AI Powered Procrastination Reducer

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Abstract- Procrastination is a widespread issue that affects productivity and overall well-being, often making it harder for individuals to complete important tasks on time. This paper introduces an AI-driven system designed to help users overcome procrastination by understanding their behaviour, identifying common triggers, and providing timely interventions. The system dynamically prioritizes tasks, sends real-time reminders, and offers personalized encouragement to keep users motivated and focused. With built-in machine learning capabilities, the tool continuously adapts to individual habits and preferences, becoming more effective over time. Initial evaluations suggest that this approach can significantly improve time management and foster lasting productivity.

I. INTRODUCTION

Procrastination touches many areas of our lives, sapping energy and fuelling stress. Overcoming it requires fresh, inventive approaches. By leveraging Artificial Intelligence's ability to monitor behaviour and deliver personalized interventions, we now have a promising method to tackle procrastination head-on. This study introduces a system that employs these advanced techniques to assess and reduce procrastination in real-time. In the wake of the global pandemic, we find ourselves facing yet another formidable challenge—a surge in addictive behaviours that might be the most compelling in human history. What's particularly alarming is that this widespread issue has not been fully acknowledged, even as it significantly.

contributes to our current mental health crisis. Today marks a pivotal moment as we strive to turn the tide against this modern epidemic.

These apps — they've learned how to speak directly to our brains. How can we give ourselves?
little hits of happiness and little distractions, just enough to keep us from turning them off? They don't need drugs or alcohol. All they need is code. A few pings, a few notifications, and suddenly our minds are hooked.

It's not dramatic. It's not loud. It's quiet. It's soft. It *sneaks up on you*. That's what makes it so dangerous. As a student, it's crushing. You try to focus, but your brain is already halfway into the next scroll. You want to care about your classes and your future, but it's hard to compete with something that feels *so easy*. The school feels slow. Life feels slower. Screens feel better — until they don't

Some of the factors that contribute to this procrastination are –

- Easy access to devices
- Notifications and alerts
- Social media
- Email and messaging apps
- Online browsing
- Gaming
- Music and video streaming
- Fear of missing out
- Lack of self-regulation
- Dopamine loop

These factors contribute to procrastination due to electronic devices and addressing them can help individuals develop strategies to overcome this procrastination.

II. LITERATURE REVIEW

[1] The study by Yerdelen, McCaffrey, and Klassen (2016) investigates the longitudinal relationship between procrastination, anxiety, and self-efficacy for self-regulated learning among undergraduate

students. Using Latent Growth Curve Modelling, the researchers analysed data collected from 182 students over four-time points during a semester. The study aimed to understand how these variables. evolve over time and interact with one another.

[2] The study by Walumbwa et al. (2018) explores the relationship between creative self-efficacy and creative performance, emphasizing the underlying mechanisms that influence this dynamic. Using social cognitive theory, the authors propose a model were thriving at work serves as a mediating factor, while perceived work significance and task interdependence act as moderators. The research, based on a multi-source dataset from 795 employees and 149 supervisors, finds that individuals with high creative self-efficacy tend to exhibit stronger creative performance, but this relationship is partially mediated by thriving—a state of personal growth and engagement at work.

[3] The research paper by Alblwi et al. (2019) explores the phenomenon of procrastination on social networking sites (SNS) and identifies the types and triggers associated with it. The study highlights how SNS, designed to foster social interaction and connectedness, often employ persuasive features like notifications, immersive interfaces, and peer pressure mechanisms. These features can inadvertently encourage procrastination, particularly among users with low self-regulation or those seeking mood modification.

[4] The study by Cuncolkar and D'Silva (2020) examines the authors explore how low self-esteem and low self-efficacy contribute to procrastination, as students who doubt their abilities often delay tasks due to fear of failure. Conversely, higher motivation levels—particularly intrinsic motivation—are found to mitigate procrastination, enabling students to engage more effectively with their academic responsibilities.

[5] The study by Liu et al. (2022) This research looks at how success in math can boost a person's confidence in programming, with creativity acting as the important link between the two focusing on the mediating role of creativity. The research highlights how mathematical skills, often foundational for logical reasoning, positively influence programming self-efficacy—an individual's confidence in their ability to learn and perform programming tasks. However, the study goes further to explore how creativity acts as a bridge in this relationship.

[6] Bai et al. (2023) explore how active procrastination—a deliberate, self-regulated form of delaying tasks—can foster creative thinking, rather than hinder performance. The researchers propose that the relationship is not direct but operates through two sequential mediators: personal mastery and creative self-concept. Personal mastery reflects an individual's perceived control and competence in managing tasks and challenges.

