid in automating and improving the teaching process, improving students' learning outcomes. Overall, the study has important ramifications for the education field, particularly in light of the COVID-19 pandemic, and can be a beneficial resource for educators and decision-makers who want to enhance students' online learning opportunities (Dogan and Birant. 2021).

According to Almodaresi et al. 2021, The Covid-19 pandemic has significantly impacted the education sector worldwide. Educational institutions were forced to shut down to curb the spread of the virus, leading to a shift towards online Learning. As a result, many researchers have sought to analyze the effectiveness of Covid-19 on Education using machine learning techniques, such as logistic regression. Logistic regression (L.R.) is a statistical method to analyze the relationship between a categorical dependent variable and one or more independent variables. L.R. has been widely used in research to predict outcomes and classify data. In the context of Covid-19 and Education, L.R. can be used to analyze the impact of the pandemic on educational outcomes and predict future trends.

According to Alghamdi (2021), one application of L.R. in the analysis of Covid-19's impact on Education is predicting student performance. With the shift towards online Learning, students may experience a range of challenges that may affect their performance. For instance, lacking face-to-face interaction with teachers and peers may decrease motivation and engagement. L.R. can be used to predict the likelihood of students experiencing academic difficulties based on their demographic characteristics, past academic performance, and other factors. Another application of L.R. in analyzing Covid-19's impact on Education is the prediction of student engagement. Online Learning has led to a significant decrease in student engagement, which may result in a decline in academic performance. L.R. can be used to analyze the relationship between student engagement and various factors, such as demographic characteristics and online learning experiences, and predict the likelihood of students being engaged in their Learning.

Furthermore, L.R. can also be used to predict the impact of Covid-19 on future enrolment rates. With the pandemic disrupting traditional learning methods, many students may opt for alternative learning options, such as online programs. L.R. can be used to predict the likelihood of students choosing online programs based on their demographic characteristics, past academic performance, and other factors.

Parthiban et al. (2021) conducted a study on the impact of Covid-19 on Education and explored various online learning platforms and structures to ensure that students can learn and study effectively. They also discussed teaching styles, resource distribution tools, and modern tools that can be used to enhance the online learning experience. Additionally, the study

examined the challenges teachers face during online teaching, such as students' negative attitude towards online Learning and the lack of socialization opportunities. To address these challenges, the researchers introduced a method to enhance the online teaching experience and provide students with the best online classroom learning experience. According to Safdari et al. (2021), the method involved using machine learning tools to personalize the learning experience for each student and reduce stress levels. The study focused on day-to-day teaching techniques that utilize online teaching methods to provide a stress-free learning experience for students. Furthermore, the study also highlighted the importance of online examinations and creating a suitable environment for them. The researchers recognized that the transition to online Learning and examinations was a significant challenge for both students and teachers, and they provided solutions to overcome these challenges.

Awadh et al. (2021) conducted a study on the impact of controlling plans on the spread of COVID-19 using machine learning techniques. The study was conducted following the global crisis caused by the spread of COVID-19, which forced nations to implement preventive measures such as social distancing to control the spread of the disease. The study utilized supervised machine learning tools, including Naive Bayes, Multilayer Perceptron, and J48 classifiers, to analyze data collected through a questionnaire filled out by Basra City residents. The questionnaire contained almost 50 queries related to healthcare management, precautions, and demographic, psychological, and cognitive variables that significantly impacted the spread of COVID-19. The size of the dataset was 1017 entries of residents, and Weka 3.8 tool was utilized for building a model. The study outcomes indicated that quarantine was the major factor in controlling the spread of the disease.

Furthermore, J48 was declared the best choice among all three algorithms regarding accuracy and efficiency. The study highlights the importance of utilizing machine learning techniques to analyze data related to the spread of COVID-19 and identify effective strategies for controlling the spread of the disease. Policymakers and healthcare professionals can utilize the study's findings to design effective strategies for controlling the spread of COVID-19.

3. METHODOLOGY

3.1 Introduction

The present chapter delineates the methodology employed to scrutinize the efficacy of Covid-19 on Education through machine learning techniques. This research endeavors to examine the conduct and routines of students during this timeframe through the utilization of exploratory data analysis (E.D.A.). The subsequent sections explain the research methodology, data acquisition, data preparation, and the machine learning methodologies employed in this investigation.

3.2 Research Design

The study used a data from students residing in Delhi-NCR and other regions beyond Delhi-NCR. This particular design was selected based on its capacity to offer a concise representation of the conduct and routines of the subjects amid the Covid-19 outbreak.

3.3 Data Collection

Data was collected from Kaggle to gather information on diverse dimensions of the respondents' experiences amid the pandemic. These dimensions encompassed their

characteristics, utilization of electronic devices, and allocation of time across different activities, and preferences for stress management and social media channels. The data also shows health-related matters and their influence on the day-to-day activities of the respondents.

3.4 Exploratory Data Analysis (E.D.A.)

Exploratory Data Analysis (E.D.A.) was performed on the pre-processed dataset to reveal any underlying patterns, trends, and relationships among the variables. The methodology employed in this study entailed the production of descriptive statistics, graphical representations such as bar charts, pie charts, histograms, and scatter plots, as well as the computation of correlation coefficients among the numerical variables.

3.5 Machine Learning Techniques

Various machine learning methodologies were utilized to examine variables' interrelationships and reveal patterns within the dataset. The methodologies mentioned above encompassed unsupervised learning techniques, such as clustering and dimensionality reduction, and supervised learning techniques, such as classification and regression.

3.5.1 Unsupervised Learning

The dataset was subjected to clustering techniques, namely K-means and hierarchical clustering, to detect clusters of participants who exhibit comparable characteristics or behaviours. The utilization of dimensionality reduction methodologies, including principal component analysis (P.C.A.), was also employed to streamline the dataset and enhance the comprehensibility of the outcomes.

3.5.2 Supervised Learning

The study employed classification algorithms, including logistic regression, decision trees, and support vector machines, to forecast diverse outcomes, such as the probability of encountering health complications amid the pandemic or stress-alleviating activities. The study employed regression techniques, specifically linear regression, to construct a model that captures the association between continuous variables. The variables in question include the duration of time allocated to diverse activities and the age of the participants.

3.6 Model Evaluation

The model performance evaluation was conducted by utilizing suitable metrics, including accuracy, precision, recall, and F1-score for classification assignments, and mean squared error, root mean squared error, and R-squared for regression assignments. The models underwent fine-tuning procedures that involved hyper parameter tuning and feature selection techniques to attain optimal performance.

