JIMO

Your Brain Buddy!

547 Technical Report

Purple Team 9

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Content

Business Problem

Addressing Modern Societal Challenges: *Jimo* recognizes the multifaceted challenges faced by individuals in contemporary society, where the prevalence of digital distractions and the fast pace of life can lead to a myriad of psychological and cognitive issues. Jimo is designed to offer a meaningful engagement, providing an interactive solution that transcends mere entertainment.

Combating Boredom and Enhancing Emotional Well-Being: In an era where attention is fragmented and genuine engagement is scarce, Jimo stands out as a beacon of immersive entertainment that combats boredom and fosters positive emotional well-being. By offering an engaging and thought-provoking experience, Jimo helps alleviate mood swings and provides a joyful escape, thereby contributing to improved mental health.

Cognitive Stimulation and Memory Enhancement: Beyond entertainment, Jimo serves as a cognitive tool that challenges the player's mental faculties, addressing the common issue of short-term memory challenges. Engaging in puzzles and scenarios stimulates cognitive processes, enhancing memory retention and problem-solving skills, crucial in navigating the complexities of modern life.

Stress Reduction through Interactive Play: The fast-paced nature of contemporary society often culminates in heightened stress levels, impacting overall life satisfaction and productivity. Jimo offers a unique stress-relief avenue, allowing players to immerse themselves in a world that demands focus yet provides relaxation, thus serving as a counterbalance to daily stressors.

Ideal Customer Profile

Our game targets a broad demographic, from vibrant youths to seasoned seniors, offering benefits tailored to each group. For the younger audience, it serves as an engaging icebreaker at social gatherings, enhancing interactions. In contrast, seniors can leverage the game to stimulate their cognitive functions, interacting with AI to keep their minds active.

Potential Buyers–
Dating App Companies: In the competitive market of dating apps, companies strive to provide unique features that differentiate their services and enhance user experience. By integrating our game into their platforms, these companies can introduce a distinctive interactive element that facilitates deeper connections among users. The game serves as an engaging conversation starter, allowing individuals to interact in a playful and less pressured environment. This innovative feature can increase user engagement, encourage longer app usage, and potentially lead to more meaningful interactions, aligning with the core objectives of dating app companies.

Corporate Entities for Team Building: Corporations constantly seek innovative and effective methods for team building to enhance collaboration and communication among employees. Our game could serve as a unique tool for corporate training sessions or team-building retreats, offering a fun and interactive way to develop problem-solving skills, encourage teamwork, and foster a collaborative culture.

Universities and Educational Institutions: These establishments continually seek innovative methods to enhance student engagement and foster a sense of community. By incorporating Jimo into their social events, universities can offer an interactive experience that not only entertains but also promotes cognitive engagement and social interaction among students. The game's adaptability makes it suitable for casual gatherings, and structured team-building activities, providing a versatile tool for educational institutions aiming to enrich their campus life.

Healthcare Facilities for Cognitive Therapy: Healthcare institutions, especially those focusing on mental health and cognitive therapy, could use your game as a therapeutic tool. It can aid in improving patients' memory, concentration, and problem-solving skills. For instance, therapists could use the game in cognitive rehabilitation sessions to assist patients with brain injuries or cognitive impairments in regaining their mental functions.

Senior Living Communities for Mental Engagement: To combat cognitive decline and promote mental agility among elderly residents, senior living communities could incorporate your game into their regular activities. It would provide a fun and stimulating way for seniors to engage their brains, potentially improving memory and cognitive speed, thereby enhancing their quality of life.

Solution

Design Thinking Process & Technology Choices–
OpenAI GPT-4 and GPT-3.5 Integration: Jimo leverages the advanced natural language processing capabilities of OpenAI's GPT-4 and GPT-3.5 models to understand user queries, generate contextual responses, and provide hints or solutions to puzzles. These state-of-the-art AI models enable Jimo to maintain a conversational interface, interpret user inputs accurately, and offer personalized gaming experiences.

