

Vinatta AI

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1. Introduction

1.1 Project Purpose

The purpose of this project would be to build The Patient Engagement that utilizes a conversation A.I. model in order to deliver a person-like conversation to patients engaged via SMS. Currently, there are two objectives: take conversations made by the diagnostic facility's inside sales team and transcribe them into text, and create a library of responses that can be used to train the SMS chatbot. Conversations would be separated out by either successfully scheduled (1) or not successfully scheduled (0).

1.2 Project Scope

The scope of this project is to leverage APIs to grab phone call conversations, transcribe them into text, label the conversation as successfully scheduled or not, and begin parsing through the transcribed data to identify a pattern of successful scheduling calls or to analyze for sentiment. This will then collaborate with mood analysis using waveform extraction in order to further narrow down the personality of the patient. All of this will be used to craft custom text messages that will facilitate patient engagement.

Major Feature	Difficulty (1-5)
Sentiment AI	5
Mood AI Integration	4
Generalized Logic System	5
Conversational Model	4

1.3 Road Map

The road map for this project takes into consideration having access to SleepLyfe's data to build the initial model off of. This is key to most of the steps in the road map since the dev work will be validated by being able to fulfill SleepLyfe's needs.

Phase 1: Preparation (1 Week)	Create a list of all relevant data sources we have available to train the AI on. Organize this data and clean it ensuring it is a clean data set. Perform data munging to prevent issues when training models. Determine which features and labels we can train on to achieve the required outcome.
Phase 2: Training (2 Weeks)	Based on the features and labels we establish as relevant to creating a useful model, train models using the appropriate methods. Improve accuracy of model by tuning parameters. The goal is to have at least a 70% accuracy rate for any classification algorithms and a minimized error for any regression algorithms.
Phase 3: Development (2 Weeks Parallel)	Using the developed models, build an API that can handle requests for engagement analysis, engagement insights, and scheduling insights.
Phase 4: Integration (1 Week Parallel)	Integrate the developed APIs into SleepLyfe's systems to enable access to the product. This is a multi-step phase with integrations for each relevant portion being a step in completing this.

Phase 5: Analysis & R&D (2 Weeks Parallel)	After integrations are complete, we will begin a phased rollout of services to SleepLyfe clients to validate the system and ensure it delivers the results that are expected. As the rollout occurs, at each step we will take that opportunity to revise and improve models, or performance of the system.
Phase 6: Release (1 Week Parallel)	Complete the full rollout of Vinatta powered SleepLyfe features.

2. Overall Description

This section will give an overview of the whole system. The system will be explained in its context to show how the system interacts with other systems and introduce the basic functionality of it. It will also describe what type of stakeholders that will use the system and what functionality is available for each type. At last, the constraints and assumptions for the system will be presented.

2.1 Product Perspective

Vinatta is a data science agency that aims to bolster patient engagement and enable the healthcare industry to leverage artificial intelligence in their R&D. By implementing psychological and behavioral models coupled with sentiment analysis, Vinatta intends to reach into the minds of patients and understand their thought process in order to steer them to the best way to treat their diagnosis. This can be done by using a predictive algorithm that factors in both live and background data. By using key factors such as their age, ethnicity, and insurance practice we can begin to formulate who the client really is. We can learn to understand how they think by breaking down their responses, their response time, and use sentiment software to analyze their emotional capabilities.

All of this will allow for one simple output: a personalized message that educates the user on what they really want to know, and help re-engage them with their medical practitioners.

But the engagement AI is only a part of the solution. Hospitals and physicians are bombarded with patients on a daily basis, which can lead to an extensive amount of human error. Vinatta wants to help revolutionize the healthcare space by focusing on automation via AI. We want our systems to learn, find flaws in the system, and constantly evolve. No solution is permanent, except for the one that innovates around its competitors, but what if that could be automated as well?

2.2 Product Functions

Sentiment AI (Main Feature)

- Helps you automatically identify the emotional tone in comments and gain fast, real-time insights from large sets of customer data. Using Mood AI to analyze audio tracks (extracts waveform, and compares to psychological models, and outputs emotion).

Financial AI (Add on Feature)

- The financial AI incorporates the customers' financials and develops a response in order to satisfy their engagement. This works when working with customers who are not sure if the price is sometimes worth it

so the AI will offer a discount or an incentive to purchase the AWT that will not be harmful towards the company.

- EX: Patient: “Is the AWT even worth it?”, AI: “The AWT may be expensive to purchase but we do offer this deal <insert deal>.

2.3 Twilio SMS API

Twilio is a developer platform for communications. They give access to a multitude of API's that span a variety of different functions. An API or Application Programming Interface is a software intermediary that lets applications talk to each other. For this instance, Sleeplyfe will be implementing Twilio's SMS API. This API allows for automated messages to be sent out via a registered Twilio phone number. However, this is just a building block. Sleeplyfe will then import it's custom messages, and integrate with the soon to be created data model in order to maximize engagement.

2.4 User Characteristics

There are three types of users that interact with the system: Companies, Doctors, and Patients. Each of these three types of users has different use of the system so each of them has their own requirements.