3.7 Ethical Considerations

The confidentiality of all data gathered in this research was upheld, and the anonymity of the participants was preserved throughout the analysis. Before completing the questionnaire, all participants provided informed consent. The research complied with the ethical standards and principles prescribed by the pertinent institutional review board.

3.8 Conclusion

This section has presented a synopsis of the methodology utilized in this investigation to assess the efficacy of Covid-19 in Education through machine learning methodologies. The forthcoming chapters showcases the outcomes of the preliminary data examination and

artificial intelligence models, succeeded by analysing the discoveries and their consequences for Education amidst the Covid-19 outbreak.

4. RESULTS AND ANALYSIS

This study aims to explore the impact of the Covid-19 pandemic on Education, and it also aims to identify the behaviour and habits of students during this period using machine learning techniques. This study has used exploratory data analysis (E.D.A.) to analyse students' responses from Delhi-NCR and other regions outside Delhi-NCR.

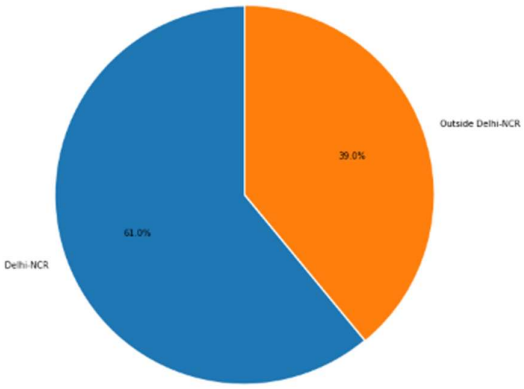


Figure 1: Regional distribution

According to the study, 61% of the individuals were residents of the Delhi-NCR region, while 39% were from places outside the Delhi-NCR region. According to the participants' age distribution, the majority (n=138) were between the ages of 18 and 25, with the biggest proportion of participants being in the 19–20 and 21—and the lowest proportion being in the 20–21 age brackets.

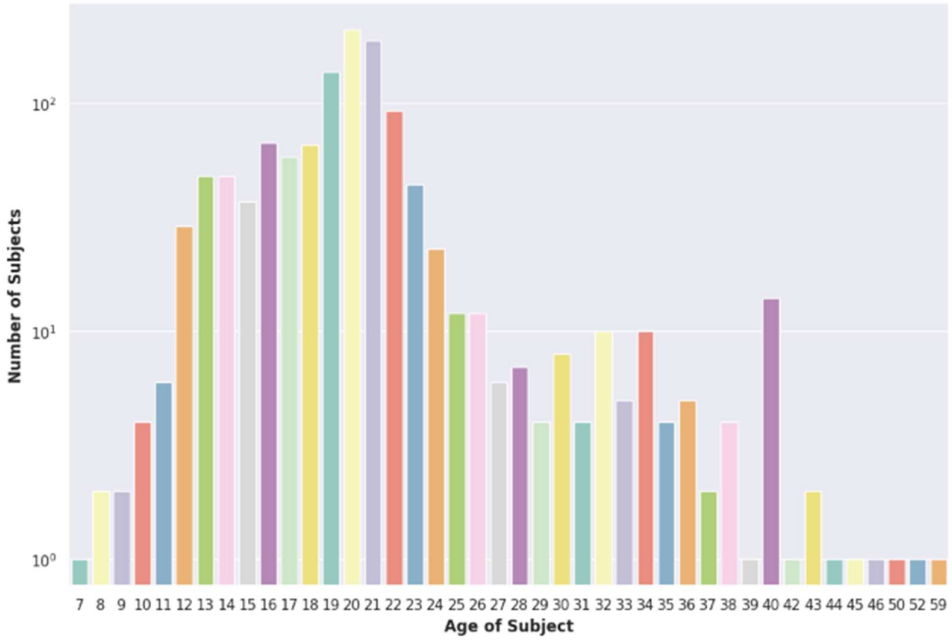


Figure 2: Age-wise Distribution

The study's findings revealed that most participants utilized laptops or desktop computers (n=545), closely followed by smartphones (n=539), for online Leabf nsbnb,dnfvbnsjfjbmbnmfbjbvnhvd RHGHB.NN VMB NFBJVVFBVFJFJNBFNJNFDJBFJBFHVDBHVFVFVHVHJHSJHFHVHDSDJSHJHGVH FVBVB,MD BVBD BD BF BVDB VDSNSXCVB DSB,C d. ;dvnflgtrogpfnfbbgfjbhrning during the epidemic. Only a small part of the subjects used tablets, smartphones, laptop/ desktop computers, or any other gadgets.

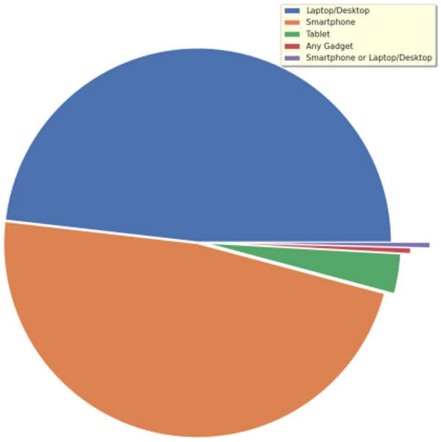


Figure 3: Devices used for Online Learning

The study's findings revealed that the individuals spent an average of 3.2 hours per day—0–10 hours—in online classes. The average daily time spent on self-study was 2.9 hours, ranging from 0 to 18 hours. The daily average time spent exercising was 0.8 hours, ranging from 0 to 5 hours. The average daily amount of sleep ranged from 4 to 15 hours and was 7.9 hours. With a range of 0 to 10 hours, the daily average for social media use was 2.4 hours. Finally, on average, 1.0 hours per day were spent watching T.V., ranging from 0 to 15 hours.

