

Provision of Personalised Mental Health Mobile Application "Project Angel," Funded by the Hong Kong Jockey Club Social Innovation Centre (SIC)

1. Background

Hong Kong is experiencing a severe mental health crisis, ranking lowest in the Asia-Pacific region for three years. The 2022 *360° Global Well-being Index*¹ scored it at 56.7, below the regional average. Suicide rates have risen nearly 20% over the past decade, particularly among those aged 15-29. With psychiatric wait times up to 10 months and only 7.5 psychiatrists per 100,000 people, urgent action is needed to combat stigma and improve mental health support.

2. Objectives

Funded by the SIC, this project aims to deliver a personalised mental health mobile application, *Project Angel*, providing 24/7 Artificial Intelligence (AI)-powered mental health support. Project Angel aims to achieve at least the following objectives:

- 2.1. **Offer Continuous Accessibility:** Provide immediate support at any time, reducing reliance on overburdened public services that have long waiting times.
- 2.2. **Integrate Therapeutic Techniques:** Utilise methods such as Cognitive Behavioral Therapy and Emotional Regulation Therapy to offer evidence-based interventions.
- 2.3. **Enhance Scalability:** Address the shortage of mental health professionals by assisting multiple users simultaneously without compromising the quality of interaction.

Project Angel distinguishes itself from existing mental health services, such as *Open* 嚟 and *Say Something* 講心情, through the following features:

- i. **24/7 Support and Long-Term Engagement:** Project Angel offers immediate AI-powered assistance without the need to wait for a human counsellor.
- ii. **AI-Powered Personalisation:** Project Angel provides tailored interactions using advanced AI, surpassing the generic responses of human-dependent services.
- iii. **Confidential Environment:** Project Angel ensures complete privacy, encouraging users to seek help without the stigma associated with traditional services.
- iv. **Scalability and Accessibility:** Project Angel can assist multiple users simultaneously, unlike existing mental health services that rely on limited human resources.

Project Angel is not limited to any specific demographic, however, the following are the primary focus areas for end users:

- a. **Students:** Address academic stress, anxiety, and pressures faced by youth.
- b. **General Public:** Support adults dealing with work-related stress and personal challenges.

¹ 調查指香港身心健康指數連續3年位列亞太地區榜末 近9成港人壓力過大 精神健康問題響警號 僱主提供相關支援, *Mingpao.com*, Nov. 08, 2022. <https://jump.mingpao.com/career-news/work-life-balance/>【2022年全球健康指數調查】調查指香港身心健康指/

3. Scope of Work

This project aims to achieve the following objectives:

- 3.1. General
 - a. Project management and documentations
 - b. Use case development
 - c. Conducting User Acceptance Tests (UAT)
 - d. Marketing promotion
- 3.2. Large Language Model (LLM)
 - a. One-off fine-tuning a LLM with psychological therapy datasets
 - b. Ensuring ethical standards and cultural sensitivity in AI interactions
- 3.3. Mobile Application
 - a. Creation of a multilingual, user-friendly application interface
 - b. Integration of a LLM for real-time, personalised counselling
 - c. Development of a mental health tracking system for users
- 3.4. Maintenance Support Service
 - a. Guarantee of operation for at least one (1) year under Defects Liability Period (DLP)
 - b. Resolution of functional bugs and security vulnerabilities

This project **does NOT** provide services within the following scope:

- i. Fine-tune LLM after application launch
- ii. Live interactions with human therapists through the application
- iii. Offline counselling services and meetup events
- iv. Partnerships with external mental health institutions for service provision

4. Assumptions

The project is assumed to have the following factors leading to its success:

- 4.1. Technical Feasibility: LLM can be effectively fine-tuned for therapeutic conversations while maintaining ethics.
- 4.2. User Willingness: Individuals are open to using AI chatbots for mental health support.
- 4.3. Data Availability: Adequate psychological therapy data is accessible for training.
- 4.4. Regulatory Compliance: The project meets all legal requirements related to data privacy, mental health services, and AI deployment.
- 4.5. Stakeholder Support: Sponsors and partners provide necessary funding and support.

