

## **Work Breakdown Structure (WBS)**

### **1. Project Initiation**

- 1.1. Project Management
  - 1.1.1. Conduct Kick-off Meeting
  - 1.1.2. Define Project Scope
  - 1.1.3. Develop Project Charter
  - 1.1.4. Create WBS
- 1.2. Team Formation
  - 1.2.1. Assemble Project Team
  - 1.2.2. Assign Scrum Roles and Responsibilities
- 1.3. Communication Management
  - 1.3.1. Establish Communication Plan
  - 1.3.2. Conduct Regular Team Meetings
- 1.4. Risk Management
  - 1.4.1. Identify Potential Risks
  - 1.4.2. Analyse Impact of Risks
  - 1.4.3. Develop Risk Mitigation Strategies
- 1.5. Budget Management
  - 1.5.1. Define Budget Requirements
  - 1.5.2. Monitor Expenses and Adjust as Needed

### **2. Planning**

- 2.1. Product Backlog Development
  - 2.1.1. Gather User Requirements
  - 2.1.2. Define Product Vision and Goals
  - 2.1.3. Create Epics and User Stories
  - 2.1.4. Estimate User Stories
- 2.2. Sprint Planning
  - 2.2.1. Conduct Sprint Planning Meetings
  - 2.2.2. Define Sprint Goals
  - 2.2.3. Create Sprint Backlog
- 2.3. Backlog Refinement
  - 2.3.1. Update User Stories Based on Feedback
  - 2.3.2. Prioritise New Features and Improvements

### **3. Scrum Events**

- 3.1. Daily Scrum
  - 3.1.1. Conduct Daily Stand-ups
- 3.2. Sprint Review
  - 3.2.1. Conduct Sprint Review Meetings
  - 3.2.2. Demonstrate Completed Features
  - 3.2.3. Gather Feedback from Stakeholders
- 3.3. Sprint Retrospective
  - 3.3.1. Conduct Sprint Retrospective Meetings
  - 3.3.2. Discuss What Went Well and Areas for Improvement
  - 3.3.3. Identify Action Items for Next Sprint

#### **4. Infrastructure Setup**

- 4.1. Backend Infrastructure
  - 4.1.1. Set Up Servers and Hosting
  - 4.1.2. Configure Databases
  - 4.1.3. Implement Load Balancing
- 4.2. DevOps Implementation
  - 4.2.1. Establish CI/CD Pipelines
  - 4.2.2. Automate Deployment Processes
  - 4.2.3. Monitor System Performance
- 4.3. Security and Compliance
  - 4.3.1. Implement Firewall and Security Protocols
  - 4.3.2. Ensure Compliance with Data Protection Laws
  - 4.3.3. Set Up Regular Security Audits
- 4.4. Scalability Planning
  - 4.4.1. Design for Horizontal Scaling
  - 4.4.2. Implement Caching Strategies
  - 4.4.3. Prepare for Increased User Load

#### **5. Mobile Application Development**

- 5.1. Requirements Analysis
  - 5.1.1. Gather User Requirements
  - 5.1.2. Define Functional Specifications
  - 5.1.3. Outline Technical Requirements
- 5.2. UI/UX Design
  - 5.2.1. Create Wireframes and Mockups
  - 5.2.2. Design User Interface Elements
  - 5.2.3. Develop User Experience Flow
  - 5.2.4. Conduct Usability Testing
- 5.3. Front-End Development
  - 5.3.1. Set Up Development Environment
  - 5.3.2. Develop User Interface Components
  - 5.3.3. Implement Responsive Design
- 5.4. Back-End Development
  - 5.4.1. Set Up Server Environment
  - 5.4.2. Develop APIs and Services
  - 5.4.3. Integrate Database Systems
- 5.5. Integration with LLM
  - 5.5.1. Define Integration Points
  - 5.5.2. Implement REST API to LLM
- 5.6. Security Implementation
  - 5.6.1. Implement User Authentication
  - 5.6.2. Conduct Security Testing
- 5.7. Testing and Quality Assurance
  - 5.7.1. Develop Test Plans and Cases
  - 5.7.2. Perform Functional Testing
  - 5.7.3. Conduct Performance Testing
  - 5.7.4. Maximum Load Traffic Testing

