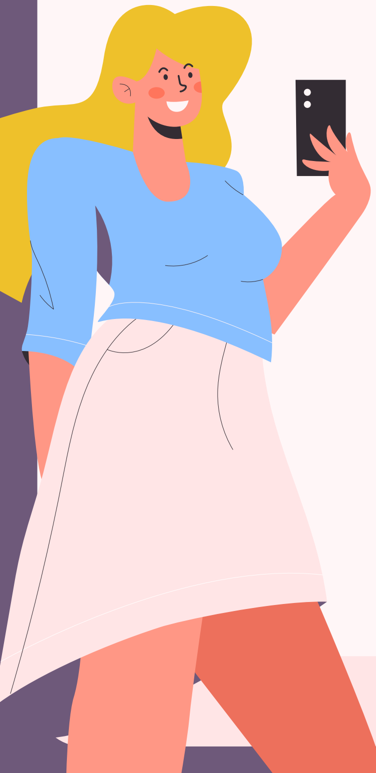

Predicting Anxiety and Depression due to

Phone Addiction in Teens

TABLE OF CONTENTS

OUR TEAM

Maya Parra - *Business Hook*

Aishwarya Mundada - *Lead Modeler*

Mohammad ameen - *Quality Assurance*

Octavio Gzain - *Technical Leader*

Chinmaiye Gandhi- *Data engineer*

Jeiti Trujillo- *Project Manager*

The Business Hook

The Pain Point

Who is this for?

- Insurance companies, specifically those who cover reactive mental health treatment, also known as crisis therapy

What problem do we want to fix?

- Crisis therapy is expensive to cover compared to preventative care.
- We hope to save insurance companies money by not having to cover medication for high-risk teens.

The "So What?" Business Impacts

Why this matters?
A teen mental-health "crisis episode" often shows up as an ED visit and sometimes an inpatient admission, both are claim events the insurer pays for.

Benchmark costs:
Youth outpatient mental-health episode: $2,673 per episode (includes psychotherapy, assessment, medication)
The real episodes can be higher depending on follow-up care.

What specific decision the model supports
When to trigger parent interventions once a teen crosses the tipping point (e.g., social hours/day +phone checks/day)

5,320 MILLION

People worldwide who use a cell phone

6 out of 10

People are addicted to cell phones

7,700 MILLION

Worldwide purchase of cell phones

Data Reality Feasibility Check

Dataset Structure

Individual-level data with demographic characteristics, phone usage behaviors (screen time, social media), sleep patterns, and academic performance indicators for each teenager.

Target Variable

Anxiety_Level and Depression_Level serve as the outcome measure, enabling both regression and classification approaches to identify high-risk adolescents.

Predictive Features

Behavioral predictors include screen exposure patterns, usage frequency metrics, and sleep disruption indicators that correlate with addiction risk.

Business Value for Insurance Providers

From Reactive to Preventive Care

This dataset enables insurers to transition from costly reactive interventions such as crisis therapy and medication to earlier, lower-cost preventive care models.

Early identification of teens at high risk of phone addiction and associated mental health issues creates a practical pipeline from risk prediction to targeted early intervention.

The result: significant reduction in mental health treatment costs while improving patient outcomes.

URL : Dataset

ID	Name	Age	Gender	Location	School_Grade	Daily_Usage_Hours	Sleep_Hours	Academic_Performance	Social_Interactions	Exercise_Hours	Anxiety_Level	Depression_Level	Self_Esteem	Parental_Control	Screen_Time_Before_Bed	Phone_Checks_Per_Day	Apps_Used_Daily	Time_on_Social_Media	Time_on_Gaming	Time_on_Education	Phone_Usage_Purpose
1	Shannon Francis	13	Female	Hansonfort	9th	4	6.1	78	5	0.1	10	3	8	0	1.4	86	19	3.6	1.7	1.2	Browsing
2	Scott Rodriguez	17	Female	Theodorefort	7th	5.5	6.5	70	5	0	3	7	3	0	0.9	96	9	1.1	4	1.8	Browsing
3	Adrian Knox	13	Other	Lindseystad	11th	5.8	5.5	93	8	0.8	2	3	10	0	0.5	137	8	0.3	1.5	0.4	Education
4	Brittany Hamilton	18	Female	West Anthony	12th	3.1	3.9	78	8	1.6	9	10	3	0	1.4	128	7	3.1	1.6	0.8	Social Media
5	Steven Smith	14	Other	Port Lindsaystad	9th	2.5	6.7	56	4	1.1	1	5	1	0	1	96	20	2.6	0.9	1.1	Gaming

Proposed analytics approach

Binary Classification

We are going to build a Classification Model with **Decision Trees**. This algorithm has a high degree of explainability which is important to offer recommendations.

We need to flag teens who cross the "Clinical Threshold" to trigger an intervention. To achieve this we will create a binary target called High_Risk_Claimant.

- Class 1 (High Risk): Anxiety OR Depression Level > 7
- Class 0 (Low Risk): All other users

Key Hypotheses

Hypothesis A - “Screen exposure as driver”:

- Variables: *Screen_Time_Before_Bed* & *Sleep_Hours*
- High blue light exposure immediately before bed disrupts sleep cycles, which is a leading physiological precursor to anxiety spikes

Hypothesis B - “Social media as driver”:

- Variables: *Phone_Checks_Per_Day* & *Time_on_Social_Media*
- High-frequency checking (fragmented attention) is likely more correlated with depression than long, sustained sessions of Gaming or Education

Defining Success: Crisis Prevention

For health insurers, success isn't measured by algorithmic accuracy alone, it's defined by meaningful reductions in costly acute interventions and sustained improvements in member health outcomes.

Primary Goal

Reduce crisis-related claims within the first few months resulting in fewer hospitali-zations, emergency therapy sessions, healthier teens.

Preventative Shift

Increase utilization of **low-cost preventative care** as counseling apps, wellness coaching triggered by early alerts.

Predictive Precision

Achieve **90%+ recall** to catch high-risk cases with **14–30-day lead time** before clinical crisis emerges.

Economic Impact: The Bottom Line

Metric	Definition of Success	Impact
Cost Avoidance	Prevent acute interventions through early action	Save $$$ per avoided crisis
Lifetime Value	Improved long-term outcomes reducing chronic claims	Sustained savings into adulthood
Engagement Rate	Parents take action after receiving alerts	Less booking consultations

Critical Context: In mental health prediction, false negatives carry far greater costs than false positives. Missing a high-risk teen leads to crisis; flagging a healthy teen enables preventative support, a worthwhile investment.

Thank You!