

Mental Health and Technology :

An evaluation of mental health and other health factors in relation to screen time, social media usage, and age.

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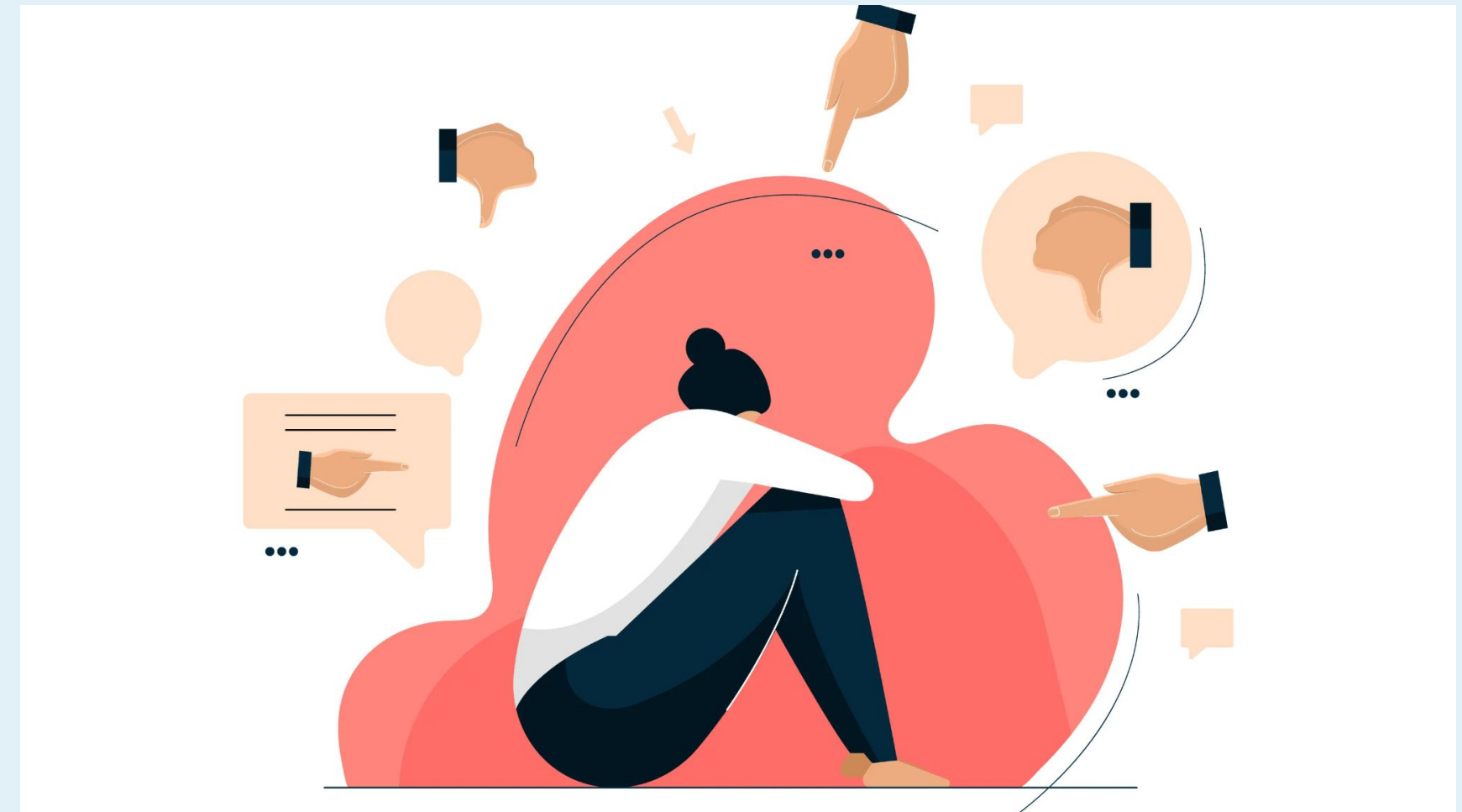


