

INFO 698 - Capstone Project

VIP - AI in Medical Interviewing

Project proposal & Statement of Work

Robert Delfs, Project Manager

Team Members

Jasdeep Singh Jhaji

Shashwat Singh

Advisor:

Dr. Allan Hamilton

Date: 04-04-2025

Version	Summary of Changes	Date
<i>1</i>	<i>Created a Rough Draft of All Sections</i>	<i>4/1/25</i>
<i>1.1</i>	<i>Added Advisor requirements</i>	<i>4/1/25</i>
<i>1.2</i>	<i>First draft of all sections completed</i>	<i>4/1/25</i>
<i>2</i>	<i>Added Executive Summary and User/Market Research</i>	<i>4/2/25</i>
<i>2.1</i>	<i>Added Sections 3-7</i>	<i>4/2/25</i>
<i>2.2</i>	<i>Reviewed and finalized section content</i>	<i>4/3/25</i>
<i>3</i>	<i>Version submitted for signatures</i>	<i>4/4/25</i>

Table 1. Revision History Table

Contents

1. Executive Summary	4
2. User/Market research	5
3. Product Features	8
Feature 1: Medical Case Creator (MCC) with Reusability	8
Feature 2: AI-Assisted Case Generation	8
Feature 3: Integration of Future Modules via APIs	9
Feature 4: Lock/Unlock AI Generated fields	9
4. Project Timeline & Gantt Chart	10
5. Ethics	12
6. Approvals	15
7. Appendix	16
A. Advisor Engagement	16
1) Project Team Responsibilities	16
2) Faculty Advisor Responsibilities	16
B. Ground Rules	17

1. Executive Summary

This section was written by: Shashwat Singh

Our project, *AI in Medical Interviewing*, is a responsive, web-based application that leverages OpenAI's GPT-based large language models to simulate realistic patient-provider interactions. Designed to assist healthcare professionals and trainees, the tool focuses on improving diagnostic reasoning, communication skills, and empathy through dynamic, scenario-based interviews. It transforms traditional interview training into a flexible, interactive platform that offers intelligent suggestions, real-time dialogue generation, and tailored user feedback, while ensuring scalability and easy accessibility.

The need for AI-assisted clinical interviewing stems from the growing emphasis on communication and soft skills within medical education, including at our own institution. Traditional training tools are often rigid, time-consuming, or limited in availability outside structured classroom settings. This project addresses those gaps by simulating lifelike patient-provider interactions and offering immediate, AI-driven feedback, enhancing both learning outcomes and accessibility. While the broader goal is to support healthcare professionals in general, our current focus is on creating a resource tailored to the needs of students and faculty at the University of Arizona. What makes our approach distinctive is its adaptability to various medical scenarios, seamless integration of feedback analytics, and an intuitive onboarding experience for users.

We are working on a modular, web-based project that brings together key features from various vertical teams—including the Medical Case Creator (MCC), Suture Analysis tool, and Virtual Patient simulator, with more features being added iteratively. We started with onboarding the MCC, which allows users to create customizable, downloadable, and reusable JSON-based forms that represent medical cases. To streamline this process, we implemented AI-assisted form-filling using ChatGPT's API, enabling rapid generation of structured medical content. Leveraging prompt engineering techniques, we fine-tune the interaction between users and the AI model to ensure clinical relevance, clarity, and consistency in the generated output. These templates can be uploaded, modified, or reused across cases, allowing seamless scenario design and transfer across teams. This integration of Generative AI and reusable design elements sets the foundation for scalable, case-based learning simulations that are both easy to develop and understand.

Team Member	Feature Responsibility
Jasdeep Singh Jhaji	Prompt Design, OpenAI Integration, Data Logging, User Research, Context Integration
Shashwat Singh	UI Design, OpenAI Integration, Scenario Development, Context Integration

Table 2. Team member responsibilities

2. User/Market Research

This section was written by *Jasdeep Singh Jhajj*

Overall Market

The global medical simulation market is experiencing significant growth, driven by an increasing emphasis on patient safety, the need for healthcare professionals to enhance their skills in risk-free environments, and the rising recognition of the benefits of simulation-based training.

