

# Project 1: Disease Diagnosis and Predictions

Assigned to: [Your Student's Name]

## Background:

Accurate disease diagnosis and proactive prediction of potential health issues are critical in ensuring timely and effective patient care. This task focuses on harnessing ChatGPT's AI capabilities to assist healthcare providers in diagnosing diseases based on patient symptoms and predicting future health conditions.

## Problem Statement:

Healthcare providers often encounter challenges in confirming diagnoses and foreseeing potential health issues. By utilizing ChatGPT's AI capabilities, this task seeks to develop a model that assists healthcare providers in diagnosing diseases based on symptoms and predicting future health conditions using historical patient data from Electronic Medical Records (EMR). The goal is to enhance diagnostic accuracy and provide proactive patient care recommendations.

## Tasks:

- Investigate the current challenges and limitations faced by healthcare providers in disease diagnosis and prediction.
- Explore the capabilities of ChatGPT in understanding and analyzing medical symptoms, patient history, and relevant medical literature.
- Develop a model that uses ChatGPT to assist healthcare providers in diagnosing diseases by analyzing patient symptoms and medical history.
- Implement a predictive model that utilizes historical patient data stored in EMR to proactively identify potential health issues and recommend preventive measures.
- Train the model on a diverse dataset of medical cases to ensure accurate diagnosis and prediction across various health conditions.
- Validate the model's performance through rigorous testing and comparisons with existing diagnostic and prediction methods.
- Document the model's development process, training methodology, and evaluation results.

## Deliverables:

- Disease diagnosis model powered by ChatGPT, capable of analyzing symptoms and medical history.
- Predictive model utilizing EMR data to forecast potential health issues.
- Performance evaluation report comparing model accuracy and effectiveness.
- Explanations and visualizations demonstrating the model's reasoning for diagnoses and predictions.

- Documentation on model development, training data, and interpretability measures.

### **Project Engineering Guidelines**

Here is a suggested research and development engineering cycle to follow:

- First do a thorough literature survey of the prior art related to the project and then shortlist the ones based on some justifiable rationale for this use case
- Understand the models at depth including mathematics so you know what is happening inside the state-of-the-art method
- Find suitable datasets or scientifically generate them for this use case
- Build a software architecture diagram including class and sequence diagrams you were taught in the OOPs
- Build you pipeline in real-time by using big data technologies if needed
- Bonus would be awarded if you did model engineering with strong mathematics background instead of just doing api calls like programmers
- Create your testing and performance evaluation metrices and then measure them to show the inner working and behavior of your models on real-world scenarios. Moreover, some notion of accuracy and effectiveness of such systems need to be established.
- Add comments in the code for documentation purpose, code with no comments will be penalized heavily.

## Project 2: Streamlining Clinical Documentation and Reducing Provider's Burden

Assigned to: [Student Name]

### Background:

Clinical documentation is a critical aspect of healthcare, but it often burdens healthcare providers with administrative tasks. By developing a system that automates clinical documentation using ChatGPT, providers can focus more on patient care. Additionally, ChatGPT can be used to summarize patient information, making it easier for providers to access key details efficiently. This task aims to alleviate the provider's burden and improve documentation accuracy.

### Problem Statement:

Develop a system using ChatGPT that automates clinical documentation, reduces the provider's burden, and summarizes patient information for quick access. The system should utilize ChatGPT's capabilities by generating accurate documentation.

### Tasks:

- Explore existing clinical documentation processes and challenges.
- Design a workflow for capturing and summarizing information.
- Integrate ChatGPT to convert audio files to text and extract relevant information.
- Develop a summarization module to extract key details from patient records.
- Implement security measures to protect patient data during transcription and summarization.
- Evaluate the accuracy of automated documentation and summarization.
- Test the system
- Create guidelines for using the automated documentation system effectively.

### Deliverables:

- Automated clinical documentation system with ChatGPT integration.
- Summarization module for extracting key information.
- Usability testing report with feedback
- Documentation on system implementation, security measures, and guidelines.

### Project Engineering Guidelines

Here is a suggested research and development engineering cycle to follow:

- First do a thorough literature survey of the prior art related to the project and then shortlist the ones based on some justifiable rationale for this use case

- Understand the models at depth including mathematics so you know what is happening inside the state-of-the-art method
- Find suitable datasets or scientifically generate them for this use case
- Build a software architecture diagram including class and sequence diagrams you were taught in the OOPs
- Build you pipeline in real-time by using big data technologies if needed
- Bonus would be awarded if you did model engineering with strong mathematics background instead of just doing api calls like programmers
- Create your testing and performance evaluation metrics and then measure them to show the inner working and behavior of your models on real-world scenarios. Moreover, some notion of accuracy and effectiveness of such systems need to be established.
- Add comments in the code for documentation purpose, code with no comments will be penalized heavily.