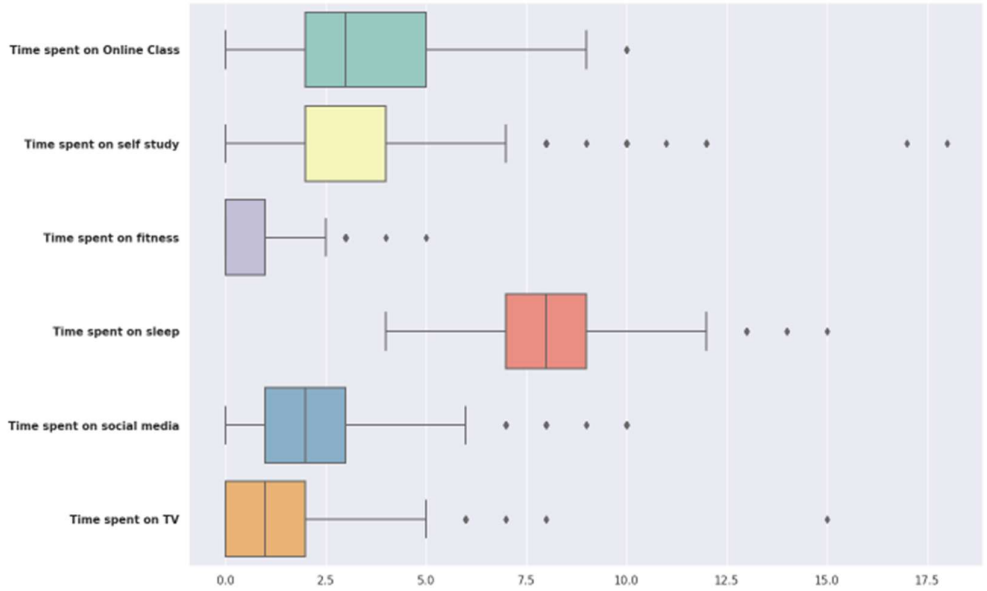


Figure 4: How they spent their time?

According to the study's findings, students favored Instagram over WhatsApp and YouTube by a margin of 352 to 337. 18 students who participated in the study said they didn't use social networking sites.

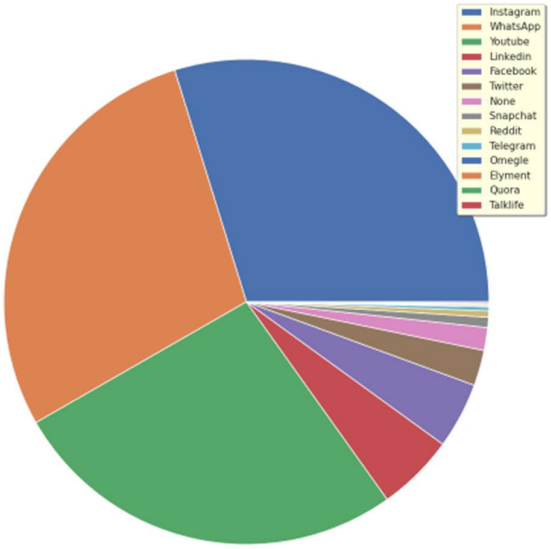


Figure 5: Preferred social media platform

The study's results revealed that 276 individuals chose to listen to music as their preferred method of relieving stress. With 175 participants choosing it, online gaming came in second place as a stress reliever. The third most popular pastime was watching web series, selected by 102 participants. In this study, 74 respondents chose reading books, ranked just fourth overall.

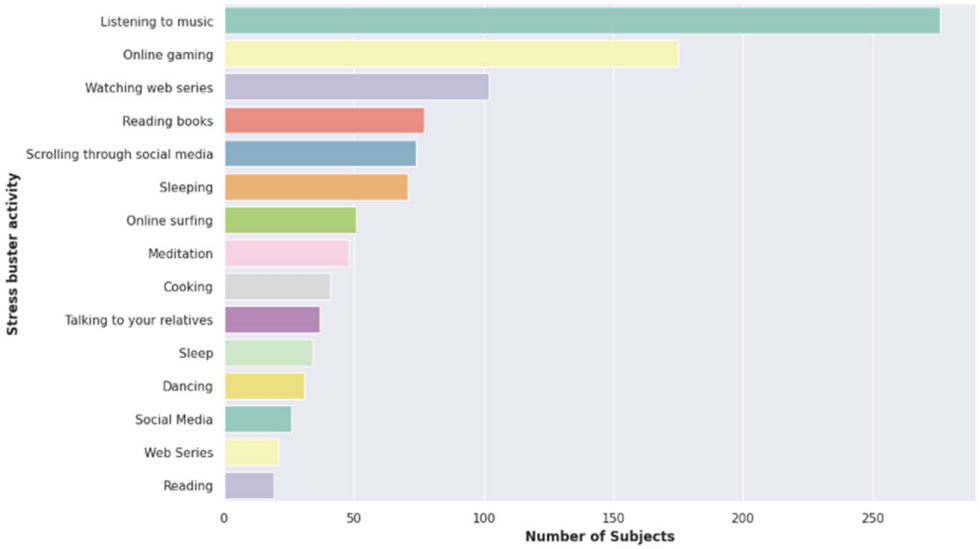


Figure 6: Favorite stress buster

According to the findings, most participants missed college and/or high school the most because of the COVID-19 pandemic. They are following these missing friends and relatives and traveling. Also mentioned by the subjects was how much they missed their pre-COVID

routine and interactions with others. These findings imply that the participants' daily lives have been interrupted and that the epidemic has significantly impacted their mental health and general well-being.