The integration of artificial intelligence (AI) into medical education is rapidly transforming the landscape of healthcare training. To understand the potential impact and market opportunity for our project, "AI in Medical Interviewing," we have compiled key metrics that highlight the current state and projections of the medical education and simulation market:

Metric	Value
Global Medical Simulation Market Size (2024)	Estimated at USD 2.8 billion.
Projected Medical Simulation Market Size (2033)	Expected to reach USD 7.5 billion by 2033, growing at a CAGR of 11.21% from 2025 to 2033.
Number of Medical Schools Worldwide	Over 4,100 medical schools are listed in the World Directory of Medical Schools.
Medical Students Worldwide	The International Federation of Medical Students Associations (IFMSA) represents a network of more than 1.5 million medical students from 133 national member organizations in 123 countries.
Annual Healthcare AI Investment	Venture-capital investments in health AI in the U.S. alone reached \$11 billion in 2024.

Table 3: User Market Research

The integration of AI in medical education is among the fastest-growing segments in healthcare technology. For instance, virtual patient simulation, a key component of AI-driven medical training, was valued at USD 4.23 billion in 2023 and is projected to reach USD 10.31 billion by 2032, growing at a CAGR of 10.4%. This growth indicates a strong market demand for solutions like our proposed application, which aims to enhance medical interviewing skills through AI-powered simulations.

Existing Competitors

Several established platforms exist in the market for AI-driven medical case learning, virtual patient interviews, and interactive case-based learning systems. Below is a competitive analysis of key players in this space:

Competitor	Primary Features	Our Differentiation
DxR Clinician	Case-based learning system, fixed scenarios	AI-driven dynamic responses, field-level AI assistance
Shadow Health	Virtual patient interviews, standardized responses	Real-time AI generation, customizable case creation
i-Human Patients	Branching dialogue, clinical reasoning focus	Open-ended interactions, sectional AI assistance
OnlineMedEd	Video-based education with limited interactivity	Interactive case building, multi-level AI integration

Table 4: Competitor Market Comparison

Our key competitive advantages include:

- Unified dashboard interface that centralizes key tools for streamlined medical case creation and interviewing workflows
- Field-level AI assistance allowing targeted content generation
- Section-specific AI actions for customized scenario building
- Multi-table functionality that enables complex case creation
- Variable-level AI assistance for granular educational content development
- Open API integration enabling institutional customization

3. Product Features

This section was written by Shashwat Singh

The *AI in Medical Interviewing* platform is designed as a modular, extensible system that combines the work of multiple vertical teams into a cohesive application. Below are the key features we will be implementing in this project, prioritized by impact and feasibility:

Feature 1: Medical Case Creator (MCC) with Reusability

This feature enables users to design structured clinical scenarios through customizable form-based inputs and manage them as reusable templates. Each case is saved in JSON format and can be shared or iterated upon across teams and modules.

- Allows creation, upload, and download of structured case templates
- Supports fields like symptoms, history, vitals, diagnostics, etc.
- Built for modular reuse and sharing within the university setting
- Enables collaborative curriculum design and rapid editing

Feature 2: AI-Assisted Case Generation

This feature integrates ChatGPT via prompt engineering to help auto-populate the MCC forms based on minimal user input. It streamlines the workflow and allows for rapid, intelligent form generation.

- Uses natural language prompts (e.g., "special_equipment_and_supplies")
- Supports AI generation at multiple levels: field-level, table-level, and full form-level
- Context-aware generation: retains previously filled field values and uses them to influence related outputs
- Automatically fills out relevant form fields based on medical context
- Reduces manual effort and accelerates prototyping
- Provides a base layer of intelligent content that can be reviewed or edited

Feature 3: Integration of Future Modules via APIs

The platform is designed to incorporate additional intelligent modules developed by other vertical teams, such as the Suture Analysis tool and Virtual Patient simulator.

- Lays the groundwork for system-wide collaboration across VIP tracks
- Future-facing: allows plug-and-play of new intelligent modules
- Ensures scalability beyond a single feature set

Feature 4: Lock/Unlock AI-Generated Fields

This utility enables users to lock AI-generated fields that they want to preserve, even when regenerating other parts of the form.

- Allows selective field locking to maintain trusted content
- Prevents unwanted overwriting during multiple AI generations
- Ensures fine-grained control and customization for users

4. Project Timeline & Gantt Chart

This section was written by: *Jasdeep Singh Jhaji*

Project Overview

This project focuses on developing an AI-driven Medical Case Creator App to assist medical students in generating and refining clinical case scenarios. Key goals include improving AI-generated responses, ensuring consistency, and implementing content control mechanisms. The project will follow a structured timeline with defined milestones, development phases, and testing periods to ensure a functional and optimized product by the final showcase.