5. Milestones

The development is estimated for a period of six (6) months, tentatively scheduled from November 2024 to April 2025. The commencement date will be subject to written confirmation by the Hong Kong Jockey Club (HKJC) upon the issuance of the agreement. Key milestones, along with the tentative timeline, are as follows:

Milestones	Due Date	Details
Planning and Solution Design	Month 1	<ul style="list-style-type: none"> - Kick-off meeting and project planning - System architectural design
Design and Development	Month 3	<ul style="list-style-type: none"> - Infrastructure setup - Develop application interface, implement basic functionalities - LLM fine-tuning and evaluation
System Integration	Month 4	<ul style="list-style-type: none"> - System migration and deployment - System monitoring integration
UAT, Evaluation, and Refinement	Month 5	<ul style="list-style-type: none"> - Conduct formal UAT with selected participants - Analyse feedback, refine LLM, enhance application features
Operation	Month 6	<ul style="list-style-type: none"> - Rollout the application to the public - Resolution of functional bugs and security vulnerabilities

6. Budget Estimate

The estimated total cost for the project is HKD 1,000,000, broken down as follows:

Description	Unit Cost (HK\$)	QTY	Total Cost (HK\$)
Personnel			
- 300 man-days for Development	500,000	1	500,000
- 20 man-days for DLP	30,000	1	30,000
Materials			
- Data Acquisition	30,000	1	30,000
Operation			
- One-off LLM fine-tuning	50,000	1	50,000
- Server hosting per month	10,000	18	180,000
Miscellaneous			
- Cybersecurity audit	30,000	1	30,000
- Licences and subscriptions	20,000	1	20,000
- Psychologist consultancy	70,000	1	70,000
- Marketing and outreach for UAT	30,000	1	30,000
- Contingency fund	60,000	1	60,000
Net-Total			\$1,000,000

7. **Approach**

The intention of Project Angel is to assist individuals experiencing suicidal thoughts. Given the sensitive nature of this project, the advice provided by the application will be developed with caution and informed by a feedback loop from psychologists. Therefore, this project will utilise an Agile methodology for iterative development and continuous improvement based on expert insights.

The entire project will be divided into the following high-level development phases:

- 7.1. Planning and Team Formation
 - a. Assemble Team: Bring together experts in AI, software development, and mental health to ensure a well-rounded approach.
 - b. Competitor Analysis: Conduct a thorough analysis of existing mental health applications to identify gaps and opportunities for differentiation.
- 7.2. Development Phase
 - a. Mobile Application Development: Create an intuitive and user-friendly interface designed to encourage user engagement and ease of navigation.
 - b. LLM Fine-Tuning: Train the language model using relevant psychological therapy datasets, ensuring that ethical guidelines and cultural sensitivity are maintained throughout the process.
- 7.3. Testing and Evaluation
 - a. Pilot Testing: Deploy the application to a small user group to gather initial feedback on functionality and user experience.
 - b. Feedback Integration: Refine the application and AI responses based on user input, ensuring that the final product meets the needs of our target audience.
- 7.4. Deployment and Monitoring
 - a. Launch Application: Release the mobile application to the public, making it accessible to users in Hong Kong.
 - b. Continuous Monitoring: Track performance metrics, user engagement, and feedback post-launch to facilitate ongoing improvements and updates.

8. Project Organisation

Funded by the SIC, the **HKJC will be the Project Sponsor of this project**, providing funding for the development of Project Angel. The project team is responsible for the technical execution of the project, including design, development, and implementation. Roles include:

- 8.1. **External Project Team:** Works closely with the project team to monitor development progress, provide subject matter expertise, and ensure the project meets the acceptance criteria. This team is composed of personnel from the HKJC.
- 8.2. **Project Manager:** Oversees overall project planning, coordination, and delivery to ensure timely completion within budget and quality standards. Kelvin Luk will serve as the Project Manager.
- 8.3. **Solution Architect:** Designs the technical architecture and integrates system components to meet functional and non-functional requirements. Kelvin Luk will also serve as the Solution Architect.
- 8.4. **Full Stack Software Engineer:** Designs and develops the mobile application, and integration with the LLM model. Jack Chan will act as the Software Engineer.
- 8.5. **AI Engineer:** Analyses data sources, develops and fine-tunes LLM, and designs CI/CD and DevOps pipelines. Billy Tse will be appointed as the AI Engineer.

9. Deliverables and Success Factors

The project will be deemed to successful delivery from the team if the following criteria are met:

Deliverables	Acceptance Criteria
Infrastructure Setup	Successful setup of services for the application.
Mobile Application	UAT acceptance from the HKJC and outreach testers <ul style="list-style-type: none"> - Over 90% UI/UX feedback is positive based on surveys. - Application functions properly, including the mental health tracking system. - The platform handles increasing users without performance issues.
Fine-tuned LLM	A chatbot provides empathetic, accurate, and helpful responses that align with therapeutic best practices. Evaluation will include: <ul style="list-style-type: none"> - Case studies. - Professional bodies in psychological therapy.
Documentation	Complete and accurate documentation, including: <ul style="list-style-type: none"> - Project artefacts - System architecture design - Mobile application UI/UX design - LLM evaluation test plan - System reliability test plan
Project Management	Regular project meetings with HKJC project team members. <ul style="list-style-type: none"> - Sprint review
One-Year DLP	Prompt resolution of any functional bugs, security vulnerabilities, or deviations from specifications identified within the application.

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