- 5.7.5. User Acceptance Testing
- 5.7.6. Fix Bugs and Issues
- 5.8. Deployment Preparation
  - 5.8.1. Prepare Deployment Packages
  - 5.8.2. Set Up Deployment Pipelines
  - 5.8.3. Configure App Store Listings
- 6. **Large Language Model (LLM) Development**
  - 6.1. Data Collection
    - 6.1.1. Identify Data Sources
    - 6.1.2. Acquire Psychological Therapy Datasets
    - 6.1.3. Obtain Necessary Permissions and Licences
  - 6.2. Data Preprocessing
    - 6.2.1. Data Cleansing
    - 6.2.2. Extract, Transform, and Load
  - 6.3. Model Fine-Tuning
    - 6.3.1. Configure Training Environment
    - 6.3.2. Fine-Tune LLM
    - 6.3.3. Evaluate Model Performance
  - 6.4. Ethical and Cultural Alignment
    - 6.4.1. Implement Ethical Guidelines
    - 6.4.2. Ensure Cultural Sensitivity
    - 6.4.3. Review for Bias and Appropriateness
  - 6.5. Testing and Validation
    - 6.5.1. Conduct Model Response Evaluation
    - 6.5.2. Validate Responses with Experts
    - 6.5.3. Security Testing
  - 6.6. Deployment Readiness
    - 6.6.1. Set Up Hosting Environment
    - 6.6.2. Optimise Model for Production
- 7. **User Testing and Feedback Integration**
  - 7.1. Pilot Testing Plan
    - 7.1.1. Define Testing Objectives
    - 7.1.2. Develop Testing Protocols
    - 7.1.3. Prepare Testing Materials
  - 7.2. Recruit Test Users
    - 7.2.1. Identify Target User Groups
    - 7.2.2. Obtain Consent and Non-Disclosure Agreements
    - 7.2.3. Schedule Testing Sessions
  - 7.3. Conduct User Testing
    - 7.3.1. Facilitate Testing Sessions
    - 7.3.2. Collect Usage Data and Feedback
    - 7.3.3. Observe User Interactions
  - 7.4. Feedback Analysis
    - 7.4.1. Compile Feedback Reports
    - 7.4.2. Identify Common Issues
    - 7.4.3. Prioritise Areas for Improvement

- 7.5. Implement Improvements
  - 7.5.1. Update Application Features
  - 7.5.2. Refine LLM Prompt Design
  - 7.5.3. Test Adjustments for Effectiveness
- 8. **Regulatory Compliance and Legal**
  - 8.1. Data Privacy Compliance
    - 8.1.1. Review Data Protection Regulations
    - 8.1.2. Develop Privacy Policy and Terms
    - 8.1.3. Implement User Consent Mechanisms
  - 8.2. Mental Health Service Regulations
    - 8.2.1. Understand Relevant Health Laws
    - 8.2.2. Consult with Legal Experts
    - 8.2.3. Ensure Service Compliance
  - 8.3. Intellectual Property
    - 8.3.1. Secure Necessary Licences
    - 8.3.2. Protect Proprietary Technology
    - 8.3.3. Address Copyright Concerns
  - 8.4. Legal Documentation
    - 8.4.1. Draft User Agreements
    - 8.4.2. Prepare Disclaimers
    - 8.4.3. Review with Legal Counsel
- 9. **Deployment and Launch**
  - 9.1. Final Preparations
    - 9.1.1. Perform Final Testing
    - 9.1.2. Ensure All Features are Functional
    - 9.1.3. Prepare Marketing Materials
  - 9.2. App Store Submission
    - 9.2.1. Prepare App Store Assets
    - 9.2.2. Submit to App Stores (iOS and Android)
    - 9.2.3. Address Any Submission Feedback
  - 9.3. Marketing and Outreach
    - 9.3.1. Launch Marketing Campaigns
    - 9.3.2. Engage with Media and Press
    - 9.3.3. Organise Launch Events
    - 9.3.4. Public Education Campaigns
    - 9.3.5. Community Engagement
  - 9.4. User Onboarding
    - 9.4.1. Implement Onboarding Tutorials
    - 9.4.2. Provide Support Resources
    - 9.4.3. Gather Initial User Feedback
- 10. **Post-Launch Support and Monitoring**
  - 10.1. Performance Monitoring
    - 10.1.1. Track User Engagement Metrics
    - 10.1.2. Monitor System Stability
    - 10.1.3. Identify and Resolve Issues
  - 10.2. Continuous Improvement