1.1 Major Milestones

Table 1 shows both course-mandated milestones and our project-specific milestones that will guide our development process

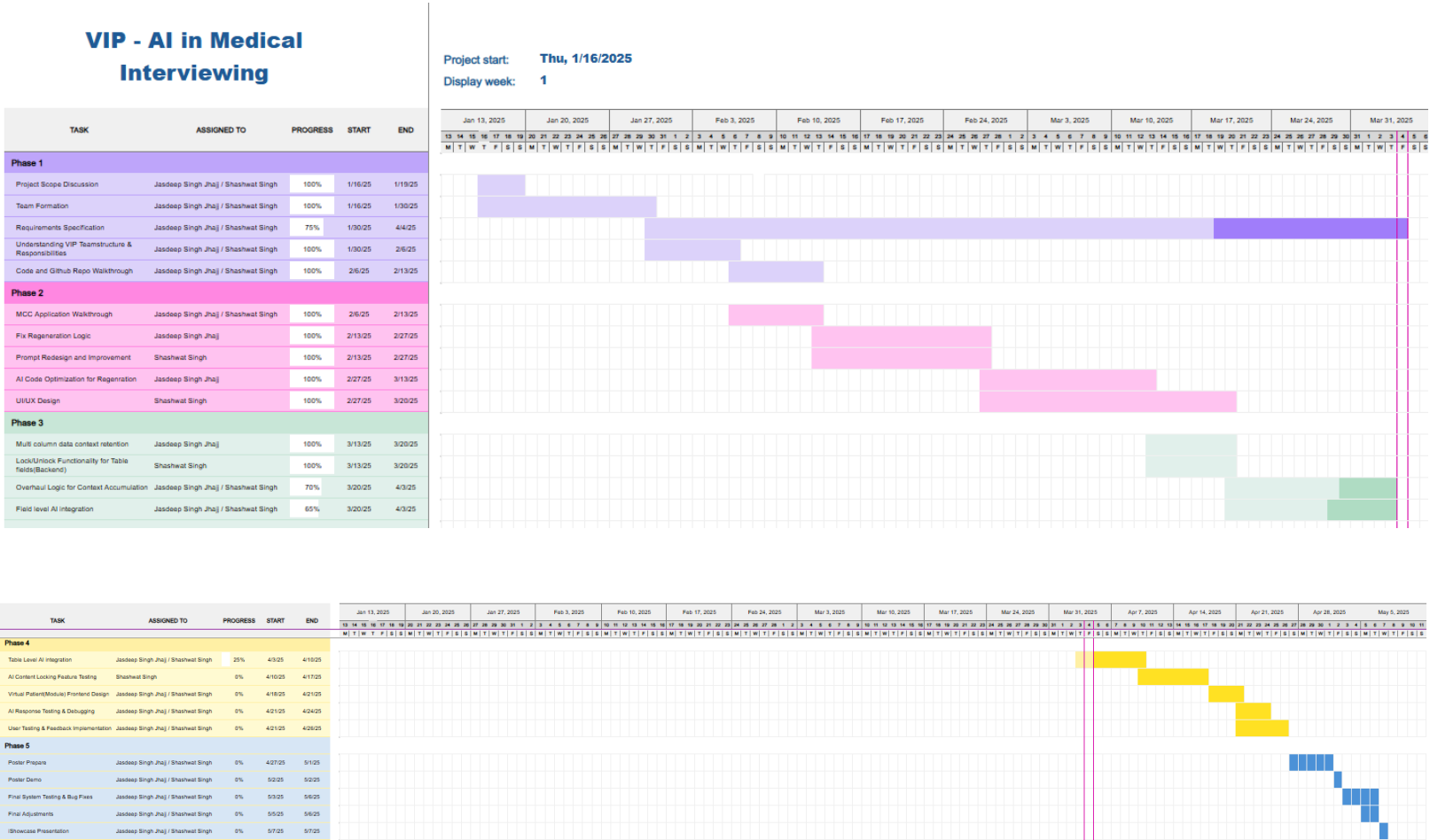
<i>Milestone</i>	<i>Date</i>
Signed Proposal Submission	04/04/2025
Project Scope Discussion	1/16/25
Team Formation	1/16/25
Requirements Specification	1/30/25
Understanding VIP Teamstructure & Responsibilities	1/30/25
Code and Github Repo Walkthrough	2/6/25
MCC Application Walkthrough	2/6/25
Fix Regeneration Logic	2/13/25
Prompt Redesign and Improvement	2/13/25
AI Code Optimization for Regeneration	2/27/25
UI/UX Design	2/27/25
Multi column data context retention	3/13/25
Lock/Unlock Functionality for Table fields(Backend)	3/13/25
Overhaul Logic for Context Accumulation	3/20/25
Field level AI integration	3/20/25
Table Level AI integration	4/3/25
AI Content Locking Feature Testing	4/10/25

