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**MASTER OF SCIENCE IN MANAGEMENT AND SYSTEMS**

**Applied Project Capstone**

**MASY GC- 4100**

**MEMORANDUM**

TO: Dr. Andres Fortino

FROM: Xiaoyun Bian

DATE: 02/21/2024

RE: **Project Requirements Specification**

**Robot Replaceability Radar: Revolutionizing Task Automation Analysis with**

**LLMs**

**Project Goal**

Develop a tool leveraging Large Language Models (LLMs) to assess and predict the automation potential of various job tasks using the O\*NET database, aiming to enhance business reengineering and strategic automation decision-making.

**Project Objectives**

* Object 1 – Develop a comprehensive functional specification for the LLM-based tool and confirm the excepted function with the client. (Due: 02/22/2024)
  + Measurement: Client approval of the functional specification with all requirements met and a satisfaction score of at least 4 out of 5.

* Object 2 – Finalize a tool using LLMs for accurately assessing task automation potential based on O\*NET data. (Due: 03/14/2024)
  + Measurement: Achieve an accuracy rate exceeding 90% in identifying automatable tasks, as verified by client acceptance.

* Object 3 – Conduct an A/B technology trial to empirically validate the tool's effectiveness and efficiency. (Due: 04/04/2024)
  + Measurement: Success indicated by a 20% reduction in analysis time and client’s acceptance in trial feedback.

* Object 4 – Produce comprehensive documentation for replicating the tool, highlighting its development process and use cases. (Due: 04/25/2024)
  + Measurement: Client approval of the documentation quality and detail, and external users’ ability to replicate the tool.

**Requirements Specifications**

Based on the project proposal provided, here is a set of functional requirements specifications for the "Robot Replaceability Radar: Revolutionizing Task Automation Analysis with LLMs" project:

1. User Registration and Authentication:

- Secure registration with email verification.

- Login with multi-factor authentication.

1. Job Description Analysis Interface:

- Text input for job descriptions with support for various formats (PDF, DOCX, plain text).

1. LLM Analysis Engine:

- Utilize LLMs to interpret and analyze job descriptions for automation potential.

1. Report Generation:

- Generate automation potential score, analysis commentary, and graphical representations.

1. O\*NET Database Integration:

- Real-time sync with the O\*NET database for accurate job and task information.

1. Feedback Mechanism:

- Feature for users to rate the accuracy of the report and submit suggestions for improvement.

1. User Dashboard:

- Personalized dashboard displaying historical analyses, saved job descriptions, and reports.

1. Security Measures:

- Implement end-to-end encryption for data in transit and at rest, with regular security audits.

The project's success will be measured by the ability to deliver these features effectively, user satisfaction. For the development of the " Robot Replaceability Radar: Revolutionizing Task Automation Analysis with LLMs " project, the following tools, techniques, and development platform considerations are proposed:

1. **Cloud Platform:** Use Google Cloud for hosting the application to ensure scalability and high availability.
2. **Programming Languages:** Python for backend development, due to its extensive libraries for machine learning and natural language processing. JavaScript for the frontend to create a responsive web application.
3. **Machine Learning Frameworks**: TensorFlow or PyTorch for developing the LLMs, with consideration for model optimization techniques.
4. **Database:** Oracle SQL database for storing user data, feedback, and job description analyses securely.
5. **Version Control:** Git for source code management, with GitHub or GitLab as the repository hosting service.
6. **Testing:** Unit testing with pytest for Python, Jest for JavaScript, and Selenium for end-to-end testing.
7. **Documentation:** Use Swagger for API documentation and Confluence for project documentation, ensuring clear communication among developers and stakeholders.
8. **Development Methodology:** Agile methodology will be adopted to allow for iterative development and continuous integration of user feedback.

**Use Case**

**Persona:** Alex, a Business Process Engineer at a manufacturing company, is tasked with identifying processes that can be automated to improve efficiency and reduce costs.

**Anecdote:** Alex receives a new project aimed at reengineering the assembly line. The challenge is to pinpoint which tasks are most suitable for automation without disrupting production quality. Alex turns to the "Robot Replaceability Radar" for help.

**Scenario:**

1. **Login:** Alex logs into the system using secure credentials.
2. **Submit Job Description:** Alex uploads the job descriptions for assembly line positions in PDF format.
3. **Analysis:** The system, utilizing its LLM analysis engine, processes the descriptions and compares them against the O\*NET database.
4. **Review Report:** Alex receives a detailed report for each position, showcasing tasks with high automation potential and suggesting types of robots or AI systems that could perform these tasks.
5. **Feedback Submission:** Impressed with the insights but noticing a potential improvement in the system's understanding of a specific task, Alex submits feedback through the system.
6. **Decision Making:** With the reports, Alex can propose a phased automation plan that minimizes disruption and maximizes ROI, presenting the findings to the management team.

**Documentation of LLM Prompts**

1. please read the document of the functional requirements for the project, following the requirements and learn the structure and examples in the document.
2. right, follow these requirements and learn the example here, there are 4 parts and then I will give you my project proposal.
3. right, follow the structure and write a functional requirement doc for my project: "Robot replaceability radar: revolutionizing task automation analysis with LLMs", here is my project proposal.
4. revise: follow the structure, there are 4 parts (project goal, project objectives, requirements specifications, use case)
5. enrich the third part, there should be two parts here, functional requirements specifications and tools, techniques, and development platform considerations. follow the example document to write.
6. about the fourth part: include persona, anecdote and be more detailed.