Companies will only be able to create message templates, search for doctors in the system, and invite doctors. They will not have access to the patients information, only the Doctors. Company portals will also not have an automated SMS, that is only for doctors. Companies will now be able to view patient data based on the hierarchy of the system.

Doctors will have the most control. They will be able to manage patient data, edit message templates, select a name of the chatbot, have full calendar access, and they will have a payment tracking system.

Patients will have a little less control. They will have the ability to take tests, respond to messages, make appointments, and make payments.

2. Features

a. Feature Requirements:

ID: FR0.1

TITLE: Obtain User Dialogue

DESC: Effectively scribe user dialogue for easy use.

ID: FR0.2

TITLE: Analyze User Dialogue

DESC: Effectively analyze the patients tone and mood through sentiment analysis.

ID: FR0.3

TITLE: AI Response

DESC: The AI needs to effectively respond to the patient with a custom appropriate response.

ID: FR0.4

TITLE: AI Sentiment Analysis

DESC: The AI needs to effectively evaluate the patient's tone and word choice to identify emotions / sentiments and notify the doctor before the arrival of the patient.

ID: FR0.5

TITLE: SMS System

DESC: Fully operational SMS system that converses with the patient using the patient AI.

ID: FR0.6

TITLE: AI Speech

DESC: The AI will need to converse with the patient through a series of queries in dialogue.

ID: FR0.7

TITLE: AI Accuracy

DESC: The AI should accurately be able to classify patient sentiment and evaluate it against their demographics to accurately choose the right response.

ID: FR0.8

TITLE: Pre Client Review

DESC: The Client Review will be done by analyzing the clients data and submitting a review beforehand.

ID: FR0.9

TITLE: Cleaning Data

DESC: Clean the data given for easy use.

ID: FR0.10

TITLE: Mining Data

DESC: If enough data is not given then mine data through the internet.

ID: FR0.11

TITLE: Test Data with Users

DESC: Test the AI with volunteers and train the data.

ID: FRO.12

TITLE: Flexible AI

DESC: The AI needs to be flexible cross platform.

ID: FRO.13

TITLE: Algorithm

DESC: Need to formulate the algorithm for the AI within the client's system.

ID: FRO.14

TITLE: Implement API's.

DESC: Integrate APIs within SMS system.

ID: FRO.15

TITLE: Voice Recognition.

DESC: Implement Voice recognition feature where it recognizes the customers voice for validation.

ID: FRO.16

TITLE: Train AI.

DESC: Train the AI with existing data.

b. Pricing Model:

Pricing will be determined based on services required. Access to any client facing services will require a license to the underlying Patient Engagement AI (recurring billing). Client facing services will be billed per use or engagement (ex. \$0.025 per 100 texts / calls sent). Supporting services may be billed on top of the base per use price (ex. 0.0075 per text message sent (Twilio pricing) if using internal texting API). Client integration services are billed one-time and will include discounted future service in case further integration work is required to enable future platform features.

Alternative licensing options can include exchanging access to data for a perpetual license or discounted license to the underlying IP.

2.4 User Characteristics:

There are three main endpoints within the AI's actions, one being the Doctor, one being the patient, and the last being the AI. Below we will describe the level of power(1-5, 5 being the most power) of each user as well as their role.

Patient	2	The patient will be interacting with the AI giving the AI data points which it needs to analyze the patient's emotions. The AI will then use this information to precisely automate a response towards the patient.
Doctor	4	The Doctor will be able to view their patient's mood on approach to their appointment and diagnose the patient accordingly.
AI	5	The AI will have the most power by having access to a database with all of the information regarding the clients and patients using SleepLyfe. It will have access to all of the billing histories as well as invoices. However, they will have security regarding the patient's personal information which they can override in a given scenario. The AI will also not be able to see Users payment information.

2.5 Constraints

- Internet connection will be a constraint for this application. If the patient does not have a signal then the automation system can not deliver its message to the patient.

- Insufficient data regarding the AI's accuracy.
- Insufficient Volunteers during the testing process.

3. Development

a. Feature Timeline

Completed By *Date* 11:59 PM CST	Feature Requirement for Clients/Patients	FRO Completed
07/14/2021	- Finalize the API's and begin development.	
07/18/2021	- Begin implementing the API's within the AI. - Begin Organizing Data.	- ID: FRO.14
07/23/2021	- Finalize a suitable algorithm for the AI's complexity. - Finalize data being used.	- ID: FRO.13 - ID: FR0.8 - ID: FR0.9 - ID: FR0.10
07/29/2021	- Begin the training process of some portions of the AI.	- ID: FRO.16 - ID: FR0.5 - ID: FR0.4
08/01/2021	- Begin training and testing AI's simultaneously in order to better the AI.	- ID: FR0.7 - ID: FR0.2 - ID: FR0.3
08/06/2021	- Begin cleaning out the AI for any bugs or fixes.	
08/09/2021	- Begin the testing process of the AI through human testing/interaction.	- ID: FR0.1 - ID: FR0.6 -
08/16/2021	- Clean out any last bugs and fixes getting ready to deploy the AI.	- ID: FR0.11 - ID: FRO.12 - ID: FRO.15
08/26/2021	- Fully integrate the AI within SleepLyfe.	

