Original Work Proposal

Introduction and Statement of Purpose

My original work will involve extensive research culminating into software that uses data analysis, programming, and artificial intelligence to optimize company operations through suggested feedback from the artificial intelligence (I intend to involve complex concepts and integrate every piece of research into a relatively advanced program) . Throughout my research up to this point I have learned of concepts like machine learning, and spoken with business owners and employees who seek to benefit from a program like this. The project called the Data-Driven Efficiency Enhancement Program (DEEP) is designed to assist companies, including UnitedHealth, in increasing efficiency in their operations through the integration of data analysis and artificial intelligence. Not only will it help businesses and those employed under them, each step of research and development done towards the final product will increase my knowledge and understanding of how to create, use and integrate artificial intelligence, data analysis, and programming. By being able to create, add and update the program through research and in-field questioning from people with real experience I will gain a clearer view on what my future in computer science will be like, and be able to decide whether or not I want to pursue a career in it at all. This will not only be beneficial to myself, but in the extensive research listed on my website those interested can follow along my thought process and hear it from an amateur's perspective.

Review of Skills and Research

There are numerous research topics that I already know that will benefit me in the completion of this work. I am adept in technology as I have used it my whole life, and for the last 2-3 years I have utilized programming language such as Java, C#, and Python meaning utilizing programming concepts into a real software application will not be as difficult as someone starting from scratch learning an entirely new programming language. Besides this my research into the topics of business, data analysis,

artificial intelligence, and computing need to be thorough and concise. Overall I need to know how to utilize data analysis and artificial intelligence to analyze company data, in order to reach this I need context. Firstly, I need to know how to identify inefficiencies in operations, processes, and resource utilization which shows itself when questioning companies or looking at their numbers and wondering how to increase or decrease them respectively. After this I need to determine how to have DEEP AI suggest data-driven feedback to increase efficiency and reduce costs. This feedback must remain data driven so there needs to be further research into enhancing decision-making through data-driven insights. To make sure the program is not so strict that only one company can use it, research into developing a customizable program that can be adapted to various industries and sectors must be made. This project was inspired after the first interview in which the Director of Regulatory Affairs at UnitedHealth adamantly spoke about how inefficient old methods of data collection are, and how while some at his work spend hours combing through legal points he spends 10x less by using a simple program. Through questioning main problems of business and utilizing connections the project is achievable.

Utilization of Higher-Level Thinking Skills

With this project, I will have to develop and use skills in researching, programming, business and understanding artificial intelligence. I need to know data collection and integration: gathering data from various sources, including internal databases, external data providers, and IoT devices. I will use my knowledge of computer science and skills in independent research as well as my resources with mentors like Bradley Shogren who have already utilized their own forms of artificial intelligence to learn how to apply statistical and machine learning techniques to analyze data and discover patterns. The project will necessitate an understanding of artificial intelligence, business practices, and programming that go beyond general knowledge and definitions honing each of the skills.

Methodology

- Research data-analysis and how to take data files and put them into the programming language
- Gather data from various sources, such as financial records, customer data, and operational metrics
- Employ statistical analysis and machine learning models to identify trends and patterns within the data
- Develop AI algorithms to predict future trends and detect anomalies.
    - Research different types
    - Consider which one suits various data best
    - Learn how to have it process the data and suggest correct outcomes
- Create a system that suggests actionable feedback based on data analysis.
- Tailor the program to meet the specific requirements of the company.
- Design a user-friendly dashboard for easy access to insights and feedback.
- Find test cases such as borrowing legal data from UnitedHealth to test with program

Materials

- Software costs may vary depending on where research leads
- Current software for coding, researching, and writing
- Research based on primary sources (Real mentors, Professionals, Companies)
- Portfolios to keep information
- Estimated Cost: ~$0 (depending on software prices if needed)

Utilization of Higher-Level Thinking Skills

Through this process, I will need to develop the programming on my own which will require independent research, utilization, and help from those familiar with the field. I will need to be able to analyze data provided through technology and know proper feedback suggestions in order to feed the right instructions to the artificial intelligence so the feedback portion is accurate. Usually I do projects like creating video games and do not document the process, simply keep the final product, but with this I will always have something to look back on if I ever need to re-learn some information. I have already learned higher-level skills like the Pareto Principle, a mathematical theory that will come in handy when developing the DEEP AI. It's important to me that this original work allows me to connect with companies and computer scientists so that I do not get a warped view of the goal. I will consider every

perspective, every piece of feedback and adjust my project accordingly without jeopardizing my learning goal.

Conclusions

The Data-Driven Efficiency Enhancement Program (DEEP) is a combination of independent research, programming, and artificial intelligence integration to create a program optimizing company operations. This project takes advantage of my proficiencies in computer science, including Java, C#, and Python. Inspired by real-world business challenges, DEEP seeks to address inefficiencies highlighted by professionals like the Director of Regulatory Affairs at UnitedHealth. I must use higher-level thinking skills, including data collection, statistical analysis, machine learning, and feedback development. Adaptability will also be necessary, as the project evolves with feedback and user testing, staying open to my mentor and companies perspectives and adjustments. The Pareto Principle, a mathematical theory, is the first of many to play a role in DEEP's development, showcasing its application in problem-solving. This project is not just about the end product; it's a continuous learning resource connecting with professionals and advancing both my social and technical knowledge and skills.