Streamlit Framework: Jimo's user interface is built using Streamlit, a powerful Python library for creating interactive web applications. Streamlit provides an intuitive and user-friendly interface for interacting with Jimo, allowing users to input queries, receive puzzle hints, and navigate through the gaming experience seamlessly. The simplicity and flexibility of Streamlit facilitate rapid prototyping, iteration, and deployment of Jimo's interface.

User Research and Iterative Development Process–

To ensure Jimo meets the needs and preferences of its users, our team conducted comprehensive user research and employed an iterative development approach. Here's an overview of our user research process and how it informed the evolution of Jimo:

Initial Prototype: We began by building the initial version of Jimo, a situation puzzle bot, to provide users with an interactive gaming experience. This prototype served as the foundation for our subsequent research and development efforts.

AI Versus AI Testing: Next we introduced AI versus AI gameplay to observe how OpenAI GPT competes with itself to solve puzzles. This testing phase helped us understand the capabilities and limitations of the AI models and provided valuable insights for further refinement.

User Testing: We conducted usability tests with real users, involving a diverse group of 50 individuals, to gather feedback on Jimo's gameplay experience. Users were asked to interact with the bot, solve puzzles, and provide feedback on their overall experience.

Feedback Collection: Through surveys, interviews, and direct user feedback during testing sessions, we collected insights into how individuals perceive and interact with puzzle-solving games. Users shared their preferences, pain points, and suggestions for improvement.

Prompt Engineering: Based on user feedback and observations from AI versus AI testing, we performed prompt engineering to refine the responses generated by OpenAI GPT. This iterative process involved tweaking prompts and fine-tuning the AI models to ensure more accurate and contextually relevant puzzle hints and solutions.

Feature Prioritization: We prioritized user-requested features based on feedback received during testing. The most commonly requested features included a voice feature for hands-free interaction, a group feature for multiplayer gameplay, and the ability to create custom puzzles.

Introduction of New Features: Over a two-week timeframe, we iterated on Jimo's design and functionality to introduce new features based on user feedback. Notably, we incorporated the 'Custom Situation Puzzle' feature, allowing users to create and play their puzzles within the app.

Continuous Improvement: Throughout the development process, we remained responsive to user feedback and actively sought ways to enhance Jimo's user experience. Regular updates and iterations were made to address usability issues, optimize performance, and introduce new features.

By engaging in rigorous user research, conducting iterative testing, and prioritizing user feedback, we were able to create a more refined and user-centric version of Jimo. Including features such as voice interaction, multiplayer support, and custom puzzle creation demonstrate our commitment to delivering a customizable puzzle-solving experience for our users.

Technical Aspects and Technology

1. Streamlit:

Streamlit is utilized to provide the user interface for interaction with Jimo's GenAI Situation Puzzle Bot. Streamlit simplifies the process of building data-driven applications, allowing developers to focus on coding without dealing with the complexities of web development.

Development Process:

- Design the user interface layout for the chatbot, including input/output sections for user queries and bot responses.
- Continuous testing and refinement of the interface based on user feedback and usability.
- UI/UX design ensured a visually appealing and intuitive interface design.

Challenges:

- Ensure real-time responsiveness of the interface, especially during periods of high user engagement, which requires optimization and performance tuning.
- Compatibility issues with certain Streamlit extensions or third-party libraries were encountered and resolved through workaround solutions or alternative implementations.
- Implement natural language processing (NLP) capabilities to parse user queries and extract relevant information for solving puzzles.

2. OpenAI's GPT-4/GPT-3.5/DALL-E3:
OpenAI's GPT-4, GPT-3.5, and DALL-E3 models are employed for puzzle generation and response analysis. These state-of-the-art AI models excel at natural language understanding and generation tasks, making them ideal for creating contextually relevant puzzle scenarios.

Packages and Platforms:

- OpenAI Python SDK is used for integrating the GPT and DALL-E models into the puzzle generation pipeline.
- Local deployment of the models for enhanced performance and privacy, depending on resource availability and specific use case requirements.

Development Process:

- Fine-tune the GPT and DALL-E models on puzzle-related data to ensure coherence and relevance in scenario generation.
- Develop algorithms to analyze user responses and provide appropriate feedback or hints.

