NEW HORIZON
COLLEGE OF ENGINEERING
Autonomous College, Affiliated to VTU | Approved by AICTE New Delhi & UGC
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

A
MINI PROJECT REPORT

ON

"Screen Time Tracker and Management"

Submitted in the partial fulfillment of the requirements in the 3rd semester of

BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

BY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

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CERTIFICATE

This is to certify that Archita Panda (1NH23CD021), bonafide students of NEW HORIZON COLLEGE OF ENGINEERING carried out the project entitled **"SCREEN TIME TRACKER AND MANAGEMENT"** as a part of Mini Project Component in partial fulfillment of the requirements during 3rd semester Bachelor of Engineering in Computer Science and Engineering (Data Science) during the year 2024 - 2025(September 2024 – January 2025).

Name & Signature of Guide

(Prof. Chandan Raj B R)

Name & Signature of HOD

(Dr. Swathi B)

External Viva Voce

Examiners	**Signatures**
1. _____	_____
2. _____	_____

ACKNOWLEDGEMENT

Any achievement, be it scholastic or otherwise does not depend solely on the individual efforts but on the guidance, encouragement and cooperation of intellectuals, elders and friends. A number of personalities, in their own capacities have helped us in carrying out this project. We would like to take an opportunity to thank them all.

First and foremost we thank the management, Dr. Mohan Manghnani, Chairman, New Horizon Educational Institutions for providing necessary infrastructure and creating good environment.

I would like to thank Dr. Manjunatha, Principal, New Horizon College of Engineering, Bengaluru, for his constant encouragement and facilities extended to us towards completing our project work.

I extend my sincere gratitude to Dr. Swathi B, Associate Professor & Head of the Department, Computer Science and Engineering (Data Science), New Horizon College of Engineering, Bengaluru for her valuable suggestions and expert advice.

I deeply express my sincere gratitude to our guide Prof. Chandan Raj B R, Senior Assistant Professor, Department of Computer Science and Engineering (Data Science), New Horizon College of Engineering, Bengaluru, for her able guidance, regular source of encouragement and assistance throughout this project.

I thank my Parents, and all Faculty members of Department of Computer Science and Engineering (Data Science) for their constant support and encouragement.

Last, but not the least, I would like to thank my peers and friends who provided me with valuable suggestions to improve my project.

Archita Panda(1NH23CD021)

ABSTRACT

In an increasingly digital world, where devices dominate our daily routines, managing screen time is both a personal and societal challenge. The Screen Time Tracker and Management project is an innovative solution designed to monitor, analyze, and visualize app usage patterns, enabling users to take control of their digital habits.

This project harnesses the capabilities of Python's powerful libraries, including pandas, matplotlib, seaborn, and streamlit, to transform raw usage data into actionable insights. Users can explore daily screen time trends, app-wise usage summaries, and the impact of notifications on productivity. By integrating interactive dashboards, rolling average trends, and customizable alerts for excessive usage, the application provides a user-friendly platform for cultivating healthier screen time habits.

This project highlights how data-driven approaches can promote well-being, empowering individuals to make informed decisions and achieve a balanced relationship with technology.

Contents

Chapter 1

Introduction

We live in a time when digital devices are an integral part of daily life. From smartphones to laptops, the time spent on screens has drastically increased, often leading to negative impacts on health, productivity, and personal relationships. While technology offers incredible benefits, unregulated screen time can cause distractions, reduced efficiency, and even stress.

The Screen Time Tracker and Management project was developed to help individuals monitor and better understand their screen usage. By analyzing trends and providing actionable insights, this tool empowers users to take charge of their digital habits. The project combines powerful Python libraries with user-friendly dashboards to present data in a meaningful way, helping users make informed decisions about their screen time.

1.1 Purpose of Study

This project aims to offer a practical solution for managing screen time effectively. It helps users understand their digital habits by analyzing app usage, identifying patterns, and offering insights that can lead to healthier practices. The study also demonstrates how data-driven tools can contribute to improved productivity and well-being.

1.2 Objective of the Project

The primary objectives of this project are:

- To process raw screen time data into an easily understandable format.
- To visualize daily and app-specific usage trends interactively.
- To provide insights that promote healthier screen habits.
- To identify and alert users about excessive usage patterns.

1.3 Problem Statement

In today's fast-paced digital environment, many individuals struggle to keep track of their screen time and its impact on their daily lives. Without proper tools, it is difficult to identify problematic usage patterns and take corrective

action. This project addresses the need for a simple, accessible, and effective solution for managing screen time through data visualization and actionable insights.