## Project 3: Prior Authorization requests and Insurance Letters

Assigned to: [Student's Name]

### Background:

Requesting prior authorization and writing insurance letters for medical procedures can be time-consuming and should be error-prone. By utilizing ChatGPT, healthcare providers and billers can automate the process, ensuring compliance with insurance requirements and reducing administrative burden. This task aims to develop a solution that streamlines the generation of prior authorization request and framing insurance letters, minimizing time.

### Problem Statement:

Develop a solution using ChatGPT to streamline the process of generating prior authorization requests and writing insurance letters for medical procedures. The goal is to reduce administrative burden and ensure compliance with insurance requirements.

### Tasks:

- Research the process of generating prior authorization request and insurance letters.
- Identify key components and requirements for accurate letters.
- Integrate ChatGPT to generate letters based on input from healthcare providers.
- Implement a validation mechanism to ensure compliance with insurance guidelines.
- Test the generated letters with different insurance companies for compatibility.
- Gather feedback from billing specialists and providers on the effectiveness of the solution.
- Develop guidelines for providers and billers on using the ChatGPT-powered solution.

### Deliverables:

- Solution for generating prior authorization request and insurance letters using ChatGPT.
- Validation mechanism to ensure compliance with insurance requirements.
- Feedback report from billing specialists and providers.
- Guidelines for using the solution effectively.

### Project Engineering Guidelines

Here is a suggested research and development engineering cycle to follow:

- First do a thorough literature survey of the prior art related to the project and then shortlist the ones based on some justifiable rationale for this use case
- Understand the models at depth including mathematics so you know what is happening inside the state-of-the-art method
- Find suitable datasets or scientifically generate them for this use case

- Build a software architecture diagram including class and sequence diagrams you were taught in the OOPs
- Build your pipeline in real-time by using big data technologies if needed
- Bonus would be awarded if you did model engineering with strong mathematics background instead of just doing api calls like programmers
- Create your testing and performance evaluation metrics and then measure them to show the inner working and behavior of your models on real-world scenarios. Moreover, some notion of accuracy and effectiveness of such systems need to be established.
- Add comments in the code for documentation purpose, code with no comments will be penalized heavily.

## Project 4: Claim Management with ChatGPT Assistance

Assigned to: [Student's Name]

### Background:

Managing insurance claims and ensuring compliance with coding requirements is crucial for healthcare providers and billers. ChatGPT can assist in reviewing claim forms, identifying errors, and suggesting appropriate claim codes. By developing a system that integrates ChatGPT for claim management, this task aims to streamline the process, reduce errors, and expedite claim submissions.

### Problem Statement:

Develop a system that utilizes ChatGPT to assist healthcare providers and billers in claim management by reviewing and suggesting improvements to claim forms. The aim is to reduce errors, increase claim acceptance rates, and expedite the claim submission process.

### Tasks:

- Research the common challenges and errors in claim management processes.
- Design a system that integrates ChatGPT to review and improve claim forms.
- Develop a claim review module that identifies potential errors and inconsistencies.
- Implement a suggestion mechanism to recommend appropriate claim codes.
- Explore integration with medical coding databases (ICD-10, CPT) for code suggestions.
- Test the claim review system with different types of claims and evaluate its effectiveness.
- Gather feedback from billers and providers on the accuracy of claim suggestions.
- Create guidelines for utilizing the system to enhance claim management.

### Deliverables:

- Claim review system with ChatGPT integration.
- Claim code suggestion mechanism.
- Testing report with feedback from billers and providers.
- Guidelines for effective use of the claim review system.

### Project Engineering Guidelines

Here is a suggested research and development engineering cycle to follow:

- First do a thorough literature survey of the prior art related to the project and then shortlist the ones based on some justifiable rationale for this use case

- Understand the models at depth including mathematics so you know what is happening inside the state-of-the-art method
- Find suitable datasets or scientifically generate them for this use case
- Build a software architecture diagram including class and sequence diagrams you were taught in the OOPs
- Build your pipeline in real-time by using big data technologies if needed
- Bonus would be awarded if you did model engineering with strong mathematics background instead of just doing api calls like programmers
- Create your testing and performance evaluation metrics and then measure them to show the inner working and behavior of your models on real-world scenarios. Moreover, some notion of accuracy and effectiveness of such systems need to be established.
- Add comments in the code for documentation purpose, code with no comments will be penalized heavily.