Introduction:

Mental Health Concerns in the Digital Age:

- **Prolonged technology use can lead to:**
 - Anxiety
 - Depression
 - Social isolation
- **Heavy use of social media has been linked to:**
 - Decreased self-esteem
 - Increased risk of developing mental health issues

<https://therapyutah.org/impact-of-heavy-technology-use-on-mental-health/#:~:text=Negative%20Mental%20Health%20Effects,of%20developing%20mental%20health%20issues.>



Introduction:

Dataset: Mental Health & Technology Usage

(<https://www.kaggle.com/datasets/waqi786/mental-health-and-technology-usage-dataset/data>)

- **Daily technology usage**
 - screen time
 - social media time
- **Health factors**
 - Stress Level
 - Physical Activity Hours
 - Sleep Hours
- **Age**
- **Gender**
- **10,000 participants**

User_ID: A unique identifier for each participant.

Age: The age of the participant.

Daily_Screen_Time (hours): Average daily screen time in hours.

Mental_Health_Score (1-10): Self-reported mental health score, where 1 is poor, and 10 is excellent.

Stress_Level (1-10): Self-reported stress level, where 1 is very low, and 10 is very high.

Sleep_Quality (1-10): Self-reported sleep quality score.

Objective:

Explore and visualize Mental Health & Technology Usage dataset with a Javascript-powered interactive Dashboard:

- **Filter Data by Age:**
 - Age: 18-29
 - Age: 30-39
 - Age: 40-49
 - Age: 50+
- **Gauge Charts:**
 - Average Stress Level by Gender
- **Bar Chart:**
 - Average Hours of Screen Time, Physical Activity, Sleep by Gender
- **Bar Chart:**
 - Average Social Media Usage and Average Physical Activity Hours

Methods Overview:

- **Data Source:**

- Kaggle (csv file)