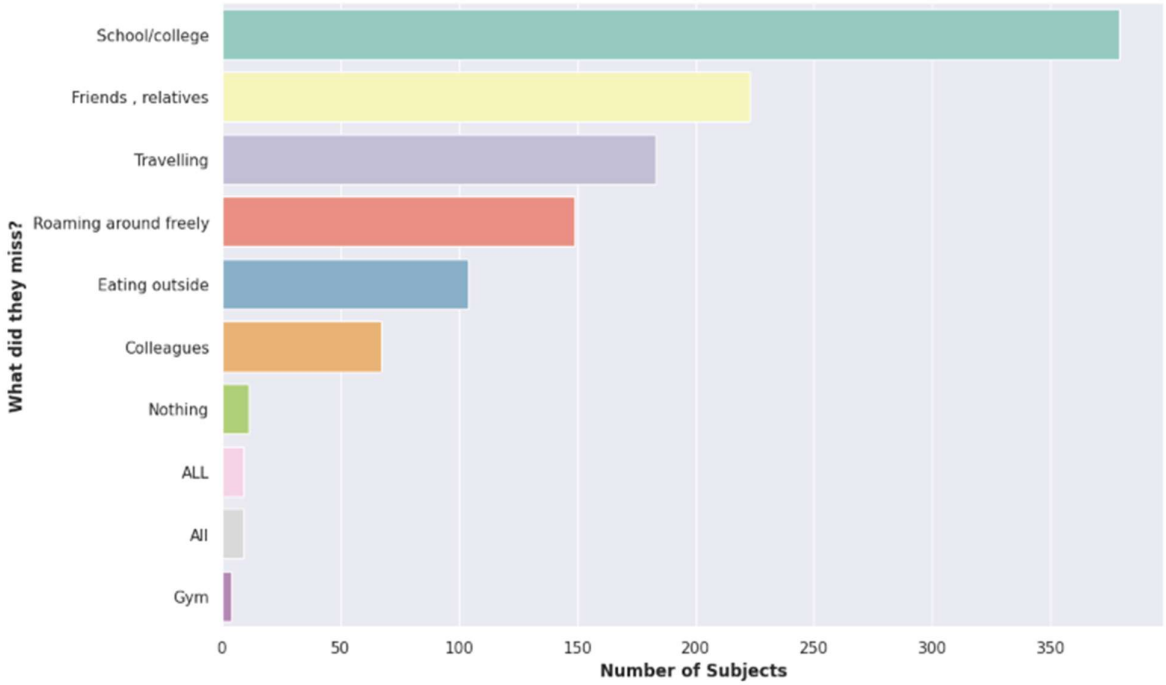
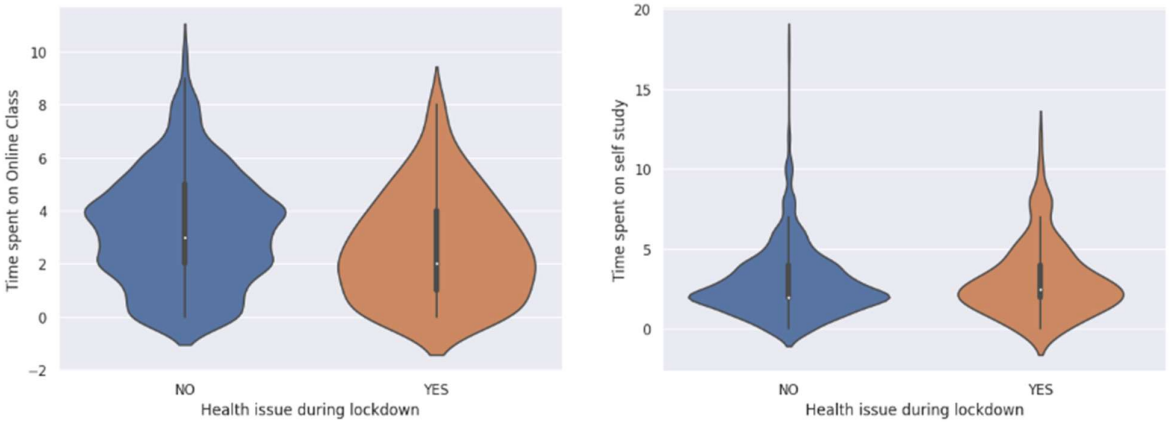


Figure 7: What did they miss the most

The findings show that the participants' health was impacted by the time spent participating in various activities during the lockdown. Comparatively to participants who had no health difficulties during the lockdown, those participants spent less time on social media, online classes, and fitness. However, they spent more time studying alone, indicating they had more free time due to their health problems. Both groups appear to spend a comparable amount of time watching T.V. and sleeping. These findings imply that health difficulties significantly impacted individuals' activities during the lockdown.



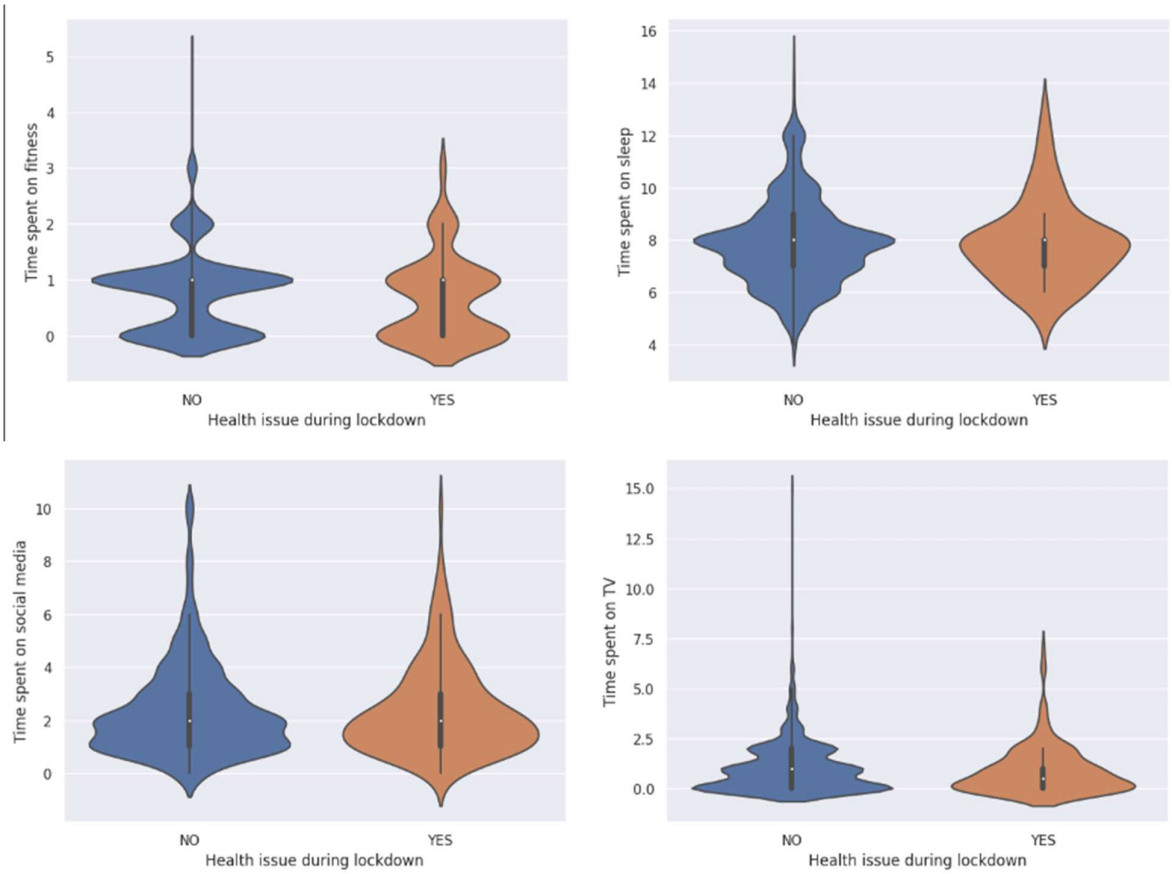


Figure 8" The activities they spent their time on?