Challenges:

- Balance the computational resources required for running the AI models with performance constraints and cost considerations.
- Ensure the quality and diversity of generated puzzle scenarios while maintaining coherence and relevance to user interactions.

3. Gemini Pro:

Gemini Pro is a custom-built AI algorithm specifically tailored for puzzle generation and response analysis, which leverages techniques of adversarial generation, reinforcement learning, or evolutionary algorithms to create challenging and diverse puzzle scenarios dynamically.

Packages and Platforms:

- Gemini Python package, developed in-house, is utilized for integrating the custom AI component into the puzzle generation pipeline.
- Deployment options include both API access and local deployment, depending on performance needs and resource availability.

Development Process:

- Conduct research and development of custom AI algorithms for puzzle generation
- Integrate Gemini into the puzzle generation pipeline with Streamlit and OpenAI.

Challenges:

- Design algorithms capable of generating diverse and contextually coherent puzzle scenarios while maintaining computational efficiency poses a significant challenge.
- Balance the complexity of generated puzzles to ensure they are challenging yet solvable for users with varying levels of logical reasoning skills requires careful testing.

To sum up, Jimo, our GenAI Situation Puzzle Bot leverages Streamlit for the user interface, OpenAI GPT-4, GPT-3.5, and DALL-E3 for puzzle generation and response analysis, and Gemini for enhanced puzzle generation capabilities.

Evaluation/Results

In evaluating the effectiveness of the tools—Streamlit, OpenAI's GPT-4/GPT-3.5/DALL-E3, and Gemini Pro—several metrics were employed to measure success in solving the business problem of creating an interactive chatbot hosting engaging situation puzzles.

User Engagement Metrics:

- Time Spent: Measure the average time users spend interacting with the chatbot. Longer durations indicate higher engagement and interest.
- Number of Interactions: Count the total number of interactions per user session. Higher interaction counts suggest increased user engagement.
- Repeat Usage: Monitor the percentage of users who return to the chatbot for multiple sessions. A high percentage indicates sustained interest and engagement.

Puzzle Solving Metrics:

- Success Rate: % of users who successfully solve puzzles within a given session. A higher success rate indicates effective puzzle design and user guidance.
- Time to Solve: the average time users take to solve puzzles. Shorter durations suggest well-designed puzzles that challenge users without overwhelming them.
- Hint Usage: the frequency of users requesting hints during puzzle solving. A balance between hint usage and puzzle difficulty indicates effective user support.

User Satisfaction Metrics:

- Surveys and Feedback: Collect user feedback through surveys or direct interaction to assess satisfaction with the chatbot experience. Qualitative feedback provides insights into usability, engagement, and areas for improvement.
- Ratings and Reviews: Monitor user ratings and reviews on relevant platforms. Positive ratings and reviews indicate user satisfaction and endorsement of the chatbot's value proposition.

Technical Performance Metrics:

- Response Time: the average response time of chatbot interface to user queries. Faster times contribute to a smoother user experience and higher engagement.
- System Stability: Monitor system uptime and stability to ensure uninterrupted availability of the chatbot. Minimal downtime and robust performance contribute to user satisfaction and trust in the chatbot's reliability.

Puzzle Diversity and Creativity:

- Scenario Variability: Assess the creativity of generated puzzle scenarios. A wide range of scenarios with challenges enhances engagement and replay value.
- Visual Appeal (DALL-E3): Evaluate the visual quality and relevance of images generated by DALL-E3. Visually striking and contextually relevant images enhance the immersive puzzle-solving experience.

Evaluation Process:

Step 1 - Test to gather feedback on usability, engagement, and puzzle-solving experience.
Step 2 - Analyze data to assess engagement metrics and puzzle-solving performance.
Step 3 - Utilize dashboards to monitor real-time KPIs and identify areas for improvement.
Step 4 - Iterate on the design and functionality of the chatbot based on evaluation results and user feedback to continuously improve effectiveness in solving the business problem.

Limitations and Future Work

1. **Story Generation**

Jimo can already generate its own stories, offering customers a variety of choices on how to engage. Initially, customers select from existing genres, such as horror, slice-of-life, or non-horror. Additionally, Jimo allows customers to define the theme of the game they wish to play by simply entering keywords.