- **Data Storage/Cleaning/Extraction:**

- MongoDB



- **Javascript**

- Plotly
- Chart.js

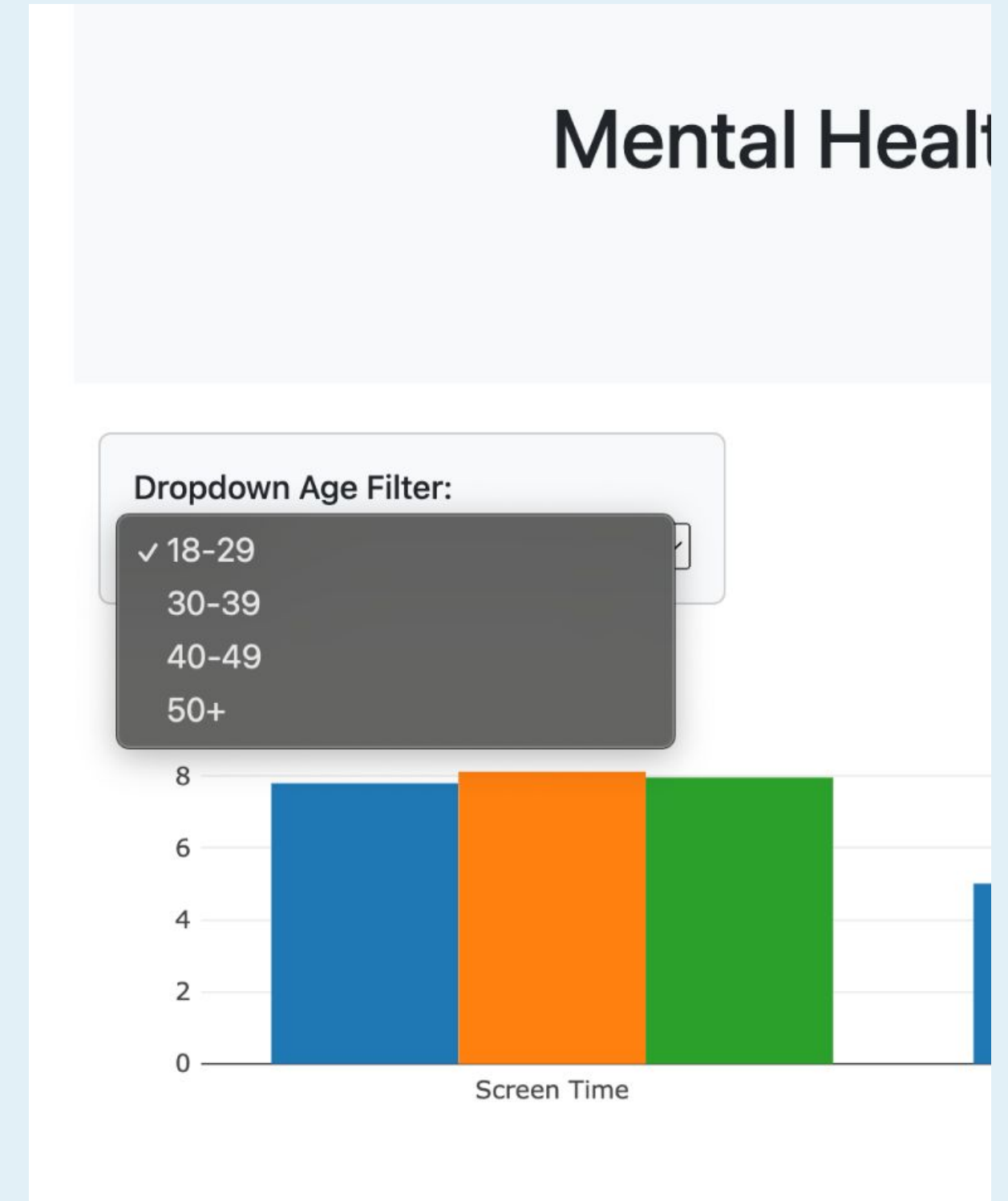


Filtering Function

- Using the dropdown option, each of the charts are able to be adjusted by age group to compare between decades
 - Ages: 18-29, 30-39, 40-49, and 50+
- In order to have the function apply to all charts, we created the “updateCharts” function so that the age-group value selected would refresh/recreate the chart with the selected ages
- With future expansion, we would like to also include more interaction with selectable variables in each of the charts so that the user can tailor their interaction with the charts.
 - i.e. Plotting the Boolean variables against numerical values to determine direct impact on work and Social Activity

```
<h6>Dropdown Age Filter:</h6>
<select id="age-group" onchange="updateCharts()">
  <option value="18-29">18-29</option>
  <option value="30-39">30-39</option>
  <option value="40-49">40-49</option>
  <option value="50+">50+</option>
```

```
const updateCharts = () => {
  const ageGroup = document.getElementById("age-group").value;
```

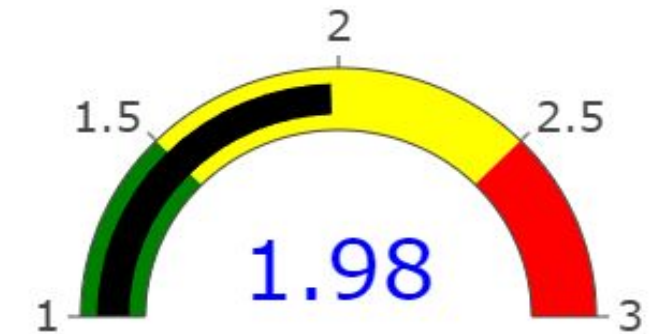


Gauge Charts

Measuring Average Stress Levels

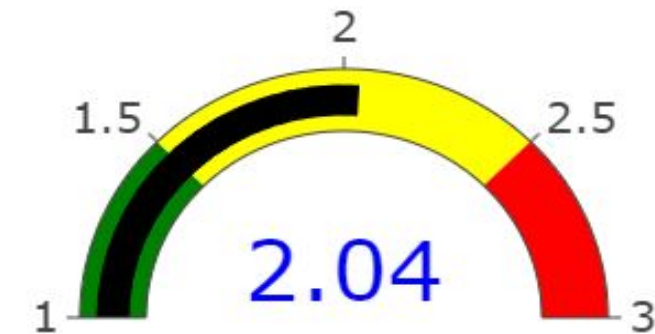
Female

Average Stress Level for Females (18-29)