1.4 Motivation

The inspiration for this project stems from the growing need to strike a balance between productivity and personal well-being in the digital age. Excessive screen time has been linked to issues such as reduced mental focus, disrupted sleep patterns, and declining interpersonal relationships. The goal is to create a tool that not only tracks digital usage but also motivates users to adopt healthier digital habits by offering clear insights and actionable recommendations.

1.5 Methodology

- Data Collection: The app usage data is uploaded by users in a structured CSV format.
- Data Cleaning: Duplicate entries and missing values are handled to ensure accurate analysis.
- Data Processing: Metrics such as daily usage, app-specific summaries, and notifications are computed.
- Data Visualization: Interactive charts and graphs are created using Python libraries to present insights clearly.
- Alerts and Insights: Users are notified of excessive usage patterns and provided with actionable feedback to improve their digital habits.

Chapter 2

System and Language Requirements

2.2 Tools and Technologies Used

The project was implemented using the following tools and technologies:

Programming Language: Python

Libraries:

streamlit: Interactive dashboard creation

pandas: for data manipulation and analysis

seaborn: for creating visualizations

matplotlib: for plotting data

2.2 Hardware and Software Requirements

2.2.1 Hardware Requirements

Processor: Intel Core i5 or above

RAM: 8GB or above

Storage: 256GB SSD or more

2.2.2 Software Requirements

Operating System: Windows 10 or Linux

Python 3.8 or above

Libraries: pandas, matplotlib, seaborn

2.3 About the Language

Python is a versatile, high-level programming language that has gained immense popularity in various fields, including data analysis, machine learning, and web development. Its simplicity and readability make it an excellent choice for both beginners and experienced developers. Python's interpreted nature allows for quick prototyping and testing, which accelerates the development process.

One of Python's greatest strengths lies in its extensive libraries and frameworks. For data analysis, libraries like pandas provide powerful tools for

data manipulation and analysis, making it easy to handle large datasets and perform complex operations. Matplotlib and seaborn are essential for data visualization, offering a wide range of plotting functions to create informative and aesthetically pleasing graphs and charts.

In the realm of machine learning, Python shines with libraries such as scikit-learn, TensorFlow, and PyTorch. These libraries provide robust tools for building and training machine learning models, enabling developers to implement cutting-edge algorithms with ease. Additionally, Python's integration with other languages and tools, such as SQL for database management and Flask or Django for web development, further enhances its versatility.

Chapter 3

Implementation

3.1 Algorithm

Step 1: Import libraries for data manipulation (pandas), visualization (matplotlib, seaborn), application interface (streamlit), and computations (numpy).

Step 2: Set up the Streamlit app's layout, page title, and page icon.

Step 3: Input raw dataset from the user and display it.

Step 4: Perform data cleaning operations such as removing duplicate rows,handle missing data and Ensure that the Date column is in a valid datetime format; discard rows where the date conversion fails. Display cleaned data set

Step 5: Manipulate the data by grouping the data by date and age to find aggregate metrics. Return app summary and daily summary.

Step 6: Define visualization functions to display bar plot,line plot,line plot with rolling average,pie chart and histogram.

Step 7 : Display warning messages for excessive usage and the app details.

3.2 Functions in the program

The major functions included in screen time tracking and management include data cleaning, data processing and data visualization.

3.2.1 Data Cleaning

The dataset is preprocessed to ensure quality and accuracy by:

- Removing Duplicates: Duplicate rows are dropped to maintain data integrity.
- Handling Missing Values: Missing values are dropped, and invalid dates are corrected or excluded.
- Standardizing the Date Format: The Date column is converted to a consistent datetime format

3.2.2 Data Processing

Two main summaries are generated:

App Summary: Aggregates metrics for each app, including total usage time, notifications,

and the number of times opened. Helps identify high-usage apps.

Daily Summary: Summarizes metrics for each day to reveal patterns over time. Enables tracking of overall usage trends.

3.2.3 Visualizations

The following visualizations provide insights into the dataset:

- Daily Usage Trends

Visualization: Line plot showing screen time trends over days.

Insight: Highlights daily patterns and peaks in screen usage.

- Total Usage by App

Visualization: Bar plot comparing screen time for different apps.

Insight: Identifies apps consuming the most screen time.

- 7-Day Rolling Average

Visualization: Line plot with a rolling average to smooth trends.

Insight: Highlights sustained changes in usage patterns.

- App Usage

Visualization: A pie chart showing the proportion of total screen time contributed by each app.

Insight: Provides a quick overview of which apps dominate usage.