Virtual Patient (Module) Frontend Design	4/18/25
AI Response Testing & Debugging	4/21/25
User Testing & Feedback Implementation	4/21/25
Poster Prepare	4/25/25
Poster Demo	5/2/25
Final System Testing & Bug Fixes	5/3/25
Final Adjustments	5/5/25
iShowcase Presentation	5/7/25

Table 5: Milestone Schedule

Gantt Chart

[Click to open](#)



5. Ethics

This section was written by: *Jasdeep Singh Jhaji*

#	Question	Generally	Data Breach
1	Could a user sell drugs or other illegal items on your platform?	N	N
2	Could a user of your platform engage in sex trafficking?	N	N
3	Could a user sell class notes or cheat on their homework on your platform?	N	N
4	Could a stalker use your project to find someone?	N	N
5	Could your app be used to spy on or track individuals?	N	N
6	Could your app/software access the camera or microphone and record things without users being aware?	N	N
7	If someone uses your platform, could they be re-traumatized or have their mental health impacted in some way?	N	M
8	Could your algorithm promote material that would traumatize or upset individuals?	N	N
9	Would your users be upset if the data you collect was given to someone else?	M	M
10	Could a data leak potentially lead to identity theft?	N	Y
11	If your site was hacked, would users of that product potentially lose their job, spouse, or family?	N	N
12	Should there be an age limitation on your product?	Y	Y

13	Could someone use your product to find, contact, and potentially commit elder abuse?	N	N
14	If the data on your platform was breached, could it be used to blackmail the users?	N	N
15	Does the existence of your project imply that a particular racial group, gender, religion or other protected category is inherently bad, gross, or unwanted?	N	N
16	Could your product be used to commit hate crimes against a specific group?	N	N
17	Does the primary content of your game or algorithm focus on something considered deeply unethical?	N	N
18	Does your game or software contain race, gender, or other stereotypes?	N	N
19	Could users of your app scam other individuals?	N	N
20	Is your particular algorithm biased towards predicting correctly only for one race, gender, or other group?	N	N
21	Are the users of your project, players of your game, or those being surveyed for your data aware of how their data will be used?	N	N
22	What are the possible misinterpretations of your results? For example - would a white supremacist or misogynist be stoked about your results if they misinterpreted it?	N	N
23	Does the use or purchase of your data potentially contribute to a dangerous group or regime?	N	N

24	Could your virtual reality environment cause injury to the user?	N	N
25	Are your study participants or game players aware that their data will be collected and used?	Y	Y
26	Does your game or app contain addictive design elements without benefit to the user?	N	N
27	Does your survey contain an aspect of compulsion or unusually large incentive, that would command users to take it even if it was to their detriment?	N	N
28	Could your research outcomes harm an individual or entity?	N	N

Table 6: Ethics

6. Approvals

This section was written by: *Shashwat Singh*

The signatures of the people below indicate an understanding of the purpose and content of this document by those signing it. By signing this document, you indicate that you approve of the proposed project outlined in this Statement of Work, the division of work, the Ground Rules and that the next steps may be taken to create a Product Specification and proceed with the project.