Limitation: It's not possible to guarantee the quality of the story. There may be errors in story logic, political antagonism, racial discrimination, etc. These are outcomes we wish to avoid, as we do not want the enjoyment of our game to be at the expense of others.
Future Work: add frameworks to Jimo through employee reviews, which helps prevent Jimo from generating stories that demean others based on race or gender differences. Our goal is to enable Jimo to generate higher-quality stories.

2. **Image Generation**

Jimo creates images after the story. Players choose between realistic or comic styles, enhancing their understanding of the story's development.

Limitation:

- Images are generated randomly each time, leading to potential inconsistencies in quality and content. This can delay image production if story responses are too rapid, possibly detracting from the user experience.
- Current AI limitations prevent the generation of images containing banned words, resulting in incorrect images or the inability to generate images for some stories.

Future Work:

- Upon the release of new image generation AI technology, we plan to update the image API. Similarly, we aim to generate images for stories with fixed themes, improving efficiency by enabling employees to select the story flow chart that best aligns with the story and adjust photos accordingly.
- train story generation to use fewer prohibited words, or to avoid them entirely by using synonyms. This helps avoid the generation of excessively graphic or disturbing images.

3. **Customer Interaction**

Users now have additional interactions beyond asking questions. They can change their profile pictures, switch themes, and customize the input theme.
Limitation: Users cannot play with voice commands, and there are no other options available.
Future Work: We plan to introduce voice recognition for text input, or even voice commands for gameplay. Additionally, we aim to expand game selection to include puzzles or board games.

Business Model and Monetization

1. Value Propositions

Cognitive Enhancement: Jimo is designed to challenge the brain and improve memory, problem-solving, and critical thinking skills.
Socialization: Multiplayer features enable social interaction and build user community.
Unlimited Stories: Generate customizable scenarios to keep the game fresh and engaging.

2. Customer Segments

B2C (Direct to Consumer): Individual consumers, their demographics, gaming preferences, and the app meets their needs for cognitive and social engagement.
B2B (Business to Business): Jimo serves as a tool for cognitive training institutions and corporate training programs.

3. Channels

Online Platforms: app listing, visibility, and user acquisition on Google Play and Apple Store.
Partner Networks: Partnerships with cognitive training platforms and corporate training firms.
Social Media and Content Marketing: Content marketing strategies, social media plans, and channels drive user engagement and retention.

4. Customer Relationships (Strategic Account Management): manage B2B relationships, customer support, and retention strategies.

5. Revenue Streams

Subscription Model: pricing tiers, benefits at each level, and how to drive recurring revenue.
Licensing Fees: potential partnerships and structures for licensing the game or its AI technology.
In-App Purchases: types of in-app purchases available and their contribution to revenue.

6. Key Resources

AI Technology: how AI technology powers the game, how it works to create unlimited stories.
Development Team: profile skilled game developers and designers' expertise and roles.
Marketing and Sales Team: responsible for executing marketing strategies and driving sales.

7. Key Activities

Game Design and Development: processes of designing, developing, and updating the game.
User Testing and Feedback: how user feedback is collected and used to improve the game.
Marketing and Promotion: promotional and advertising campaigns, user acquisition strategies.

8. Key Partners
AI Development Companies: partnerships with AI tech providers or development companies.
Cognitive Training Institutions: institution collaborations for content validation and credibility.
Corporate Training Firms: strategic alliances for corporate training programs using the game.

9. Cost Structure
Development Costs: Break down costs of salaries, technology, and tools.
Operational Costs: Detail ongoing costs of hosting, customer support, and operational expenses.
Marketing Costs: Present marketing budget for advertising, promotions, and content creation.

Monetization

The model is structured to maximize profitability while providing value to users. The game app's financial sustainability is built on three primary revenue streams:

1. Cost Per Click (CPC) Advertising

- Model: Revenue is generated when each user clicks on advertisements displayed in app.
- Implementation: Partner with advertising networks to serve targeted ads to users, leveraging user data to increase ad relevance and click-through rates.
- User Experience: Balance ad placement and frequency to ensure a non-intrusive gaming experience, considering premium ad-free subscriptions for users.
- Optimization: Utilize A/B testing to determine the most effective ad types, placements, and timing to maximize click-through and conversion rates without compromising user engagement.