- 10.2.1. Release Regular Updates
  - 10.2.2. Implement New Features
  - 10.2.3. Optimise Existing Functions
- 10.3. Customer Support
  - 10.3.1. Set Up Support Channels
  - 10.3.2. Respond to User Inquiries
  - 10.3.3. Manage User Feedback
- 10.4. Reporting and Analytics
  - 10.4.1. Generate Regular Reports
  - 10.4.2. Analyse User Behaviour
  - 10.4.3. Adjust Strategies Accordingly
- 11. **Documentation and Training**
  - 11.1. Technical Documentation
    - 11.1.1. Document Codebase and Architecture
    - 11.1.2. Maintain API Documentation
    - 11.1.3. Update Documentation with Changes
  - 11.2. User Manuals and Guides
    - 11.2.1. Create User Guide for App
    - 11.2.2. Develop FAQs and Help Resources
    - 11.2.3. Provide educational materials on mental health
    - 11.2.4. Translate Materials into Multiple Languages
    - 11.2.5. Include links to professional help and emergency contacts.
  - 11.3. Team Training
    - 11.3.1. Train Support Staff
    - 11.3.2. Conduct Knowledge Transfer Sessions
    - 11.3.3. Update Team on New Features
- 12. **Project Closure**
  - 12.1. Final Evaluation
    - 12.1.1. Review Project Objectives
    - 12.1.2. Assess Deliverables Against Plan
  - 12.2. Stakeholder Communication
    - 12.2.1. Prepare Final Reports
    - 12.2.2. Present Outcomes to Sponsors
    - 12.2.3. Obtain Formal Acceptance
  - 12.3. Administrative Closure
    - 12.3.1. Release Project Resources
    - 12.3.2. Close Contracts and Agreements

END OF WBS

### **Risk Identification**

ID	Risk Items
01	<b><u>Potential Investors</u></b> <ul style="list-style-type: none"> <li>- Mental health issues are a critical concern in Hong Kong. The objectives of Project Angel may attract interest from mental health organisations and institutions seeking to collaborate. Strategic partnerships could provide additional resources, expertise, and credibility, enhancing the app's features and outreach capabilities.</li> </ul>
02	<b><u>Social Criticism and Stigma Surrounding AI in Mental Health</u></b> <ul style="list-style-type: none"> <li>- Incredulity towards the use of AI in addressing social issues may lead to social criticism, impacting public perception and acceptance. Negative public sentiment could deter users from engaging with Project Angel, limiting its reach and effectiveness in addressing mental health challenges.</li> </ul>
03	<b><u>Lack of User Interest in the Product</u></b> <ul style="list-style-type: none"> <li>- There may be insufficient interest from potential users in adopting the mental health application, particularly in engaging with an AI. Low user willingness can significantly hinder adoption rates and undermine the project's objectives.</li> </ul>
04	<b><u>User Increase Leading to Compute Scale Issues</u></b> <ul style="list-style-type: none"> <li>- A rapid increase in user adoption could result in heightened computational demands, particularly for GPU usage, which are costly. If the project exceeds its budget for computational resources, it may lead to financial strain or compromise the quality of service provided by Project Angel.</li> </ul>
05	<b><u>LLM Hallucination</u></b> <ul style="list-style-type: none"> <li>- LLMs are notorious for generating inaccurate or nonsensical responses, which may confuse end users during interactions with Project Angel. This issue can undermine user trust and the effectiveness of the service, potentially leading to negative user experiences and lower adoption rates.</li> </ul>
06	<b><u>Inability to Fine-Tune LLM in Cantonese/Chinese</u></b> <ul style="list-style-type: none"> <li>- Most LLMs are primarily pre-trained on English text, which poses challenges for effectively fine-tuning them for Cantonese or Chinese language processing. The inability to provide support in Cantonese or Chinese may limit accessibility and utility for a significant portion of the target demographic in Hong Kong.</li> </ul>
07	<b><u>Dependence on External Data Sources</u></b> <ul style="list-style-type: none"> <li>- Relying on external psychological therapy data for training the LLM may introduce issues related to data quality, often summarised as "garbage in, garbage out." Poor-quality data can negatively affect the LLM's performance, leading to inaccurate responses and a diminished user experience.</li> </ul>
08	<b><u>Delay of LLM Evaluation from Psychologists</u></b> <ul style="list-style-type: none"> <li>- The fine-tuned LLM must undergo evaluation by external psychologists to verify that its responses align with ethical guidelines and psychological theories. Delays in this manual evaluation process could postpone the project's release.</li> </ul>
09	<b><u>Insufficient User Testing</u></b> <ul style="list-style-type: none"> <li>- It is both inaccurate and unethical to recruit end users who are experiencing mental health issues for testing the application. A lack of sufficient user feedback could lead to the release of a product that does not meet user needs, resulting in poor adoption and satisfaction.</li> </ul>
10	<b><u>Development Mistakes Leading to Frontend and Backend Mismatch</u></b> <ul style="list-style-type: none"> <li>- Errors during development could cause discrepancies between the frontend user interface and backend functionalities. Such mismatches can lead to user frustration and negatively impact the app's usability and adoption.</li> </ul>