[7] The study by Guo and Chen (2024) in the *Journal of Educational Psychology* examines paper explores how excessive, compulsive use of social media can detract from academic responsibilities by fostering habitual distractions that lead to delays in task completion. Using a robust quantitative design, the authors collected data from a diverse sample of college students by employing standardized measures, likely including scales that assess the degree of social media addiction and levels of academic procrastination.

[8] Bicer, Chamberlin, and Perihan (2020) conducted that they synthesized findings from numerous studies—encompassing over 11,000 participants—to reveal a moderate, statistically significant positive correlation between math performance and creative thinking. Notably, the relationship proved stronger when creativity was evaluated with math-specific assessments rather than through general measures. The analysis also highlighted that younger students (elementary and middle school) tend to exhibit a more pronounced association compared to high school students.

[9] Bocconi, Chioccariello, and Earp (2018) present a comprehensive report that outlines and explores how Nordic countries—such as Denmark, Finland, Norway, and Sweden—are embedding these subjects within school curricula. Detailing strategies for curriculum design, teacher training, and policy development. It emphasizes the progressive nature of the implementation process, highlighting both the

promising outcomes and the challenges faced during adoption.

[10] Steel and Ferrari (2013) set out to explore procrastination as more than just a personal failing—it's a complex interplay of individual traits and societal factors. By surveying over 16,000 English-speaking adults globally, they uncovered that procrastination is especially common among young, single men with lower education levels. The study indicates that procrastination isn't merely an isolated behaviour; it bridges key demographic differences—mediating the relationship between gender and education—and points to broader cultural influences where lower societal self-discipline might also play a role. This research invites us to consider that procrastination is woven into our everyday lives by both personal habits and wider social dynamics, suggesting that effective solutions require addressing not just individual behaviours but also the contexts in which these behaviours develop.

III. METHODOLOGY

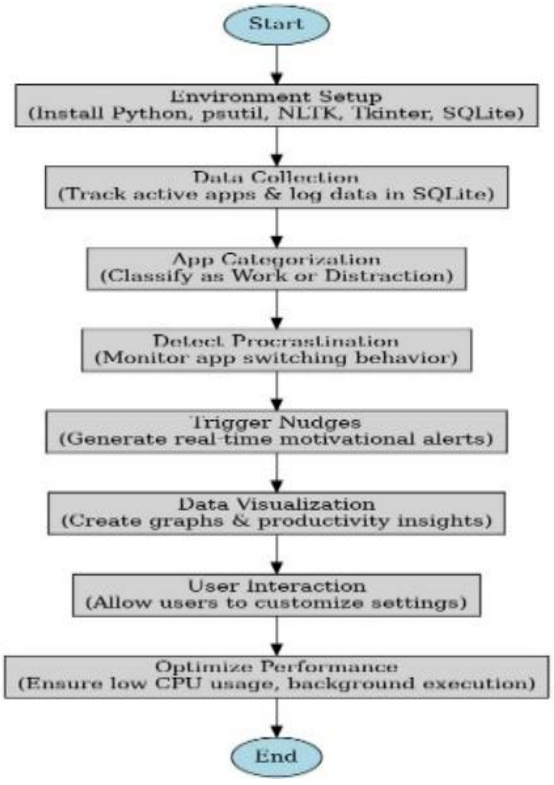


Figure 4.1 - logical flow of app tracking, detection, nudging

Our project is developed using Python and NLP and consists of the following core components –

i) App Tracking

Imagine Python's process management toolkit, psutil, as your behind-the-scenes assistant who quietly keeps an eye on your computer's well-being. It not only monitors system processes, CPU, memory, disk, and network usage, but it also gives you a real-time snapshot of what's happening behind the scenes. Picture using the simple psutil.process_iter() function to stroll through all the running apps, collecting key details like their process IDs, executable paths, and command line arguments. This way, you can see exactly which apps are active, how long they've been running, and how much of your system's resources they're using. Tools like psutil. Process (pid).name() fetches the app's name and psutil.process(pid).exe() shows you the full path, helping you easily tell if an application is for work or just a distraction.

What makes it even more useful is that psutil can neatly store all this data—say, in an SQLite database—so you can review historical patterns in app usage. This is invaluable for productivity apps that need to figure out if you're spending too much time on distracting platforms like social media or entertainment apps. With such insights, the system can gently remind you to refocus through alerts or motivational nudges on your dashboard.