The findings demonstrate no apparent age-related differences in the effects of health problems during the lockdown. During the lockdown, health problems were distributed similarly throughout both age groups (20 years old).

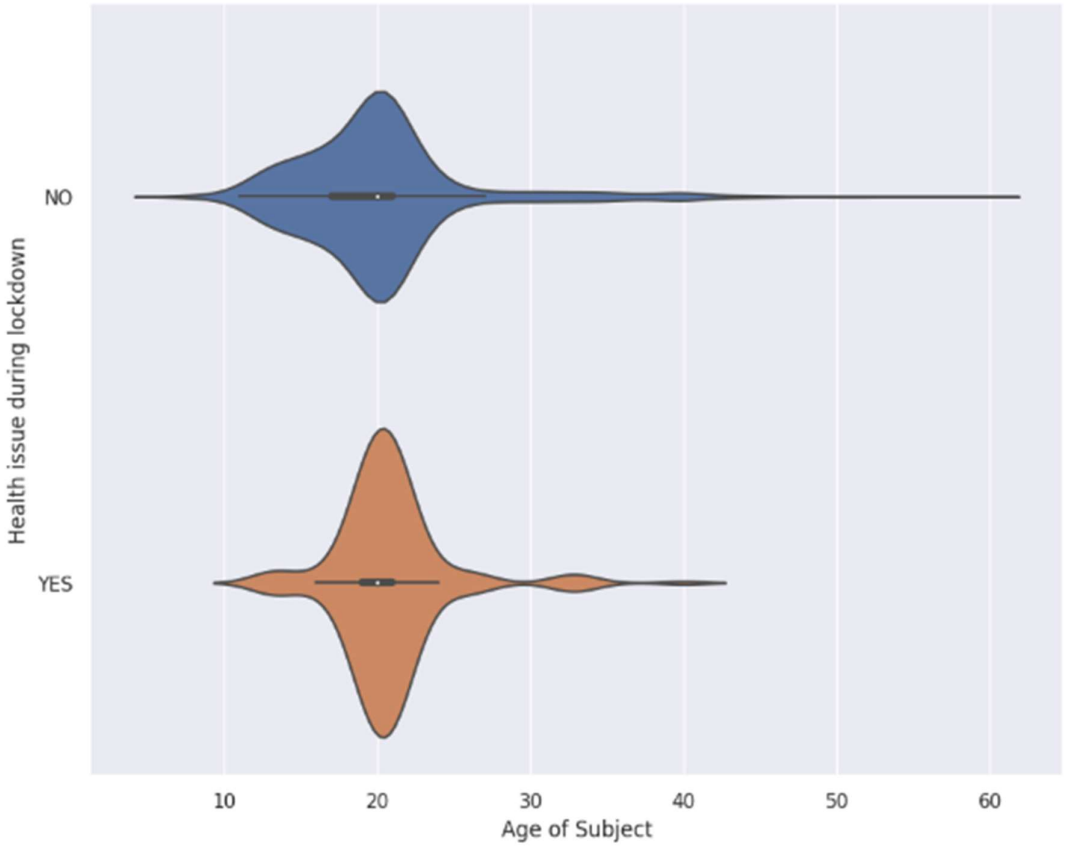


Figure 9: Age during a lockdown:

According to the findings, there might be a connection between a person's daily food consumption and their risk of developing health problems. A larger proportion of individuals who reported having a health issue during lockdown reported having fewer meals per day compared to those who did not report any health issues. On the other hand, a higher percentage of people who did not mention any health difficulties while the lockdown was in effect said they ate four or five times daily. These findings emphasize the significance of consuming a balanced diet throughout the lockdown to lessen the risk of developing health problems.

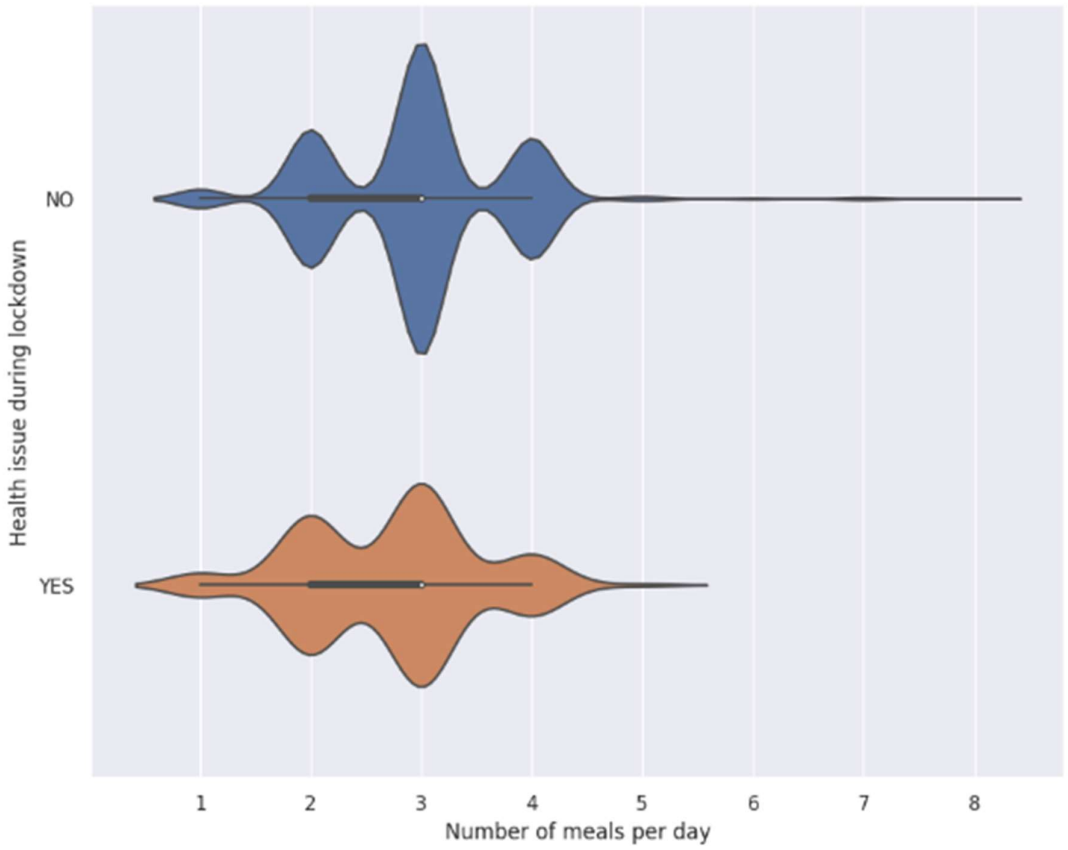


Figure 10: Number of meals per day

According to the examination of the data, there was no apparent correlation between the number of meals and weight change during the lockdown. People who said they only ate one or two meals a day had the widest range in weight change, with some people reporting weight loss and others reporting weight gain. People who said they ate three or four meals daily also showed a wide range of weight changes. Interestingly, people who claimed to eat more than four meals every day had a slightly lower range in weight change. According to the findings, a person's daily meal frequency may not be a reliable indicator of how much their weight changed during the lockout.

