



TED UNIVERSITY

CMPE 491 / SENG 491 Senior Project

Local Generative AI Services Super App Project Specifications Report

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Team Members:

Deniz ÖZCAN, 33577146512, Software Engineering

Betül Ülkü YURT, 11056264926, Software Engineering

Umut ŞAHİN, 11597931646, Software Engineering

Supervisor: Emin KUĞU

Jury Members:

Tansel DÖKEROĞLU

Kasım Murat KARAKAYA

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1 Introduction

1.1 Description

This project aims to develop a comprehensive web and mobile application platform hosting a suite of AI-powered "mini-apps". These mini-apps leverage cutting-edge AI models to provide users diverse functionalities, fostering accessibility, creativity, and personalized experiences. The platform envisions empowering users with tools for:

- **Video Language Translation:** Real-time translation of spoken language in videos breaks down language barriers and promotes global communication. Support for multiple languages will be prioritized based on usage statistics and demand.
- **Multilingual Audio Documents:** Any document can be converted into natural-sounding speech, making written content accessible to a wider audience including visually impaired users.
- **Bedtime Story Creator:** This creative tool produces unique and engaging bedtime stories tailored to the child's age and interests, encouraging imagination and literacy. Customization options include character names, story themes, and length.
- **Video Auto-Captions and Creation:** The mini-app automatically generates captions for videos. Additionally, it will facilitate the creation of simple videos from user-provided text, images, or audio.
- **Daily Recap:** A personalized podcast feature delivering a daily summary of news and information tailored to user interests, providing a convenient and efficient way to stay informed.
- **AI Powered Internet Research:** The mini-app will save users time and effort by leveraging the power of large language models (LLMs) to conduct comprehensive internet research on any topic. It will allow users to specify search parameters, filter results, and summarize key findings in a pdf report.
- **Text-to-Image Generator:** This tool transforms written descriptions into visually compelling images, empowering creative expression and content creation. Users can refine generated images by adjusting style, detail, and resolution parameters.
- **Image-to-Video Generator:** This tool converts sequences of images into dynamic videos, enhancing visual storytelling and presentation capabilities. Users can control transitions, effects, and background music.

1.2 Constraints

- **Economic:** Budgetary limitations may restrict the selection of premium AI models and necessitate careful resource allocation for processing power and data storage. Cost-effective solutions and open-source alternatives will be explored.
- **Environmental:** Minimizing environmental impact is a key priority. Efficient server infrastructure, optimized code, and responsible data management practices will be used to reduce energy consumption and carbon footprint.
- **Social:** Designing an inclusive and accessible platform for users of different abilities and backgrounds is crucial. Adherence to accessibility guidelines and usability best practices will be strictly enforced.
- **Political:** Compliance with data handling and AI regulations, including GDPR, and other relevant legislation, is mandatory. Transparency in data collection and usage policies will be maintained.
- **Ethical:** In particular, ethical considerations regarding the use of AI in content creation will be carefully considered. Measures will be implemented to reduce bias, promote fairness, and ensure responsible content creation.
- **Health and Safety:** User well-being is a primary concern. Content moderation and filtering mechanisms will be implemented to prevent the production of harmful or inappropriate content, especially on services such as bedtime story creation.
- **Manufacturability:** A modular architecture will facilitate efficient maintenance, updates, and scalability. This approach will allow for independent development and deployment of individual mini-apps.
- **Sustainability:** Sustainable practices will be incorporated throughout the project lifecycle, including using renewable energy sources where feasible and responsible resource management.

1.3 Professional and Ethical Issues

- **Transparent Data Usage and Consent:** Clear and concise data usage policies will be presented to users, outlining data collection, storage, and processing practices. Explicit user consent will be obtained before any personal data is collected.

- **Fair Algorithms:** AI models will be carefully evaluated and tuned to mitigate biases and ensure equitable outcomes. Regular audits and monitoring will address any potential biases that may emerge.
- **User Privacy:** Robust security measures, including encryption and secure storage protocols, will be implemented to protect user data and maintain privacy.
- **Adherence to Professional Standards:** Industry best practices and ethical guidelines for AI development and deployment will be strictly adhered to, ensuring user trust and compliance with professional standards.
- **Content Moderation:** Appropriate content moderation mechanisms will be implemented to prevent generating harmful, offensive, or inappropriate content. Human oversight and automated filtering systems will be employed to ensure responsible content generation.
- **Intellectual Property:** Clear guidelines will be established regarding the ownership and usage rights of generated content, respecting intellectual property rights, and preventing copyright infringement.

2 Requirements

2.1 Functional Requirements

1. **Modular Accessibility:** Each mini-app must function independently and be accessible from the main dashboard. Future enhancements will explore interoperability between mini-apps (e.g., using text-to-image output in the video creator).
2. **Personalization Options:** Services like the daily recap and bedtime story creator must offer robust personalization based on user profiles, preferences, and historical data.
3. **User Input Handling:** Flexible and intuitive input mechanisms will be implemented for various data types, including text, images, audio, and video.
4. **Data Collection and Storage:** Secure and compliant data handling procedures will be implemented, adhering to data protection regulations and user privacy policies.
5. **Content Generation:** Output-sharing options for generated content will be provided, allowing users to download, share, and integrate their creations into other platforms.
6. **API Key Management:** Secure storage and management of user-provided API keys for third-party services (e.g., OpenAI, Gemini) will be implemented.
7. **Multi-Model Support:** The platform will support a variety of AI models and providers, giving users flexibility and choice. This includes:
 - Support for Gemini models via user-provided API keys.

- Support for OpenAI models via user-provided API keys.
- Support for platform-hosted open-source models (Llama, Mistral, etc.).
- Advanced: Support user-hosted LLMs via custom inference endpoints and request templates.

2.2 Nonfunctional Requirements

1. **Performance Benchmarks:** Mini-app loading times should not exceed 10 seconds on a stable internet connection. Media generation processing times should be kept under 1 minute per 10MB of input data. Performance testing and optimization will be conducted throughout the development process.
2. **Scalability:** The platform architecture must be scalable to accommodate a growing user base and increasing usage demands without performance degradation. Cloud-based infrastructure and load-balancing mechanisms will be employed.
3. **User-Friendly Interface:** An intuitive and user-friendly interface will be designed, ensuring ease of navigation, clear instructions, and accessibility for all users, regardless of their technical expertise.
4. **Security and Compliance:** Robust security measures, including data encryption, access control, and vulnerability assessments, will be implemented to ensure data security and compliance with relevant regulations.
5. **Cross-Platform Compatibility:** We prioritize consistent performance and user experience across devices and operating systems (web, mobile app).
6. **Reliability:** Robust error handling, redundancy measures, and proactive maintenance schedules will ensure high uptime and availability.
7. **Accessibility:** Adherence to WCAG guidelines will ensure accessibility for users with disabilities, including screen reader compatibility, keyboard navigation, and alternative text for images.

3 References

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