10/1/2024

Project Proposal

AGA

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Contents

Declaration

I hereby declare that the work described in this dissertation is, except where otherwise stated, entirely my own work and has not been submitted as an exercise for a degree at this or any other university.

Signed:

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13th October 2024.

Summary

The Advanced Guidance Assistance (AGA) bot is a software designed specifically to support individuals with ADHD in managing their daily tasks and routines. It acts as a personal assistant that provides structured guidance, reminders, and encouragement to help users stay focused and on track throughout their day.
With features like customisable task lists, real-time alerts, and adaptive goal setting, AGA helps reduce stress, anxiety and improve time management, making it easier to build healthier habits and maintain productivity. Its user-friendly interface and supportive approach aim to empower users to navigate their day more effectively and confidently.

In conclusion, AGA is an invaluable tool for individuals with ADHD, providing support to tackle challenges such as time management, and habit-building. By offering structured reminders, breaking tasks into manageable steps, and utilising Focus Mode to help users maintain concentration while encouraging regular breaks, AGA empowers users to stay organised, reduce stress, and develop consistent, healthy routines.

Background Research

What is ADHD?

"Attention Deficit Hyperactivity Disorder (ADHD) impacts the aspects of the brain responsible for tasks that require focus, organisation, and executive function." - (*Common ADHD Challenges and Characteristics – Leaf Complex Care*, 2023)

ADHD manifests in symptoms of hyperactivity, inattention, and impulsivity, which can interfere with various aspects of an individual's life, including academic performance, work, and personal relationships.

Common Challenges and Struggles of ADHD

1. **Difficulty Maintaining Focus and Attention**
   Individuals with ADHD often struggle to concentrate on tasks for extended periods. This leads to incomplete work, missed information, and difficulty following instructions, especially in structured environments like school or work. (*Common ADHD Challenges and Characteristics – Leaf Complex Care*, 2023)

2. **Hyperactivity**
   Restlessness, excessive talking, and the inability to stay still are common manifestations of hyperactivity, which can be particularly challenging in situations that require prolonged focus or patience. (Team, 2022)

3. **Forgetfulness and Disorganisation**
   People with ADHD often find it difficult to remember appointments, deadlines, or details from conversations. They may frequently misplace items or forget to complete tasks, leading to disorganisation in both personal and professional aspects

of life. This forgetfulness is closely tied to deficits in executive function, affecting one's ability to manage time and tasks effectively. (*Common ADHD Challenges and Characteristics – Leaf Complex Care*, 2023)

How to manage ADHD

The article from HelpGuide.org provides practical advice for managing ADHD in adults, highlighting how the condition can impact various areas of life, including work, relationships, and organisation, while offering strategies to cope with these challenges. (*Tips for Managing Adult ADHD - HelpGuide.Org*, 2018)

Organisation	Break tasks into smaller steps, use calendars and lists, and establish daily routines to manage clutter and stay organised.
Improving Focus	Organise workspace, minimise distractions, and use tools like timers to help stay productive.
Managing Stress and Mood	Establish healthy habits like regular exercise, getting enough sleep, and practising mindfulness to reduce stress and improve focus.
Time Management	Make use of clocks, timers, and reminders to stay on track and avoid procrastination.

AGA's Proposed Solution

AGA offers a comprehensive system designed to help individuals manage ADHD. Key features include:

1. **Focus Mode**: AGA detects when you're working or studying, providing in-built breaks to prevent hyperfocus and fidgeting. It encourages breaks with reminders and offers a reward system for completing tasks.
2. **Task Management**: Allows users to set tasks by name, time, date, and location. Includes a time management system that helps reschedule tasks to avoid overlaps, with rewards for staying on track.
3. **Weather & Advice Tool**: Offers timely reminders and advise depending on weather forecast.
4. **Mood Log**: Tracks emotions, providing insights and advice on improving mental wellbeing.
5. **Daily Affirmations**: Simple positive messages like "Today is a good day" to boost motivation.

6. **Wellbeing Tools**: Includes mindfulness exercises, tips, and suggested activities to promote life balance and relaxation.
7. **Summary Reminders**: Provides daily, weekly, and monthly task summaries to keep users organised and focused.
8. **Food/Water Reminders**: Reminds users to stay hydrated and nourished with regular notifications throughout the day.