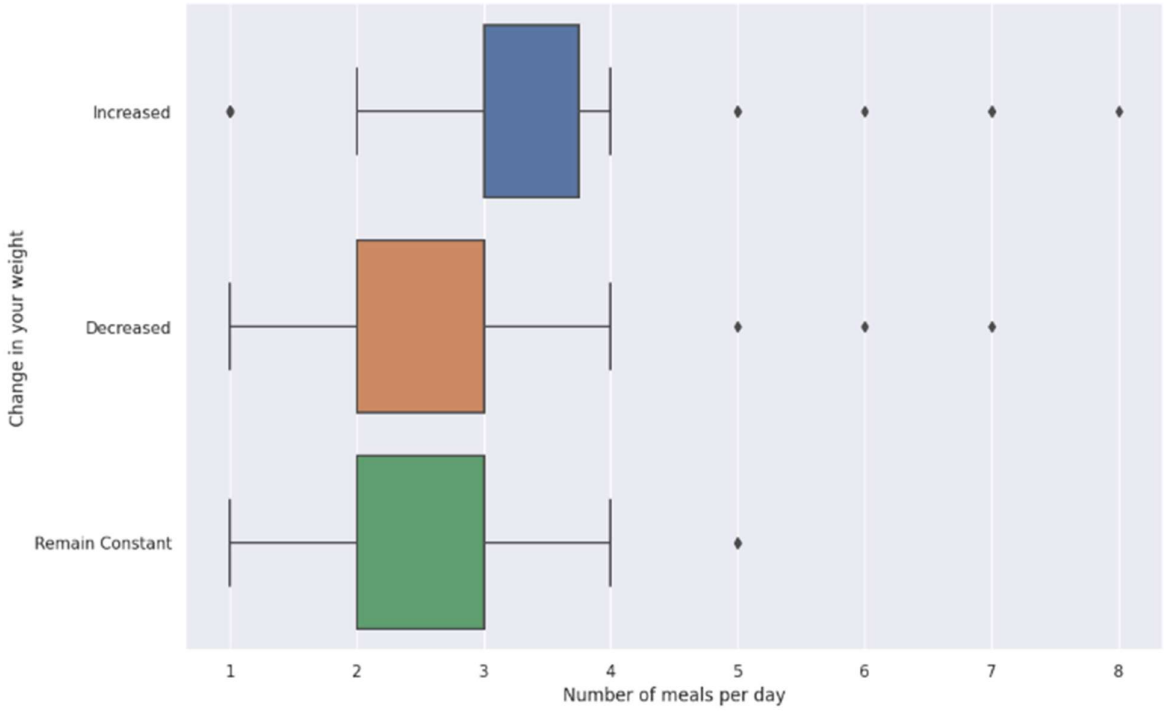
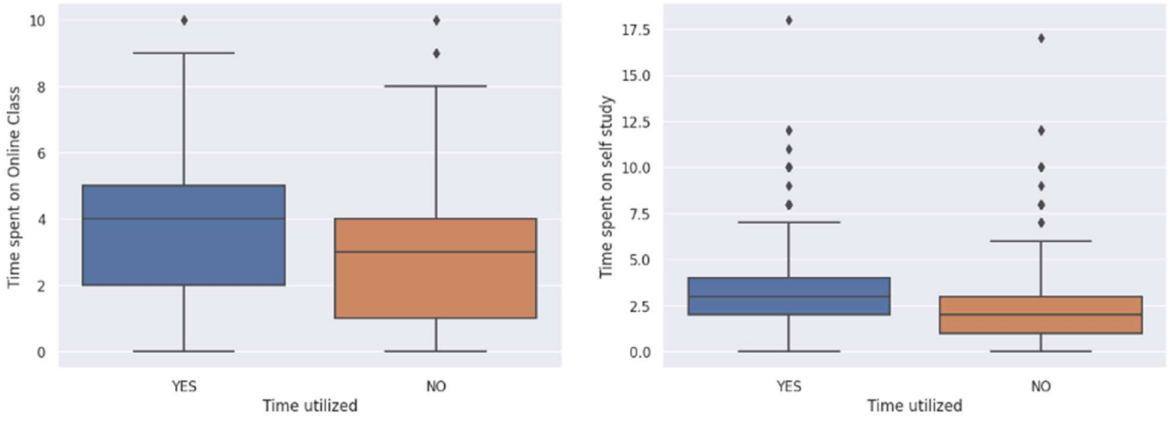


Figure 11: Does the number of meals affect weight?

Individuals who reported higher levels of time utilization during the lockdown period tended to spend more time on productive activities like online classes and self-study, while those who reported lower levels of time utilization tended to spend more time on leisure activities like social media and T.V. It's interesting to note that time spent on exercise and sleep did not correlate with time usage. The conclusions offer an understanding of how people changed how they managed their time during the lockdown, which may have implications for future pandemic response strategies.