And here's where it gets exciting: by mixing psutil with Natural Language Processing, we can go a step further. Not only can we track your behaviour, but we can also predict it, identify trends in how you use different apps, and offer intelligent suggestions to help improve your productivity. This combination can truly revolutionize how you manage your time and maintain focus throughout your day.

ii) App Categorization

App categorization involves grouping applications into useful categories, like work-related tools versus distracting ones, based on how you use them and some predetermined criteria. This process not only helps in monitoring productivity and identifying signs of procrastination but also enables the system to offer smart, timely nudges.

Imagine your computer as a lively workspace where every app is like a co-worker—some are focused and work-driven, while others are friendly distractions. App categorization is simply the art of grouping these "co-workers" into meaningful clusters—maybe one for productivity tools and another for leisure apps. This way, you get a clear picture of your activity, helping you understand whether you're on track or starting to lose focus.
The process kicks off by collecting all those little details about your computer usage.

Think of it like keeping a secret journal: every time you open an app (whether it's Chrome, Zoom, or even a YouTube window), the system notes it down. It captures the app names, window titles (which might reveal if you're watching a video or writing a report), the amount of time each app is used, and even how often you jump from one task to another. All these pieces of data add up to tell the story of your digital day.

Once the data is collected, it’s neatly organized in a digital log—like filing your journal entries into a well-kept record, using formats like SQLite databases or CSV files. This organized archive lets you review your habits over time, enabling you to see clearly which apps help boost your productivity and which ones might be pulling you away from your goals.

Ultimately, this whole categorization approach is about understanding your behaviour better. With these insights, the system can gently remind you or offer smart nudges when you need a little extra push to get back on track. Isn't it great to have a subtle, intelligent guide helping you manage your time and stay focused?
This data collected is stored in a structured format such as a database, SQLite, or CSV file, allowing further processing. The database maintains logs of app usage history, which is used for classification and trend analysis.

This approach involves –

a) Detecting Key Characteristics
First, we observe certain features of each app, such as how long you use it, how often you jump between apps, the time of day it’s used, and even any past categorizations. For instance, if an app is mostly active between 9:00 AM and 5:00 PM and you frequently switch between it and other work-related apps, it's a strong hint that the app is part of your work toolkit.

b) Teaching the System
Next, we train a supervised learning model—using methods like decision trees, logistic regression, or random forests—on a dataset where apps are already labelled as work, entertainment, social media, or communication. Think of this as showing examples to a friend, teaching them the subtle cues that distinguish a working app from one meant for leisure, so the model learns to predict new cases based on these past patterns.

c) Making Real-Time Judgments
Finally, when a new app is launched, the system quickly examines its features and predicts its category. Better yet, if the system misjudges—say it mistakenly tags a social media app as work-related—you can easily correct it. Over time, these corrections refine the model's accuracy, making this a flexible, personalized solution that continuously adapts without constant manual updates.

By integrating these steps, the system not only classifies each app accurately but also evolves with your habits, offering you a smarter, tailored way to keep your productivity on track.

Time-based categorization of some apps may have dual purposes example Google Chrome for work and procrastination and adaptive system reclassified apps based on time of usage example work hours vs leisure hours by combining real-time tracking AI models and user feedback cap categorization systems to become smarter and more personalised which will ensure better productivity insights.

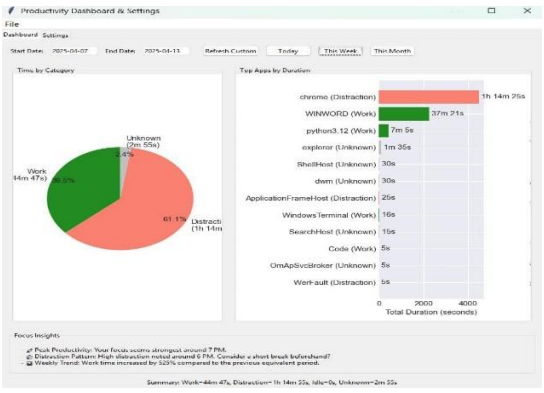
d) Provide nudges using NLP.
Imagine you're deep into a project, your screen filled with open apps—each one a bustling part of your digital workspace. In this lively environment, there’s a gentle guardian looking out for you: real-time nudges. These are not harsh alerts but soft, timely reminders that whisper, "Hey, it's time to refocus," just when you need them.

