Vision Statement

Project Title: I 👀 U ("I See U")
Company: Teladoc Health
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Project Summary:
- **What problems does this project solve?**
  - The field of telehealth, or medical care that takes place over virtual platforms or with the help of automated assistants, has made immense progress in improving the efficiency and accuracy of today's medical care.
  - However, patients frequently report feeling disconnected from their virtual or automated practitioners since speaking to a robot without a human face can feel intimidating and impersonal.
- **Why is this problem important?**
  - Integrating empathy and human approachability in medical consultations is crucial to a successful medical visit.
  - Research has shown that compassion in a consultation is associated with increased adherence to medications, decreased malpractice cases, and increased patient satisfaction (Steward, 1995).
  - Time to diagnosis can be a crucial factor in a patient's outcome, for which the accuracy of a symptom screening is crucial. Automating an initial symptom screening process could help increase the efficiency of virtual medical professionals.
- **In what ways is this problem solved today?**
  - The problem at hand typically has been solved using either a virtual portal where patients write their symptoms/issues or through a survey like document nurses give out to the patients before seeing the doctor. There are some examples of institutions that have implemented their own version of an AI intelligent symptom checker such as Harvard Medical School but not as common.
  - While these approaches aren't bad by any means, making a virtual chatbox/program to consult with the patients beforehand allows for greater efficiency and a better estimation as to what the patient may be experiencing healthwise through the report made by our program

Outcome:
- Ensure doctors have a better understanding of patients concerns and symptoms before meeting physically or virtually

- Ensure patients are comfortable voicing all their concerns in a virtual pre-checkup environment
- The creation of an interface with an avatar to understand the patients' medical problems and questions
- The creation of compiled reports of patients' symptoms and concerns with a suggested course of action available for doctors to view

Solution Implementation/Design:
- Machine Learning: Tensorflow, Python SKLearn/PyTorch/Pandas, Hugging Face
- Chatbots: Amazon Transcribe Medical, IBM Watson, Amazon Lex, Infermedica
- Avatar (Front-end): Three.js

Milestones and How to Achieve Them:
- **Goals**
  - Render static 3D model on a user interface
    - To do this, we obviously need to research and find the best tools/platforms to first generate our avatar model. Once we have a suitable model, we then need to figure out how to place it on the interface our patients will use whether it's web, desktop, mobile, etc.
  - Use ML to allow the avatar to interact like a human, based on chatbot responses
    - Once we have a static avatar, the next step towards humanizing the chatbot would be to make it dynamic. With machine learning, we hope to be able to take the chatbot responses and convert them into movement of the face and lips.
  - Create compiled reports for doctors
    - Based on conversation data, figure out how to summarize symptoms and questions for view
  - Fine-tuning of avatar
    - Testing avatar functionality and mobility using edge cases
    - Checking for unforeseen bias in avatar's interactions with patients
  - Stretch: Map symptoms to potential course of action
    - Using symptoms data, create a knowledge graph of potential patient conditions in the compiled reports
- **Specification:** The goal of the avatar is to provide patients with a sense of ease and comfort. By doing so, conversations may gain clarity which could provide the existing legacy InTouch systems to read changes in behavior more easily
- **Design:** When designing the chatbot, we can do research on other existing solutions and analyze how they approach the problem. These other solutions should stem from companies within the same industry such as Babylon Health and Zipnosis so that we know the audience and demographics should be the same.
- **Prototyping:** Prototyping such a project will be kind of difficult mainly due to testing. Ideally, we would be able to test with different audiences to gauge feedback on whether or not the avatar provides a better sense of comfortability. We would also like to do a comparison between a system with the avatar and without in order to see the difference in patient behavior