## Project 5 Appointment Scheduling and Reminders

Assigned to: [Student Name]

### Background:

Efficient appointment scheduling and reminders play a vital role in patient care. By integrating ChatGPT into a scheduling and reminder system, healthcare providers can automate appointment booking, cancellations, and reminders. This task focuses on utilizing ChatGPT's capabilities to provide patient/FDO with convenience.

### Problem Statement:

Develop an appointment scheduling and reminder system powered by ChatGPT to enhance patient-provider interactions and automate scheduling processes. The system should facilitate convenient appointment booking, cancellations, and reminders. This project uses NLP capabilities of ChatGPT.

### Tasks:

- Research existing appointment scheduling and reminder systems.
- Design a user-friendly interface that integrates ChatGPT for scheduling and reminders.
- Develop using NLP for a scheduling module that checks provider availability and offers suitable slots.
- Test the system with patients to gather feedback on usability and convenience.
- Document the system's integration process and usability testing results.

### Deliverables:

- Appointment scheduling and reminder system with ChatGPT integration.
- User interface design for patient interaction.
- Usability testing report with patient feedback.
- Documentation on integration and user guidelines.

### Project Engineering Guidelines

Here is a suggested research and development engineering cycle to follow:

- First do a thorough literature survey of the prior art related to the project and then shortlist the ones based on some justifiable rationale for this use case
- Understand the models at depth including mathematics so you know what is happening inside the state-of-the-art method
- Find suitable datasets or scientifically generate them for this use case
- Build a software architecture diagram including class and sequence diagrams you were taught in the OOPs
- Build you pipeline in real-time by using big data technologies if needed

- Bonus would be awarded if you did model engineering with strong mathematics background instead of just doing api calls like programmers
- Create your testing and performance evaluation metrics and then measure them to show the inner working and behavior of your models on real-world scenarios. Moreover, some notion of accuracy and effectiveness of such systems need to be established.
- Add comments in the code for documentation purpose, code with no comments will be penalized heavily.

## Project 6: AI-Enhanced Patient Education Module

Assigned to: [Student's Name]

### Background:

It is really important for patients to learn about their health. The modern Electronic Medical Records (EMRs) have an education module so that the providers can educate their patients better. ChatGPT, with its smart abilities, can contribute in improving the module. Developing an AI-enhanced patient education module can help reduce the efforts that the provider puts in finding the relevant material for educating their patients. Adding to this, ChatGPT can be really helpful suggesting the most relevant education material that best fits the scenario.

### Problem Statement:

The objective of this project is to create an AI-driven patient education module that utilizes ChatGPT to formulate personalized goals, nutrition plans, and recommendations for patients with specific health issues such as obesity, hypertension, and others. The module aims to provide explanations that help patients understand the rationale behind the generated recommendations, enabling them to make informed decisions about their health.

### Tasks:

- Conduct an extensive literature review of models and tools relevant to the medical domain, focusing on systems that cater to patient education and behavior change.
- Develop a deep understanding of the selected models
- Identify or generate appropriate datasets that encompass medical conditions, dietary preferences, and treatment outcomes.
- Design a software architecture diagram for the patient education module, incorporating class diagrams and sequence diagrams to showcase the flow of information and interactions.
- Integrate and test the system on multiple scenarios
- Document the system's integration process and usability testing results.

### Deliverables:

- In-depth overview of different model approaches relevant to the AI-driven patient education module.
- Patient education module with integrated techniques for generating explainable goals, nutrition plans, and recommendations.
- Insights into the reliability and truthfulness of the explanations generated by the module, accompanied by recommendations for optimization.

## **Project Engineering Guidelines**

Here is a suggested research and development engineering cycle to follow:

- First do a thorough literature survey of the prior art related to the project and then shortlist the ones based on some justifiable rationale for this use case
- Understand the models at depth including mathematics so you know what is happening inside the state-of-the-art method
- Find suitable datasets or scientifically generate them for this use case
- Build a software architecture diagram including class and sequence diagrams you were taught in the OOPs
- Build you pipeline in real-time by using big data technologies if needed
- Bonus would be awarded if you did model engineering with strong mathematics background instead of just doing api calls like programmers
- Create your testing and performance evaluation metrices and then measure them to show the inner working and behavior of your models on real-world scenarios. Moreover, some notion of accuracy and effectiveness of such systems need to be established.
- Add comments in the code for documentation purpose, code with no comments will be penalized heavily.

## Project 7: Brainy Games

Brainy Games project on which Magfoor is working. He should handover the complete code to them. Each group of 2 will work on it. They will understand the existing code and then convert it into OOPs architecture and launch it as a web application on CMD website.

Each pair within the group will collaborate on Brainy games project. Their objective will be to understand the current codebase and subsequently restructure it into an Object-Oriented Programming (OOP) architecture. Eventually, they will deploy it as a web application on the CMD website.