Case Studies to Research

To guide the feasibility and implementation of my project's features, I will be examining four key case studies that provide valuable insights and research-backed evidence. These case studies will offer practical examples to support the development and functionality of AGA.

- Concentration Sensing: Detects learner's concentration levels and contributes to improving academic ability and education content (*Concentration Sensing | Miraxia Edge Technology*, n.d.)
- Fujitsu designs facial recognition to track workers' concentration (Keane, 2021)
- Distraction detection of lectures in e-learning using machine learning based on human facial features and postural information (Betto et al., 2023)
- Focus Plus: Detect Learner's Distraction by Web Camera in Distance Teaching (Chen et al., 2021)

Proposed Approach

I have developed a comprehensive project plan for the project, which outlines the key phases, timelines, and deliverables. You can find the full project plan, including detailed information on the schedule and milestones at https://github.com/users/vedez/projects/2

Design and Research

From October 6th to October 26th, I am dedicating the first three weeks to project planning, feasibility research, and detailed product design. This will ensure that every aspect of the project is clearly defined, leaving no room for ambiguity or delays during development.

Implementation

The implementation phase is divided into two core sections:

- **Semester 1**
  This phase focuses on implementing the basic functionalities of the project. During this stage, the core features will be developed, ensuring that the essential components are functional and integrated properly.

- **Semester 2**

The focus shifts to refining the code, improving the user experience (UX), and enhancing the user interface (UI). This phase ensures that the system is user-friendly, visually appealing, and functions smoothly based on user feedback and testing.

Testing and Maintenance

Various types of testing are applied to ensure the quality and functionality of the project throughout its development. These include test case scenarios and mini testing, which are conducted after each UI update and feature completion. Structured testing phases, such as Draft Testing, assess early versions, while Final Base Testing is completed at the end of Semester 1. In Semester 2, the focus shifts to bug testing, UI/UX testing, and further refinement through S2 Final Testing. Interviews and questionnaires are used to gather user insights, and each phase is thoroughly documented for review and adjustment.

Deliverables

Functions (Features)

- **Focus Mode:** Helps maintain focus by setting in-built breaks (15, 30, 60 minutes) and detecting hyperfocus, offering reminders and wellbeing sessions during fidgeting or stimming.
- **Task Management:** Organise tasks by name, time, date, and location. Includes time management tools that help reschedule overlapping tasks and suggest alternative times.
- **Reward System**: Provides positive feedback, like "You did 30 minutes of study time, good job!" to encourage productivity and task completion.
- **Fixed Reminders**: Set reminders for important dates like bill payments or counselling sessions, ensuring no tasks are forgotten.

- **Weather & Advice Tool:** Offers weather updates and practical advice like, "It looks like it's going to rain, don't forget to bring an umbrella!"
- **Mood Log:** Tracks emotional patterns and provides insights to help users better understand and improve their emotions.
- **Daily Affirmations**: Sends encouraging messages, such as "Today is a good day," to boost motivation and positivity.
- **Wellbeing Tools**: Includes mindfulness exercises, tips, and activities to help balance work and life, like practicing listening skills or learning new activities.
- **Summary Reminders**: Offers daily alerts for today's and tomorrow's tasks, as well as weekly and monthly reminders to keep users on track.
- **Food/Water Reminders:** Reminds users to stay hydrated and nourished with prompts every 1-2 hours.

**Features are to be revised again and ordered by priority.*

Non-Functional Requirements

- **Camera (Security & Limiting Usability):** Ensures security features are in place, limiting the camera's usability for safety reasons.

- **Medical Disclaimer:** This product is designed to support users, not as a cure or permanent solution for any condition.
- **Law Principles:** Ensures adherence to legal frameworks for data protection and user privacy.
- **Data Minimisation:** Only collects necessary data required for the product's functionality.
- **Purpose Limitation:** Data is used solely for the specific purpose it was collected, with clear transparency to users on how it's processed.
- **Least Privilege:** Implement different access levels for information and code, based on authorisation levels.
- **Consent Management**: Requires explicit permission from users before collecting, using, or sharing their data.
- **Data Retention Policy:** Data is stored only for as long as necessary to meet the intended purpose.
- **Data Anonymisation**: Personal information is modified or removed to prevent individuals from being identified, allowing data to be used for analytics or research.
- **Data Integrity**: Ensures that all data remains accurate, complete, and reliable throughout its lifecycle.
- **Right to Erasure**: Provides users with the ability to deactivate or delete their personal information when requested.