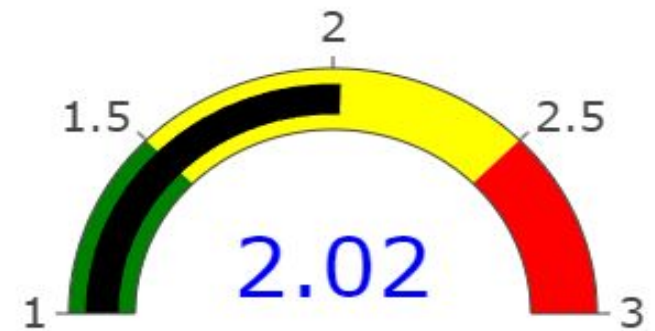
Male

Average Stress Level for Males (18-29)



Other

Average Stress Level for Others (18-29)

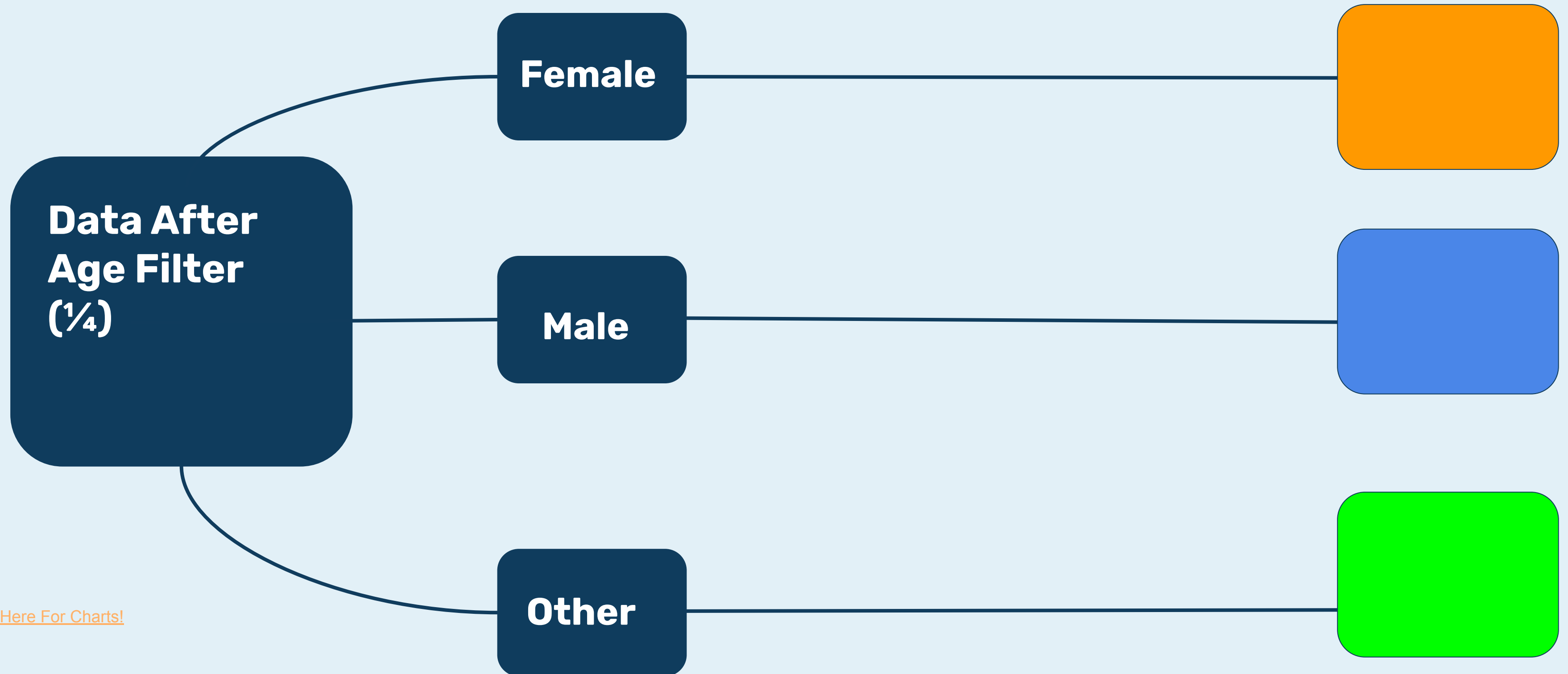


Data
After
Age
Filter
($\frac{1}{4}$)

[Click Here for Charts!](#)

Bar Chart

Measuring Average Stress Levels



[Click Here For Charts!](#)