Picture your productivity dashboard as a friendly digital butler. Throughout your workday, it quietly observes which applications you're using by pulling data with Python libraries. Every active app, whether it's your browser, chat tool, or entertainment platform, gets noticed. It logs details such as how much time you spend on each app, how frequently you switch between them, and the specific times you're active—all neatly stored in a database like SQLite, much like jotting down your daily habits in a journal.

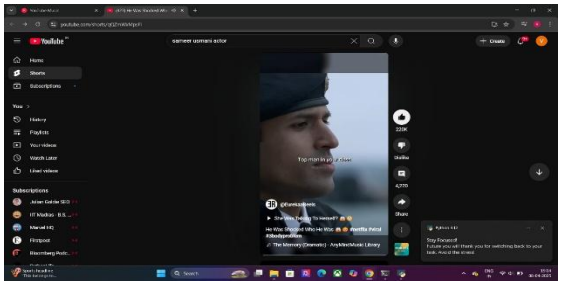
Now, imagine that as you work, you sometimes lose yourself in a social media scroll or get caught up in a long video session. When you hit these moments, the system gently intervenes. If you cross a set time limit on a distracting app or suddenly switch between apps too rapidly, a friendly pop-up appears on your screen. Perhaps it says, “You’ve spent 40 minutes on YouTube. How about a quick 5-minute break to refocus?” These nudges are designed with care—they aim to reinforce positive behaviour without ever feeling punitive.

What makes these nudges even more special is their ability to learn your patterns over time. If you often brush off a particular reminder, the system quietly adjusts the frequency or even the tone of its messages, ensuring that its prompts become more in tune with your habits. This adaptability is powered by machine learning, which helps the system recognize evolving distraction patterns and tailor the nudges just for you.

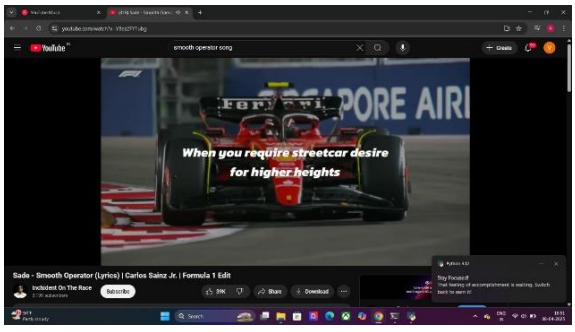
IV. RESULTS AND ANALYSIS



The pie chart illustrates user activity categorized into Work, Distraction, and Unknown over the period from April 7 to April 13, 2025. Most of the time (61.1%) was spent on distractions, followed by 36.5% on work-related tasks, and a small portion (2.4%) remained uncategorized. This distribution highlights a significant imbalance, with distractions occupying almost twice the time spent on productive tasks.



The image highlights a digital nudge in the form of a system notification at the bottom-right corner, encouraging the user to return to the task with a message: *"Stay Focused! Future you will thank you for switching back to your task. Avoid the stress!"* This gentle reminder serves as a behavioural intervention aimed at reducing distractions and promoting productivity by leveraging timely cues within the user’s workflow.



At this moment, while the user is watching a Formula 1 video on YouTube, a small but thoughtful notification appears in the corner of the screen. It doesn’t scold or demand—it simply says, *“Stay Focused! That feeling of accomplishment is waiting. Switch back to earn it!”* It feels more like a nudge from a caring friend than a computer. It gently reminds the user of the satisfaction that comes with getting things done, inviting them to return to their goals, not out of pressure, but from a place of

encouragement. This kind of nudge helps keep us grounded when distractions are just a click away.

V. DISCUSSION

The research indicates that AI holds strong potential in helping individuals manage procrastination more effectively. Early findings are encouraging, showing that such systems can positively influence focus and productivity. However, there are still some hurdles to address. Not all users engage with the system consistently, and at times, the algorithms may reflect biases that could impact fairness. To improve these tools, future efforts should aim to make them more adaptable to individual preferences and needs, while also working to minimize these limitations. In summary, AI offers a promising path toward reducing procrastination, but further refinement is needed to ensure it works equitably and effectively for all users.

CONCLUSION

This paper presents an AI-based solution to reduce procrastination, highlighting its capacity to improve productivity and foster positive work habits. Further research is essential to refine algorithms and explore broader applications in behaviour modification.

The study wasn't perfect. People procrastinate in different ways, but this research didn't explore those different types. Also, the number of participants was small and came from a specific group, so it would be great to see future studies include more people from different backgrounds to understand the full picture.

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