- Usage Duration

Visualization: Histogram plotting the distribution of daily screen time.

Insight: Highlights how daily usage is distributed across the dataset.

Chapter 4

Results and Snapshots

4.1 Results:

This project effectively tracks screen time patterns, providing actionable insights. Users can identify apps consuming excessive time and make informed decisions to reduce screen dependency. By analyzing the data, users can quickly identify which apps consume most of their time and how their usage varies over days or weeks.

The daily usage trends offer a clear picture of whether screen time is increasing or stabilizing. Rolling averages highlight long-term patterns, smoothing out occasional spikes to provide a better understanding of consistent behavior. Users with consistently high daily screen time receive actionable alerts, encouraging them to make healthier choices, like reducing non-essential app usage or scheduling breaks. Pie charts and bar plots reveal the proportional time spent on different apps, helping users pinpoint whether entertainment, social media, or work-related apps dominate their day.

It empowers users to visualize their relationship with technology, offering the tools to take control of their screen time and, ultimately, strike a balance between productivity, relaxation, and rest.

4.2 Snapshots:

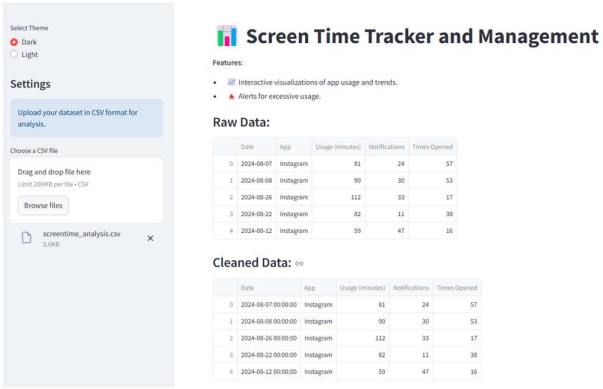

Fig 4. 1 Streamlit Dashboard displaying raw and cleaned data.

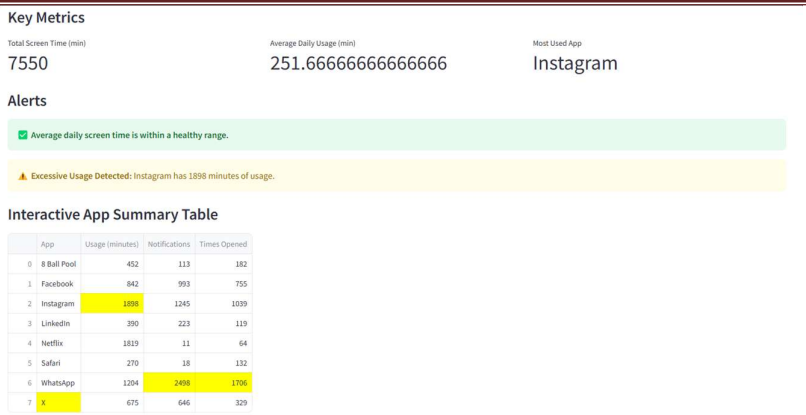

Fig 4. 2 Key matrices of total and average screen time, most used app and app summary details.

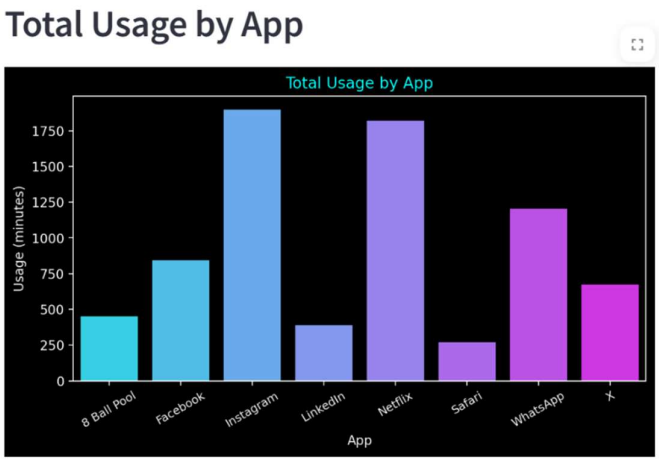

Fig 4. 3 Bar Plot of App vs Usage (Minutes).

