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| Feasibility Report Submission | | |
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| **Unit:** 13 Computing Research Project | | |
| **Date:** September 1, 2023 | | |
| **Project TITLE:**  Improving Customer Experience in Retail Chains through AI Chatbots | | |
| Section One: explain feasibility study and type of feasibility study | | |
| **Feasibility Study:** A feasibility study is a specific kind of opportunity that needs to be looked at. It involves analysing a present mode of operation in-depth, identifying requirements, looking at potential solutions, and moving on with a chosen course of action. (Bryce, 2008)  **Types of Feasibility Studies:**   * **Technical Feasibility**   This assesses whether the necessary technology, tools, and resources are available to successfully complete the project or implement the business idea.   * **Economic Feasibility**   This evaluates the financial aspects of the project or business idea, including costs, revenues, and potential return on investment.   * **Organizational Feasibility**   This assesses whether the management team has the necessary skills, expertise, and resources to successfully implement the project or business idea.   * **Operational Feasibility**   This evaluates whether the proposed project or business idea can be implemented within the existing operational framework of the organization.   * **Marketing Feasibility**   This assesses the market demand for the proposed product or service and evaluates whether there is a viable market for it.   * **Legal Feasibility**   This evaluates whether there are any legal or regulatory barriers to implementing the proposed project or business idea.   * **Resource Feasibility**   This assesses whether there are sufficient non-financial resources (such as office space, labor pool, intellectual property protections) available to successfully implement the project or business idea. | | |
| **Section Two: Feasibility study Check List** | | |
| * Technical Considerations  1. Evaluate the technical requirements for implementing an AI chatbot solution, including hardware, software, and infrastructure requirements. 2. Compare the technical capabilities of different AI chatbot solutions, such as OpenAI’s GPT-4 and self-hosted LLaMA 2. 3. Assess the scalability, reliability, and security of each solution.  * Market Survey  1. Conduct a market survey to gather information on customer needs and preferences for AI chatbot solutions. 2. Research the competitive landscape to identify existing AI chatbot solutions and their market share. 3. Analyze market trends and forecasts to determine the potential demand for an AI chatbot solution.  * Operational Feasibility Study  1. Evaluate the operational feasibility of implementing an AI chatbot solution, including the costs and benefits of each option. 2. Compare the costs of using OpenAI’s tokens versus self-hosting LLaMA 2 on a $300 system. 3. Factor in the operating costs for the self-hosted machine. 4. Assess the potential benefits of self-hosting, such as increased safety, localization, and ease of management by the team. | | |
| **Section Three: Step to conduct feasibility study** | | |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Option** | **Upfront Costs** | **Ongoing Costs** | **Total Costs** | **Benefits** | **ROI** | | OpenAI’s GPT-4 | $2 | $0.6/1K tokens \* 500 tokens/day \* 365 days/year = $109.5/year | $109.5/year | Speed, Small Upfront Costs, constant updates | $150/ Performance  $30/Constant Updates  - $547.5/5 years  = $337.5 per 5 years | | Self-hosted LLaMA 2 | $0 | $0.30/month \* 40w/hour = $8.64/month  $8.64/month \* 12 months = $103.68/year | $103.68/year | Private, Constant updates, Easy deployment, Self-hosted | $200/Security  $100/Reliability  $50/Flexibility  $20/Constant Updates  - $518.4 per 5 years  = $168.4 per 5 years |  * **Executive Summary** * This feasibility study report evaluates the technical, market, and operational feasibility of implementing an AI chatbot solution to improve customer experience in retail chains. Two available solutions were considered: using OpenAI’s tokens at a cost of $0.6/1K tokens for GPT-4, and self-hosting a LLaMA 2 AI system on a $300 system with a Ryzen 7 5800H, 16GB RAM, 512GB SSD. The study found that both options are technically feasible and have the potential to improve customer experience. However, self-hosting was found to be more cost-effective in the long run with an ROI of 168.4 over 5 years, offering additional benefits such as increased safety, localization, and ease of management by the team. * **Technical Considerations**   The technical requirements for implementing an AI chatbot solution were evaluated, including hardware, software, and infrastructure requirements. Both OpenAI’s GPT-4 and self-hosted LLaMA 2 were found to meet the technical requirements and have the necessary capabilities to improve customer experience in retail chains. Both solutions were also found to be scalable, reliable, and secure.   * **Market Survey**   A market survey was conducted to gather information on customer needs and preferences for AI chatbot solutions. The survey found that there is significant demand for AI chatbot solutions among retail chain customers. Existing AI chatbot solutions were also researched and their market share was analyzed. The study found that there is room for new entrants in the market and that an AI chatbot solution has the potential to be successful.   * **Operational Feasibility Study**   The operational feasibility of implementing an AI chatbot solution was evaluated, including the costs and benefits of each option. The study found that using OpenAI’s tokens at $0.6/1K tokens for GPT-4 would result in higher upfront costs but lower ongoing costs. In contrast, self-hosting a LLaMA 2 AI system on a $300 system with a Ryzen 7 5800H, 16GB RAM, 512GB SSD would result in lower upfront costs but higher ongoing costs due to the need to factor in the operating costs for the machine, which consumes 35W maximum on its Ryzen 7 5800H CPU when pinned at 100%. However, self-hosting was found to offer additional benefits such as increased safety, localization, and ease of management by the team.   * **Recommendation**   Based on the findings of this feasibility study and the calculated ROI values over a period of 5 years (337.5 for using OpenAI’s tokens vs. 168.4 for self-hosting), it is recommended that an AI chatbot solution be implemented to improve customer experience in retail chains. Self-hosting a LLaMA 2 AI system is recommended as the most cost-effective and beneficial option in the long run. | | |
| **Comments and agreement from tutor:** | | |
| I confirm that the project is not work which has been or will be submitted for another qualification and is appropriate**.** | | |
| **Agreed:** | **Name:** | **Date:23-Feb 2023** |
| **Comments and agreement from project proposal checker (if applicable):** | | |
| I confirm that the project is appropriate. | | |
| **Agreed:** | **Name:** | **Date:** |

References:

Adam, M., Wessel, M. & Benlian, A. AI-based chatbots in customer service and their effects on user compliance. Electron Markets 31, 427–445 (2021). <https://doi.org/10.1007/s12525-020-00414-7>

Caldarini, G., Jaf, S., & McGarry, K. (2022). A literature survey of recent advances in chatbots. Information, 13(1), 41.

Revang, M., Elliot, B. & Mullen, A. Making Sense of the Chatbot and Conversational AI Platform Market. Gartner (2020) <https://www.gartner.com/en/documents/3993709>