



# Project Abstract: Baymax

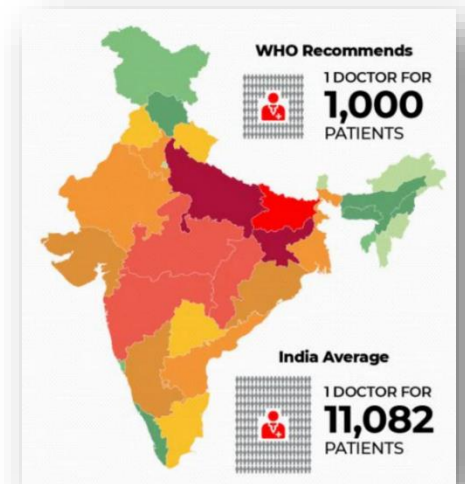
AI powered interactive medical chatbot.

# BAYMAX

Your personal healthcare companion

## Motivation

Health care facilities are now a basic and essential need of human population. But, as we all know that in remote/rural areas of India, doctors are not easily available and people have to travel long distances for getting treatment for even minor diseases like viral fever. To combat this serious issue, we have made a medbot. Even in the present situation when we are in the mid of a pandemic, already the medical facilities are less. So, this medbot cum health care assistant would be prescribing medications to patients after diagnosis. It is capable of laying out a solution to an ailment on its own. It's Competent of saving time, both for the doctor and the patient.



## Problem Statement

Develop a robust, easily implementable & economic solution to help the lack of Medical-Aid /Doctors /Hospitals /Healthcare centers /Medical clinics in underdeveloped /remote/ developed areas.

## Working

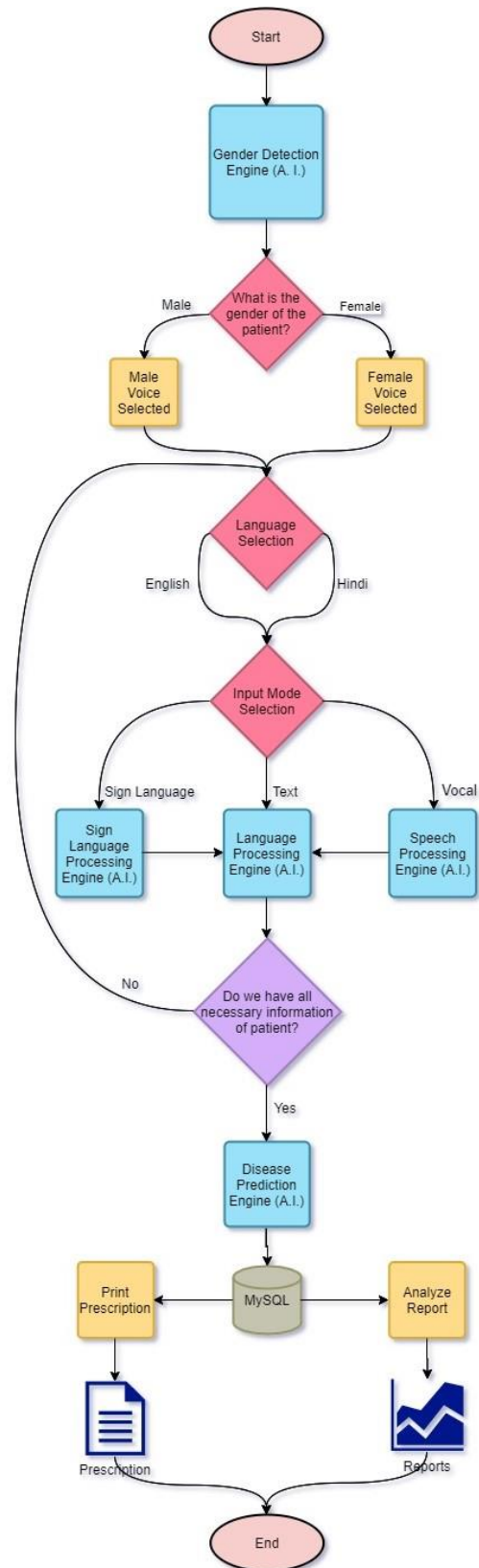
Predicting diseases from the symptoms was a major and sensitive problem as even minor error is not acceptable in this task. With some research we came to know about a variant of decision tree in TensorFlow named as decision trees classifier. It works on the concept of ADA boost algorithm. With proper application we were able to pull out a model with an incredible accuracy of 97.3%.

