

## Vision Statement

**Project Title:** Provider Augmentation for Behavioral Health Analysis

**Company:** InTouch Health

**Team Name:** Interlinked

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**Project Summary:**

- **Problems**
  - Doctors are not infallible and require augmentations/assistance in making accurate diagnoses, since mental disorders are complex to analyze; thus, technology could assist them in that area by providing additional information
  - Additional ways to gather information about patients' mental health is required
  - Doctors have a limited amount of time to meet patients in person
  - Specialized doctors might not be available in all areas of the country
- **Why are these problems important?**
  - Mental disorders are projected to overtake all physical diseases as a more recurrent cause of disability
  - There is limited aid for those with mental disorders
  - Need to lessen the burden on limited supply of doctors, as patients who need help cannot find any available
  - Patients with mental illnesses may be more likely to seek assistance when using services that do not require them to leave their houses/socially interact in person
  - Less cost for patients to use as service requires fewer resources (commute time/energy, overhead of navigating hospital and waiting for doctors, etc.)
- **How is this problem solved today?**
  - During regular doctor's appointments, if a doctor is unable to determine a physical cause of a patient's symptoms, they may suggest a mental cause. However, doctors are not mental health professionals, and may miss or incorrectly diagnose a patient's mental disorder.
  - Lab tests are used to check abnormal statistics, such as hormone levels, thyroid problems, BAC (blood alcohol content), etc. MRIs and other

diagnostic tools are used to analyze the body beyond what is visible to the naked eye.

- Unsure of diagnostic tools/software competitive with what we're designing that also gather data about sentiment of patients for mental health

### **Outcome:**

- The creation of an interface to view biological and psychological metrics of a patient in real time, based on audiovisual cues and displayed in an intuitive visual manner
- The creation of different interfaces for physician and patient to interact in real time
- A complete record of analysis records of the interactions between patient and physician
- Potentially build better machine learning models for more accurate output of biological and psychological metrics

### **Solution Implementation/Design:**

- Golang (Gin) backend
- React frontend
- Twilio for video stream
- Tensorflow for Machine Learning
- OpenFace for facial analysis
- TypeScript/JavaScript for frontend elements, basis for React and Material-UI
- MongoDB
- Potential black box using AWS services?

### **Milestones and How to Achieve Them**

- Creating webapp for transmitting audio / video between patient and doctor
- If time, add texting feature between users in session
- Creating different interfaces and functionality for patient and doctor
- Add account creation / login authorization to allow users to see / protect data
- Setting up a database to store important patient / physician information / videos for users to revisit
- Linking the machine learning model outputs to the UI with Python
- Using React, visualization of:
  - Text sentiment analysis
  - Speech sentiment analysis
  - Integration with other metrics like heartbeat
  - Actual A/V of doctor and patient
- Toggle for displaying sentiment analysis results for patient and doctor
- Implement different methods or settings of visualization
- Allow 3rd party developers to add their own models (stretch)

- Detection of style of speech, useful for common association with certain disorders (stretch)
- Create an algorithm to detect sarcasm, and ignore/reverse typical text/speech sentiment accordingly (Super Stretch Goal)