2. In-App Purchases

- Model: purchase virtual items, additional levels, special abilities, or cosmetic upgrades.
- Product Offering: Develop a variety of in-app purchase options that enhance the gameplay experience without giving pay-to-win advantages.
- Pricing Strategy: Implement a tiered pricing strategy, encouraging incremental spending.
- Promotions: Regularly offer discounts, bundles, and limited-time offers to incentivize purchases and boost revenue.

3. API Service

- Model: Monetize the app's AI technology by offering service (API) to third-party developers or content creators.
- B2B Focus: Target developers of educational apps, cognitive training platforms, and other gaming studios that could benefit from the app's AI.
- Licensing: Create flexible licensing options, including subscription-based access and pay-as-you-go models.
- API Documentation: Provide comprehensive documentation, developer support, and easy-to-use SDKs to encourage adoption of the API.

Cost-Benefit Analysis

- Advertising: Evaluate the cost of sales and marketing efforts against the revenue generated from CPC advertising.
- In-App Purchases: Analyze the cost of creating and maintaining additional content against the revenue from user purchases.
- API Service: Assess the development and maintenance costs of the API against the revenue from licensing deals and API usage.

Financial Projections

- Forecasting: Project revenues based on user acquisition rates, engagement metrics, and market trends.
- Break-Even Analysis: Calculate the break-even point for each revenue stream.
- ROI: Estimate the return on investment for marketing campaigns and development costs associated with each revenue stream.

Market Strategy

- CPC Advertising: Develop relationships with reputable ad networks and platforms. Create user profiles for targeted advertising.
- In-app purchases: Leverage in-game analytics to understand user spending behavior and preferences.
- API Service: Market the API at developer conferences, in industry publications, and through online developer communities.

Societal and Ethical Implications

Our situational puzzle game app offers a collection of brain-teaser puzzles designed to provide a unique and entertaining cognitive challenge. The app is intended for use as a conversation starter in dating scenarios and as an engaging activity in social settings such as parties.

Social Impact–

Cognitive Enhancement: The brain-teasers are intended to stimulate lateral thinking and problem-solving skills, offering an alternative form of intellectual engagement.

Social Connectivity: By serving as an icebreaker, the game has the potential to facilitate new social connections and enhance interpersonal communication.

Cultural Integration: The app can act as a bridge across cultures by providing universal challenges that transcend cultural barriers, promoting cross-cultural understanding.

Ethical Considerations–

Content Sensitivity: We are implementing stricter screening processes to ensure that our puzzles are culturally sensitive and do not perpetuate stereotypes based on race, nationality, or gender.

Fair Representation: We are committed to including wide perspectives and backgrounds in our puzzles to reflect the diversity of our user base and foster a sense of inclusion.

Responsible Marketing: Any promotional material related to the app will be crafted to avoid misleading representations and will maintain integrity in its portrayal of the product.

Privacy and Data Ethics: The app will adhere to stringent data protection protocols, ensuring that user privacy is respected and data collection is transparent and ethical.

Individual Contributions

Chia-Yi (Cheryl) Hsiao	Presentation, business model, target customer perspective, Dall-E Image generations, slide structure, project proposal document, business problem.
Meghana Remala	Conceptualisation, business problem, market analysis, business model canvas, presentation, built Monty Hall puzzle game, chatbot to query document (not included in final ppt.)
Shreya Rewadkar	Presentation, business model canvas, monetization, market analysis, future feature enhancements, end user perspective, Dall-E image generations.
Kevin Ren	Presentation: revenue model. Demo: story data collection; icon feature, provide icon pictures. Report: limitations and future work, societal and ethical implications.
Linchuan (Eric) Yang	Live demo presenting, Web frame developing, API implementing, Demo video presting and editing.
Janine Lu	Future feature enhancements, GenAI technologies, presentation, app testing, technical aspects & technology, evaluation/results, and technical report editing.

GitHub Link https://github.com/ylceric/Situation-Puzzle-GenAI

App Entrance https://bit.ly/s-puzzle