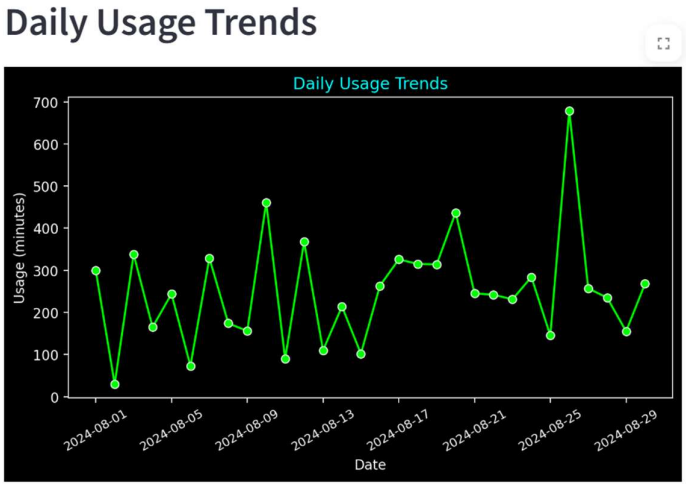

Fig 4. 4 Line plot showing screen time trends over days.

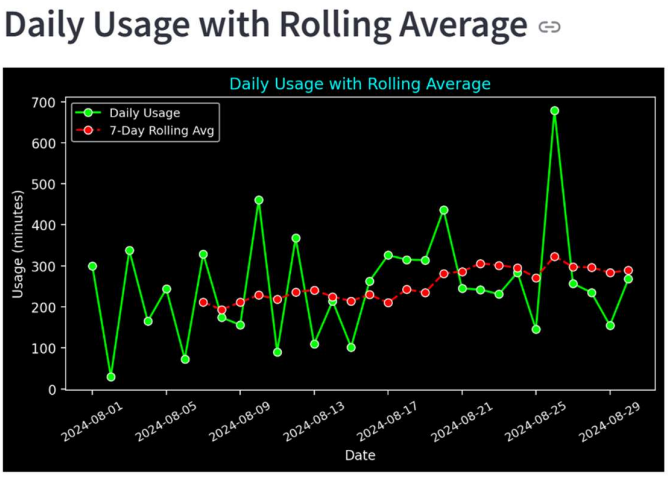

Fig 4. 5 Line plot with a rolling average to smooth trends.

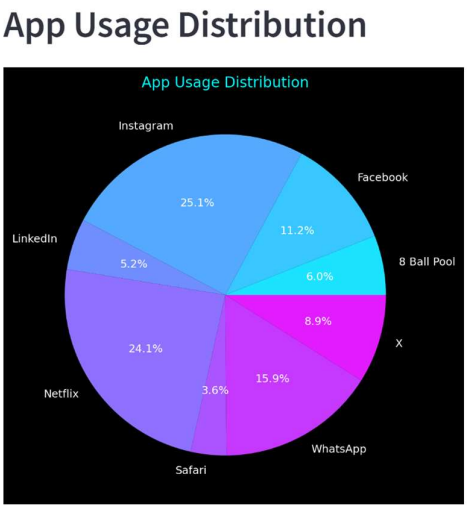

Fig 4. 6 A pie chart showing the proportion of total screen time contributed by each app.

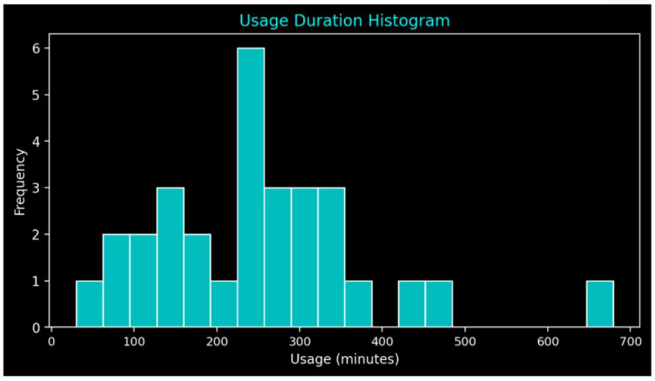

Fig 4. 7 : Histogram plotting the distribution of daily screen time.

Conclusion

The Screen Time Tracker and Management Dashboard is an effective tool for promoting healthier screen time habits. By combining robust data cleaning, insightful processing, and engaging visualizations, the dashboard offers a complete view of screen time behavior. The inclusion of alerts ensures that users are not only informed but also encouraged to act on the insights provided. With its intuitive design and focus on actionable outcomes, this project serves as an excellent example of how technology can be used to address challenges posed by excessive screen time. Also it demonstrates the practical application of data science and visualization techniques in addressing real-world challenges, offering valuable insights for personal development. It empowers users to reflect on their habits, make informed decisions, and ultimately strike a better balance between their digital and offline lives.

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