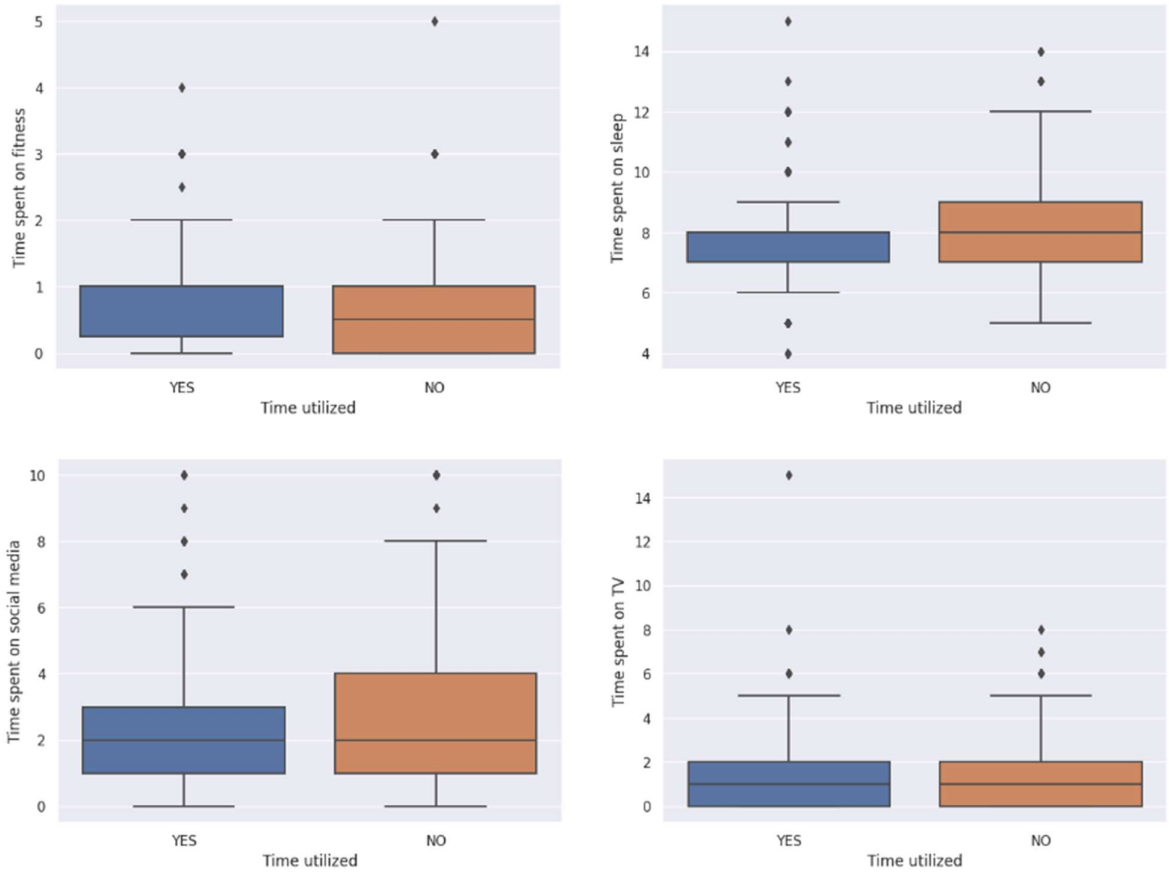


Figure 12: How they utilize their time

The investigation of the correlation between the numerical features in the dataset produced several interesting findings. First, there is a negative association between age and time spent in online classes, indicating that less time is spent in online classes as age increases. Additionally, there is a negative relationship between age and the amount of time spent on social media, indicating that as people become older, they spend less time on it. Second, there is a positive association between time spent exercising and sleeping, suggesting that people who exercise more frequently also tend to sleep more. In addition, there is a link between times spent studying independently and time spent exercising, indicating that people who study more frequently also prefer to exercise more frequently. Finally, there is a positive association between the amount of time spent on social media and the amount spent watching television, suggesting that those who watch more television are also likely to use social media more frequently. The amount of meals consumed daily has no obvious connection to any other characteristics, though.

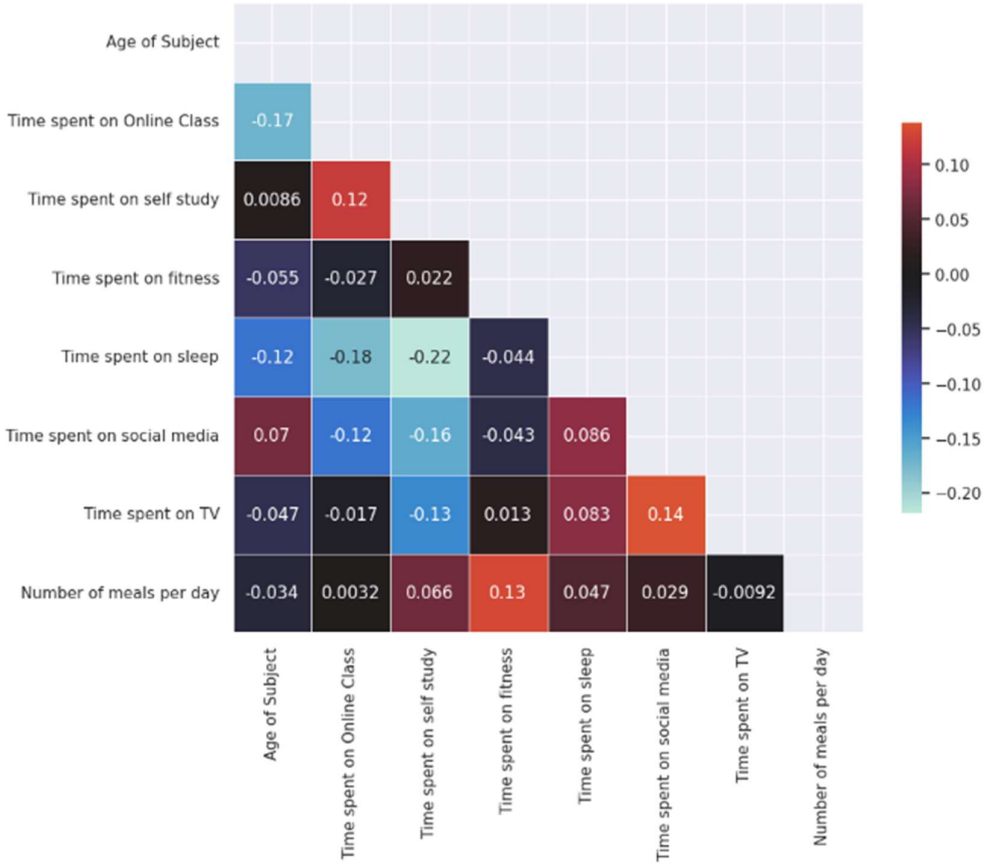


Figure 13: Correlation of numerical features

5. Conclusion and Recommendations

5.1 Introduction

This chapter is based on the conclusion of the research topic, which provides conclusive remarks regarding the research. This chapter is also based on the recommendations regarding the research, which is highly focused on improving the research. This chapter also provides the summarised findings of the research, which provides a detailed understanding of the research aims, objectives, and methods used to implement the research. The conclusion of the research is also provided in this chapter which highlights the effectiveness of the research. The conclusion is drawn from the analysis of the data collected for the research, and analysis of the research reflects the importance of the research. Future implications regarding the research are also provided in this chapter, which shows the importance of research in the specific field and highlights all the fields where the research can be effectively implemented.

