

**MASTER OF SCIENCE IN MANAGEMENT AND SYSTEMS**

**Applied Project Capstone**

**MASY GC- 4100**

**MEMORANDUM**

TO: Dr. Andres Fortino

FROM: Xiaoyun Bian

DATE: [2024/2/5]

RE: **Assignment 1B– Final Project Proposal**

**Robot Replaceability Radar**

Revolutionizing Task Automation Analysis with LLMs

By

Xiaoyun Bian

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Spring 2024

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# Client Information

Company Name**:**

NYU SPS: The Digital Forge

NYU School of Professional Studies and the Management and Systems program (MASY), is a New York-based learning institution.

## Location:

NYU School of Professional Studies, 12 West 43rd Street

New York, NY

## Project Sponsor:

Dr. Andres Fortino, Business owner

Clinical Associate Professor, NYU (<https://www.linkedin.com/in/afortino>)

## Sponsor’s Location:

Dr. Andres Fortino ([agf249@nyu.edu](mailto:agf249@nyu.edu)) can be reached over virtual conference calls as project requirements.

## Business Description:

New York University (NYU) is a private research university based in New York City. The MASY degree is based on a unique curriculum that provides students with experiential learning opportunities to develop strong management and leadership skills and gain a comprehensive knowledge of current information technologies.

# Project Information

## Project Goal:

The overarching goal of this project is to address the pressing business need for strategic automation by developing a sophisticated tool that leverages Large Language Models (LLMs) to analyze and assess the potential for automating various job tasks. With the rapid advancements in artificial intelligence and robotics, businesses are increasingly looking for ways to enhance efficiency and reduce costs by automating repetitive and predictable tasks. However, the challenge lies in accurately identifying which tasks are suitable for automation without compromising quality or increasing risk. By utilizing the comprehensive O\*NET database, this tool aims to provide business reengineering analysts with precise, data-driven insights into the automation potential of specific job tasks. This project not only seeks to streamline the decision-making process for businesses considering automation but also aims to contribute to the broader understanding of how AI can be effectively integrated into the workforce. The successful development and implementation of this tool will mark a significant step forward in the field of job automation, offering a blueprint for future innovations in this area.

## Projected business benefit of the project:

The project promises significant business benefits, poised to transform the landscape of organizational efficiency and strategy. By enabling a precise assessment of automation potential, it supports strategic business reengineering, thus facilitating enhanced decision-making. It also offers a pathway to substantial cost reduction by identifying opportunities for automation that decrease labor expenses and bolster operational efficiency. Early recognition of such opportunities grants companies a competitive advantage, allowing them to stay ahead in the market. Furthermore, it serves as a risk management tool by pinpointing areas where automation may be unsuitable, thereby averting costly missteps. Lastly, the project champions innovation by encouraging the uptake of new technologies, thereby nurturing a culture primed for continuous improvement and future-facing development.

## Project Brief description:

This project seeks to refine and complete a cutting-edge tool designed to evaluate the feasibility of automating specific human tasks within various job roles, utilizing the comprehensive O\*NET database from the Bureau of Labor Statistics as its foundational dataset.

In pursuit of this goal, the project will involve the development and refinement of a prototype tool, followed by an A/B technology trial to empirically test its efficacy. Documentation will be a key component, offering a detailed blueprint for replicating the tool using LLM technology and highlighting practical applications through case studies. This comprehensive approach not only aims to validate the tool's effectiveness but also to foster its adoption across various business sectors. The culmination of these efforts will be a detailed report, poised for submission as a conference paper, that encapsulates the project's findings, methodologies, and the broader implications for job automation and business process optimization.

## Relationship to the client:

I am a NYU SPS student, and Dr. Andres Fortino is my instructor of Applied Project class in Spring 2024.

(The Client’s relationship with the Project Manager will be that of an independent contractor, and nothing in this sponsorship is intended to or should be construed to, create a partnership, agency, joint venture, or employment relationship)

## Project objectives and Metrics for measuring project success (2/8/2024-5/2/2024)

* 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.