11	<b><u>Production Failures Resulting in Errors in Chatbot Functionality</u></b> <ul style="list-style-type: none"><li>- The chatbot may experience operational failures during production, resulting in incorrect or unresponsive interactions. Such issues can severely affect user satisfaction and trust in the application, potentially driving users away and harming the app's reputation.</li></ul>
12	<b><u>Cybersecurity-Related Issues</u></b> <ul style="list-style-type: none"><li>- Potential cybersecurity vulnerabilities could result in breaches or leaks of user data. Such incidents could lead to serious legal implications, loss of user trust, and damage to the project's reputation, severely affecting its success and sustainability.</li></ul>
13	<b><u>Scope Creep Due to Ongoing Psychologist Feedback</u></b> <ul style="list-style-type: none"><li>- Continuous feedback from psychologists may lead to scope creep, where additional features and changes are requested beyond the original project plan. This can result in project delays, increased costs, and resource strain, complicating project management and delivery timelines.</li></ul>
14	<b><u>Team Misunderstanding of the Scrum Framework</u></b> <ul style="list-style-type: none"><li>- If the project team does not fully grasp the principles and practices of the Scrum framework, it may result in inefficient workflows. Such misunderstandings can hinder the agile development process, slowing down progress and reducing overall team productivity.</li></ul>

**Risk Analysis**

ID	Item	Likelihood	Impact	Risk Exposure
01	Potential Investors	H	H	H
03	Lack of User Interest in the Product	H	H	H
04	User Increase Leading to Compute Scale Issues	H	H	H
05	LLM Hallucination	M	H	H
08	Delay of LLM Evaluation from Psychologists	M	H	H
09	Insufficient User Testing	H	H	H
07	Dependence on External Data Sources	L	H	M
11	Production Failures Resulting in Errors in Chatbot Functionality	L	H	M
12	Cybersecurity-Related Issues	L	H	M
13	Scope Creep Due to Ongoing Psychologist Feedback	M	M	M
02	Social Criticism and Stigma Surrounding AI in Mental Health	L	M	L
06	Inability to Fine-Tune LLM in Cantonese/Chinese	L	L	L
10	Development Mistakes Leading to Frontend and Backend Mismatch	L	M	L
14	Team Misunderstanding of the Scrum Framework	L	M	L