Key Findings

Screen Time vs mental health

Research overall screen time
Technology usage
social media
Inverse relationship.

Positive relation

Online support system == better scoring on mental health

Age Vs technology_hours

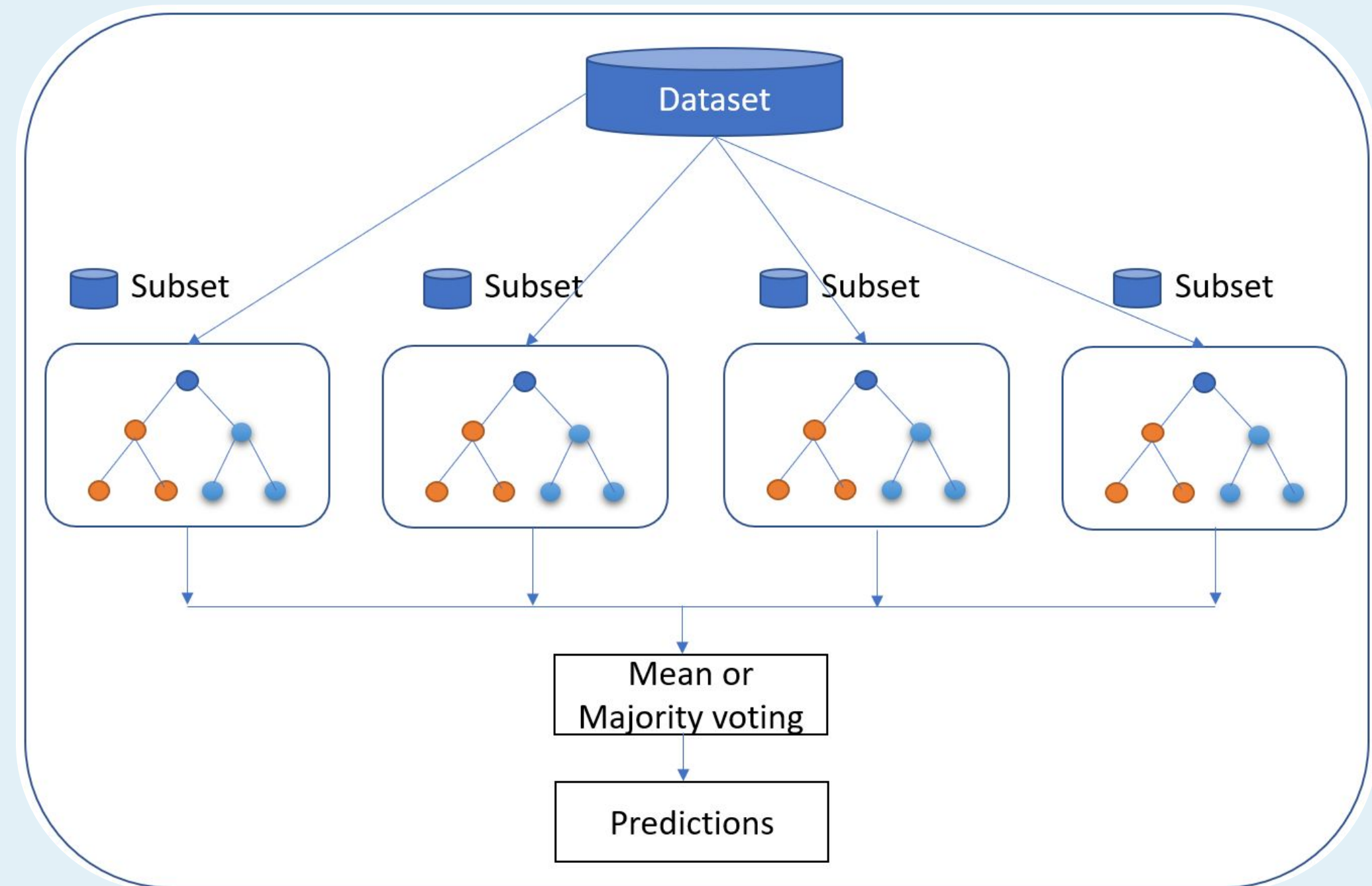
Middle age use more technology
personal/social/professional