Approver Name	Title	Signature	Date
Jasdeep Singh Jhajj	Team Member	<i>Jasdeep Singh Jhajj</i>	04/04/2025
Shashwat Singh	Team Member	<i>Shashwat Singh</i>	04/04/2025
Robert Delfs	Project Manager	<i>Robert Delfs</i>	04/04/2025
Dr. Allan Hamilton	Advisor	<i>Allan J. Hamilton</i>	4/4/2025
Dr. Greg Chism	Instructor	Sign Here	

Table 7: Approvers

Section	Author	Word Count
Introduction	Shashwat Singh	166
Executive Summary	Shashwat Singh	367
User/Market Research	Jasdeep Singh Jhaji	460
Product Features	Shashwat Singh	327
Project Timeline and Gantt Chart	Jasdeep Singh Jhaji	407
Ethics	Jasdeep Singh Jhaji	504
Approvals	Shashwat Singh	180

Table 6: Ethics

7. Appendix

Author: *Jasdeep Singh Jhaji*

A. Advisor Engagement

1. Project Team Responsibilities

- The Project Manager will set up and facilitate a weekly call/meeting with the Faculty Advisor. The Project Team will provide weekly status updates to the Faculty Advisor including upcoming deliverables, critical issues, and any adjustments to the Project Plan.
- Documents will be provided to the Faculty Advisor with adequate time for review and signature. The time necessary for review will be agreed with the Advisor. The minimum review time will be 3 days prior to the document due date.
- Design files will be provided to the Faculty Advisor as requested in a format agreed to with the Advisor.
- Support requirements will be clearly requested from the Faculty Advisor with the dates required and an adequate time for fulfilling the request.
- Modifications requests to the Project Plan by Faculty Advisor will be reviewed and agreed to within 1 week of the request.

2. Faculty Advisor Responsibilities

- The Faculty Advisor will provide knowledge and expertise to help the group stretch their skills.
- The Faculty Advisor will participate in a weekly or bi-weekly call/meeting with the Project Team to review the project status, upcoming deliverables, priorities, issues, and progress to the agreed Project Plan.
- The Faculty Advisor will provide document review, feedback and approval, rejection, approval with contingencies with adequate time for the Project Team to meet the course due dates.
- The Faculty Advisor will provide feedback to requested support requirements from the Project Team. This includes feedback and guidance on design implementations decisions, design files, test plans, test procedures and test results.
- The Faculty Advisor shall provide technical advice and guidance to the Project Team answering inquiries approximately 1 hour per week.
- Modifications to the Project Plan by the Project Team will be resolved and documented within 1 week of the request.
- Grade the finalized project using a skill-based rubric
- Attend iShowcase in May.

B. Ground Rules

As a team and as individual team members, we agree to:

1. **Stay focused on our objectives and goals.**

Each time the team meets, we will clearly define our objectives and desired outcomes at the beginning of the meeting. We will politely remind team members if we are getting off track.

2. **“Sidebar” any issues that are relevant but not consistent with the immediate objectives.**

Occasionally, important matters are raised that are not relevant to the immediate goals of the meeting. To keep the group on track, but avoid losing the issue, create a “sidebar” where these topics can be listed and discussed later.

3. **Listen when others are speaking.**

We will listen and consider others’ input before adding our own comments.

4. **All viewpoints will have an opportunity to be heard.**

We understand that some team members may be quieter than others. We will make an effort to get each team member’s viewpoint and that no one dominates the discussion.

5. **Differences of opinion will be discussed respectfully**

We will identify areas of agreement before assessing areas of disagreement. We will encourage each other to look beyond our own point of view. We will discuss different ideas respectfully. As a team, we will weigh the merits of different opinions and agree on a process for choosing a direction. All team members will respect and follow the decision or direction.

6. Look for the good points in new ideas.

We will endeavor to explore the value in each idea as we assess and select our path forward.

7. Focus on the future, not the past.

We will use our past experience to inform our decisions, but focus the discussion on the future objectives. Blame for past performance is counterproductive, we will focus on finding solutions.

8. Agree upon specific action items and next steps.

At the end of each meeting and discussion, we will summarize and agree on specific next steps, action items and assignments.

9. Accountability

As team members, we will each be responsible for our individual assignments and contribution to achieving the team objectives and goals. We will honor our responsibilities and not let our team members down.

References:

<https://www.imarcgroup.com/medical-simulation-market>

https://en.wikipedia.org/wiki/World_Directory_of_Medical_Schools

<https://ifmsa.org/>

<https://www.weforum.org/stories/2024/11/healthcare-health-ai/>

<https://www.skyquestt.com/report/virtual-patient-simulation-market>