## My role in the project:

* **Project Manager:** I will oversee the entire project lifecycle, from planning and development to execution and evaluation. This includes setting goals, timelines, and ensuring all project milestones are met efficiently.
* **Data Analyst:** I will be responsible for integrating the O\*NET database with LLMs, analyzing data, and fine-tuning the tool to ensure accurate task automation assessments. This involves both technical expertise in data handling and an understanding of job automation principles.
* **Technical Researcher:** I will document the development process, create comprehensive user guidelines, and prepare the final report for conference submission, ensuring clarity and accessibility of information to a broad audience.

## Proposed duration:

The project will start on Feb 8nd 2024 and final version will be delivered on May 2th 2024. I expect 20 hours per week on this project. Approximately 260 hours in total.

## Resources Required:

For the successful completion of this project, a suite of specific resources is essential. Firstly, access to advanced computational resources is crucial, including a high-performance computer capable of handling Large Language Models (LLMs). This setup must be equipped with the latest software for data analysis, machine learning, and algorithm development, ensuring efficient processing and analysis of complex data sets.

Another critical resource is the comprehensive O\*NET database from the Bureau of Labor Statistics, which will provide the foundational occupational information for the project. Additionally, access to a range of technical documentation tools is required for creating clear, detailed documentation and reports. These might include software for drafting, editing, and visualizing data.

# Learning Anticipations

## Areas of study in the MS program that would be covered by the project:

1. **Project Management:** The project involves extensive planning, execution, and management, aligning with the principles and practices of project management. It requires setting clear objectives, managing timelines, allocating resources efficiently, and ensuring the project meets its goals within the set constraints.
2. **Research Process & Methodology:** This project is fundamentally a research endeavor, involving the identification of a problem, hypothesis formulation, data collection, and analysis. The use of the O\*NET database and the integration of LLMs will require a methodical approach to research, testing, and validation, embodying core principles of research methodology.
3. **Data Mining and Data Warehousing:** The project will utilize data mining techniques to extract meaningful information from the O\*NET database. It also involves the aspect of data warehousing, as it requires the organization, storage, and retrieval of large datasets for analysis and tool development.
4. **Managing Big Data:** The integration of Large Language Models in assessing job automation potential deals directly with big data management. The project will require handling, processing, and analyzing vast amounts of data efficiently, making it a practical application of managing big data principles and techniques.

## Anticipated Learning outcomes:

* Gain practical skills in project management, including planning, execution, and monitoring of complex projects.
* Develop an understanding of research methodologies, focusing on empirical studies in AI and automation.
* Acquire proficiency in data mining techniques for extracting insights from large datasets.
* Learn data warehousing practices for efficient organization, storage, and management of data.
* Enhance skills in managing big data, particularly in the context of Large Language Model integration.
* Deepen knowledge in the application of AI and robotics in business automation.
* Explore the ethical and social implications of AI and automation in the workforce.

## Anticipated Project Findings:

## Potential solutions:

1. **Advanced AI-Driven Task Analysis:** The project will explore the use of sophisticated Large Language Models to dissect and analyze job descriptions, aiming to identify tasks that are most amenable to automation.
2. **Optimization Algorithms for Automation Efficiency:** Investigation into algorithms that can determine the optimal mix of human and robotic labor for various job roles, maximizing efficiency and cost-effectiveness.
3. **Integration Strategies:** The project will delve into effective strategies for integrating AI and robotic solutions into existing business processes without disrupting workflow or productivity.

## Limitations:

1. **Data Constraints:** The effectiveness of the tool is heavily dependent on the quality and comprehensiveness of the O\*NET database. Any gaps or inaccuracies in this dataset could limit the precision of the tool's recommendations.
2. **Complexity of Human Tasks:** Certain tasks, especially those requiring high levels of creativity, emotional intelligence, or intricate manual dexterity, might be challenging to assess for automation potential accurately.
3. **Technological Limitations:** The current state of AI and robotics technology may not yet be advanced enough to automate certain complex tasks identified by the tool, limiting immediate practical application.
4. **Ethical and Social Considerations:** The project might encounter limitations in addressing the broader ethical and social implications of job automation, such as workforce displacement and the need for retraining programs.

## Proposed SPS Academic Advisor’s Name:

Paul Henkel (ph320@nyu.edu)

Expected Date of Graduation**:**

May 2024