Tailored Interventions

Diverse user engagement=>personalized solutions

Future Considerations

- Creating a more interactive website which would allow for the user to input variables and then have an output of the average data of any/all remaining variables
 - For instance, someone could input their Age, Gender, and Social Media Usage hours and then a report would be generated that would show the average results of the remaining variables in a “Profile” of sorts
- Integration of the mental health questionnaire into the website
- As the dataset would continue to grow, then predictive models can be created to help determine which factors are more indicative of lifestyle effects (i.e. "Mental_Health_Status", "Work_Environment_Impact")



Ethical Considerations

Data Privacy and Anonymity



We prioritized data privacy by ensuring that all visualizations presented aggregated data, with participants **identified only by created ID numbers** to protect their identities and prevent stigmatization.

Methodology and Data Collection



Data was collected through self-reported surveys, emphasizing the need to consider the subjective nature of the responses in our analysis and how this affects the interpretation of the findings.

Accuracy and Integrity



We maintained the accuracy and integrity of our analysis by rigorously **verifying the reliability of the Kaggle dataset** and transparently communicating our methodology to build trust.

Ethical Questions for Future

Disorder-Specific Severity Measures

For Adults

- [Severity Measure for Depression—Adult \(Patient Health Questionnaire \[PHQ-9\]\)](#)
- [Severity Measure for Separation Anxiety Disorder—Adult](#)
- [Severity Measure for Specific Phobia—Adult](#)
- [Severity Measure for Social Anxiety Disorder \(Social Phobia\)—Adult](#)
- [Severity Measure for Panic Disorder—Adult](#)
- [Severity Measure for Agoraphobia—Adult](#)
- [Severity Measure for Generalized Anxiety Disorder—Adult](#)
- [Severity of Posttraumatic Stress Symptoms—Adult \(National Stressful Events Survey PTSD Short Scale \[NSESS\]\)](#)
- [Severity of Acute Stress Symptoms—Adult \(National Stressful Events Survey Acute Stress Disorder Short Scale \[NSESS\]\)](#)
- [Severity of Dissociative Symptoms—Adult \(Brief Dissociative Experiences Scale \[DES-B\]\)](#)

- How do we obtain consent from users to collect and analyze their inputted data?
- Would a predictive model have the potential to misdiagnose users?
- Are there more valid questionnaires to use in collecting data regarding mental health?
- Healthcare data comes with extra regulations and privacy laws
 - HIPAA
 - Deidentified responses
 - Secure database creation
- Can an API be created to pull from EMRs regularly if these variables are being collected in hospital systems?



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Resources/References

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