*H = High, M = Medium and L = Low*



## Risk Planning

ID	Details
01	<b><u>Potential Investors</u></b> <ul style="list-style-type: none"> <li>- <b>[EXPLOIT IT]</b> Actively engage with mental health organisations and institutions, such as Hong Kong Council of Social Service and Caritas Hong Kong, through networking events and targeted outreach. Highlight Project Angel's innovative features and societal impact to foster strategic partnerships, securing additional resources and expertise while enhancing credibility and outreach capabilities in the community.</li> </ul>
03	<b><u>Lack of User Interest in the Product</u></b> <ul style="list-style-type: none"> <li>- <b>[REDUCE IT]</b> Conduct market research to understand potential users' needs and concerns regarding an AI-driven mental health application. Implement targeted marketing strategies to raise awareness and educate potential users about the benefits of engaging with AI. Conduct user surveys and focus groups to gather insights and tailor features to user preferences.</li> </ul>
04	<b><u>User Increase Leading to Compute Scale Issues</u></b> <ul style="list-style-type: none"> <li>- <b>[ACCEPT IT]</b> Acknowledges the potential success of Project Angel in attracting users. This growth can demonstrate the application's value, making it a compelling case for seeking additional funding or exploring partnerships with businesses to share costs and resources, ultimately enhancing sustainability.</li> </ul>
05	<b><u>LLM Hallucination</u></b> <ul style="list-style-type: none"> <li>- <b>[AVOID IT]</b> Implement a strategy of extensive fine-tuning and prompt engineering. This proactive approach will help ensure the language model produces accurate and relevant responses, thereby enhancing user trust and the overall effectiveness of Project Angel, ultimately promoting higher adoption rates.</li> </ul>
08	<b><u>Delay of LLM Evaluation from Psychologists</u></b> <ul style="list-style-type: none"> <li>- <b>[REDUCE IT]</b> Initiate early engagement with a panel of professionals to streamline the review process. Establish clear timelines and regular check-ins to monitor progress. Additionally, prepare backup plans for interim evaluations to ensure the project timeline remains on track while waiting for formal assessments.</li> </ul>
09	<b><u>Insufficient User Testing</u></b> <ul style="list-style-type: none"> <li>- <b>[TRANSFER IT]</b> Seek support from the project sponsor because the Hong Kong Jockey Club has established services with individuals experiencing mental health issues. This partnership can facilitate access to a more diverse user group for testing, ensuring that feedback is both ethical and comprehensive.</li> </ul>
07	<b><u>Dependence on External Data Sources</u></b> <ul style="list-style-type: none"> <li>- <b>[AVOID IT]</b> Avoid using unreliable data altogether. Instead, identify and partner with reputable data providers who adhere to high standards of data quality. Additionally, implement a thorough evaluation process involving professional bodies, such as psychologists and social workers, to assess the data's relevance and accuracy before feeding it into the LLM.</li> </ul>
11	<b><u>Production Failures Resulting in Errors in Chatbot Functionality</u></b> <ul style="list-style-type: none"> <li>- <b>[REDUCE IT]</b> Implement automated testing and a staging environment to catch issues early. Establish a user feedback mechanism for quick reporting and create an incident response plan for prompt resolution.</li> </ul>
12	<b><u>Cybersecurity-Related Issues</u></b> <ul style="list-style-type: none"> <li>- <b>[TRANSFER IT]</b> Conduct a cybersecurity audit by partnering with an external security firm. This transfer of responsibility will ensure that potential vulnerabilities are identified and mitigated effectively. By leveraging their expertise, the risk of data breaches can be minimised, protecting user trust and the project's reputation.</li> </ul>

13	<b><u>Scope Creep Due to Ongoing Psychologist Feedback</u></b> <ul style="list-style-type: none"><li>- <b>[ACCEPT IT]</b> Commit to the Agile spirit for potential features. This approach allows for incremental improvements based on the product owner's discretion, enhancing the application's effectiveness. Embracing this feedback presents an opportunity to refine services and better meet user needs. Additionally, it may open avenues for securing more funding to support expanded features and improvements, ultimately benefiting the project's objectives.</li></ul>
----	--

END OF RISK ANALYSIS

END OF THIS DOCUMENT