5.2 Summarized Findings

The COVID-19 pandemic has had a substantial impact on the domain of Education, leading scholars to concentrate on the ramifications of the pandemic on virtual pedagogy and scholarship. Scholarly investigations have examined the utilization of data mining methodologies, machine learning algorithms, and educational big data analysis for comprehending the pandemic's effects on the education system and devising strategies to enhance it. Empirical studies have evidenced the significance of amalgamating educational psychology and technology during these pivotal periods. During the pandemic, various

machine learning techniques, including logistic regression, principle component analysis, support vector regression, and decision tree, have been utilized to forecast and scrutinize student performance, engagement, and enrolment rates. The techniques above have facilitated the identification of associations among student satisfaction, course material quality, and teacher engagement with the efficacy of online instruction. Furthermore, scholars have examined the difficulties encountered by both pupils and educators amidst the shift towards remote instruction, encompassing unfavourable perceptions towards virtual Education, limited prospects for social interaction, and apprehensions regarding online assessments.

Research has indicated that implementing machine learning technologies can facilitate the customization of learning experiences, mitigate stress levels, and enhance the efficacy of online classroom environments. Machine learning methodologies have been employed to examine the effects of containment measures on the transmission of COVID-19, thereby facilitating the identification of productive approaches to mitigate the spread of the virus. The results obtained from these investigations can assist policymakers, healthcare practitioners, educators, and individuals in positions of authority in formulating and executing measures to reduce the pandemic's impact on public health and Education. The objective of this investigation was to examine the effects of the COVID-19 pandemic on the field of Education and to detect and evaluate the conduct and routines of students during this time by applying machine learning methodologies. The research centered on pupils hailing from Delhi-NCR and other areas beyond the geographical confines of Delhi-NCR. The age range of the majority of participants was between 18 and 25 years old, and their preferred online learning devices were laptops, desktop computers, or smartphones.

The study found that the mean duration of time spent by the participants on online classes was 3.2 hours per day, while the duration of self-study was 2.9 hours. Additionally, the participants spent an average of 0.8 hours on physical exercise, 7.9 hours on sleep, 2.4 hours on social media, and 1 hour on television viewing. The social media platform of choice among participants was Instagram, whereas listening to music was identified as the most prevalent method of coping with stress. According to the results, the pandemic has caused students to experience the greatest sense of loss to their college experience, social connections, and travel opportunities. Health issues significantly impacted the daily activities of participants during the lockdown. Individuals with health concerns allocated reduced time towards social media engagement, online educational courses, and physical exercise while dedicating more time to self-directed Learning.

The research discovered no discernible variations in the impact of health issues during the lockdown based on age. A correlation was observed between daily food intake and health concerns, whereby a reduced frequency of meals was linked to an increased likelihood of experiencing health complications. The relationship between the frequency of daily meals and weight change during the lockdown was inconclusive. Individuals who reported higher time utilization during the lockdown period were likelier to engage in productive activities. In contrast, those with lower time utilization tended to participate in leisure activities. No clear correlation was observed between time usage and engagement in exercise and sleep. The research findings revealed inverse associations between age and the duration of online class attendance, as well as age and the amount of time spent on social media. The study revealed

positive correlations among the variables of time spent exercising and time spent sleeping, time spent studying independently and time spent exercising, and time spent on social media and time spent watching television. No discernible association was observed between the frequency of daily meals consumed and other attributes.

5.3 Conclusion

In conclusion, the education sector has been greatly affected by the COVID-19 pandemic, leading to the adoption of machine learning methods to enhance the online learning experience. To summarise, the use of such techniques has become imperative. The research centered on students hailing from Delhi-NCR and other localities. It revealed that the pandemic has significantly impacted the students' daily routines, physical health, and overall welfare. The age range of the majority of participants was between 18 and 25 years old. The online learning devices were laptops, desktop computers, and smartphones. On average, students devoted 3.2 hours daily to online classes and 2.9 hours to self-directed study. Time utilization during the lockdown exhibited various activities, including both productive and leisurely pursuits. However, there was no discernible association between these activities and engagement in exercise or sleep.

The lockdown period have impacted the participants' daily routines, with potential implications for their health. There appears to be a correlation between daily food intake and health issues. The study did not yield any definitive correlation between the frequency of daily meals and weight fluctuations during the lockdown period. The research established associations between age and the duration of participation in online courses, age and the duration of engagement in social media activities, the duration of physical exercise and sleep, the duration of self-directed study and physical exercise, and the duration of social media use and television viewing. The study did not find a significant correlation between the frequency of daily meals ingested and other characteristics. The results of this study can provide valuable insights for policymakers, healthcare professionals, educators, and governing bodies to develop effective measures for reducing the impact of the pandemic on public health and Education. Additionally, these findings can aid in improving the efficacy of online learning programs.

5.4 Recommendations

This research is implemented by using the experimental data analysis method, one of the significant methods of machine learning technology. For this research, it is also recommended that other machine learning methods can also be used to increase the prediction efficiency of the system. The data provided for the research is based on the labelled data useful for the supervised machine learning process. The supervised machine learning process can also be on this research to improve the prediction for the research. The supervised machine learning process is considered a highly accurate prediction method, requiring labelled data to draw effective results for the research. The supervised machine learning process can significantly enhance the research's prediction process and predicts students' accurate routine during COVID-19, which would highlight the students' major actions. A supervised machine learning process enables the system to extract important information from the system while producing effective data outputs for the system. The supervised machine-learning process is more accurate than any other one, making it significantly useful for prediction (Ho, Cheong, and Weldon, 2021).

5.5 Future Implications

This research provides a detailed analysis of the exploratory data analysis process, which is highly effective for prediction. This research provides a detailed understanding of the exploratory data analysis process, which can be significantly useful for other researchers to implement in their research. This research also supports students' behaviour during COVID-19, which shows the students' preferences during the COVID-19 period. Due to the COVID-19 lockdown, students started using online platforms to attend classes described in this research. Students' behaviour regarding online classes also highlights the impact of online platforms on students' daily routines. The basic health parameters are also provided in this research, which provides significant knowledge regarding the mental and physical health issues during COVID-19. This research can easily be implemented on the understanding of students' behaviour over online platforms of studying and the health issues which can have a significant influence on the future of the student.

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