Technical Requirements

Hardware Requirements

Raspberry Pi Setup

If developing a physical device, a Raspberry Pi will be used as the core component. The device will require:

- Camera: To detect user movements for Focus Mode and monitoring hyperfocus.
- Microphone: For potential voice interaction or command recognition.
- Display: A screen for user interaction and displaying information such as tasks, reminders, and wellbeing messages.
- Speaker: For providing audio feedback, reminders, and wellbeing cues.
- Sensors (optional): To detect physical activity or user presence for better tracking and responses.

*If the Raspberry Pi setup is not feasible, the project can be implemented as a mobile app. The app will run on standard mobile devices, using the phone's camera, mic, and speaker for similar functionality.

Software Requirements

For programming language, it is likely to be Python (OOP) for core functionality, especially if using Raspberry Pi. Python offers flexibility for integrating hardware components and machine learning models.

Infrastructure Requirements

- **Firebase**

The database will use Firebase to store user data, tasks, preferences, and progress. Firebase will provide real-time syncing and cloud-based storage solutions.

- **Backend Services**
  APIs will be needed to connect the app with external services, including weather APIs, task scheduling, and potentially health data integration.

Project Review

Deep

"This project is focused on designing and developing a web application that serves as a tool for enhancing productivity and effective time management. In today's digital world, the issue of distractions and lack of focus has become increasingly widespread, creating challenges for individuals attempting to maintain productivity and accomplish their goals. To address this concern, the project aims to offer a practical and user-friendly solution that promotes focus and minimizes distractions.

The web application enables users to effectively organize and manage tasks, while also providing visibility into deadlines. Additionally, it offers insights into the time spent on work, helping users optimize their productivity." (*1.Pdf*, n.d.)

Title: Deep
Student: James Carswell C19749651

Description (brief): This web application is designed to create a distraction-free online environment, helping users, particularly university students, focus on long, meaningful work sessions. It acts as an immersive productivity tool for organising tasks and managing work sessions effectively.

What is complex in this project:
The complexity of this project arises from multiple factors, including understanding and addressing user behaviour to promote focus, integrating a diverse technology stack, processing real-time data for task tracking, and providing personalised analytics through intuitive visualisations. Additionally, ensuring the application is scalable, flexible, and able to adapt to continuous feedback while maintaining user engagement adds another layer of complexity.

What technical architecture was used:
The technical architecture of this project includes a front-end built with TypeScript, React.js, Vite, and SASS, creating a responsive user interface with component-level state management. The back end is developed using Go (Gin framework) with GORM for database handling, while the PostgreSQL database manages data storage. The architecture also supports both SQL and JSON querying, allowing for flexibility in handling and processing user data.

Explain key strengths and weaknesses of this project, as you see it.
Strengths

- Scalability: The chosen stack is scalable, allowing for future enhancements and growth.
- Real-time Productivity Tools: The ability to track tasks and visualise progress in real time makes it a powerful tool for boosting focus and productivity.
- User Engagement: The personalised analytics and study tools cater well to university students, helping them maintain attention and build efficient work habits.

Weaknesses

- Complexity in User Behaviour Tracking: Understanding user focus and behaviour can be challenging and might require further fine-tuning.
- Potential Performance Bottlenecks: Real-time data processing and the need for frequent updates to the UI could create performance challenges, particularly as the user base grows.

Conclusion

In summary, AGA, *Advanced Guidance Assistance Bot*, is designed to provide meaningful support to individuals with ADHD, helping them manage daily tasks, improve time management, and develop productive habits. By focusing on the unique challenges faced by individuals with ADHD - such as difficulties with organisation, maintaining focus, and building routines - AGA offers practical solutions through features like task management, real-time reminders, and Focus Mode.

Through the structured project plan and phased implementation, AGA will be developed with careful attention to both functionality and user experience. From initial research and design to implementation, testing, and maintenance, this project aims to create a tool that empowers users, reduces stress, and enhances productivity. Through consistent support, AGA helps users develop healthy routines and maintain a sense of balance between work, personal life, and self-care.