Predicting gender of the patient was done by training a Convolution neural network using Keras, TensorFlow and OpenCV over a dataset containing 5,000 images of male and female faces with an accuracy of 96.3%.

Speech processing is done through Google's voice API along with Google's translate API for multilinguality of application. Natural language Toolkit (NLTK) has been used for text processing. It cleans the user input for obtaining useful data that will be used for further processing.

A user-friendly GUI is made using KIVY framework as it provides a dynamic GUI that can be easily implemented on different devices with different screen sizes including mobile phones.

# Application Flowchart



# Technically Unique Features

## Multilingual

Our application is able to interact with the patients in multiple languages including English, Hindi, Marathi, Bengali, Tamil, Telugu etc.

## Cross Platform

The application is can be installed on multiple platforms like Windows, Mac, Linux and even android without any significant changes.

## Voice Recognition

Baymax is able to understand what you are saying in any local language and can easily translate to any other language.

## Sign Language Recognition

For the people who are hearing and speech impaired can easily interact with Baymax through sign language.

## Computer Vision

Computer vision is used to make Baymax's interaction with human better by changing the voice of Baymax to female voice for a female patient.

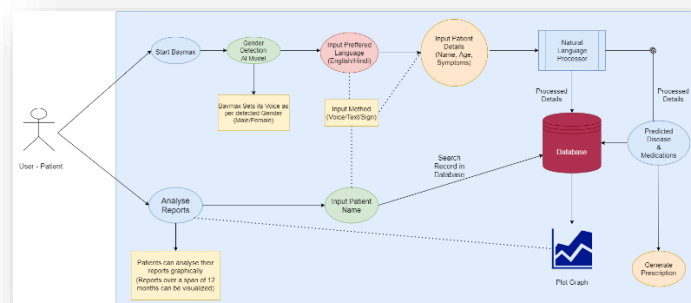
## Friendly GUI

GUI on which the application is made is very simple and easy to use. Even if someone is stuck in between they click the "Help" button and Baymax will dictate how to use.

## Encrypted Database

Oracle's MySQL is used to store all the critical information of the user. Though MySQL is an encrypted database all the patient's data is safe.

# Use Case Diagram



# Application

Let us consider some cases -

## Rural area

A farmer from a village area is suffering from malaria. He visits the nearby hospital/medical center for treatment but unable to get diagnosed because of unavailability of doctor/Unskilled doctor/Corruption or any other reason. Now he is forced to visit a city hospital which is a bit far in order to get diagnosed. He has to abandon his field, spend money to travel to the city, spend to stay in an expensive place until he gets diagnosed. All this process is not suitable for a farmer, his field and also for his family.

All this trouble that a farmer faces these days can be resolved if our system, Baymax was installed in the village's hospital/medical center.

## Remote area

A small flower shop owner in Kedarnath is about to sleep when he discovers that his room heater is broken, he had no option other than sleeping in cold room. Next morning, he wakes up with some symptoms of hypothermia. He rushes to the nearby hospital/medical center for treatment but unable to get diagnosed because of unavailability of doctor/Unskilled doctor/Corruption or any other reason. Though Kedarnath is a remote area which is not so easy to access, he is forced to call an air ambulance to transfer him to a better hospital in a city which is not affordable for most of the population.

All this trouble and expenses that this person had to bear can be avoided to an extent if our system, Baymax was installed in the Kedarnath's hospital/medical center.

## Urban area

A software engineer in Bangalore is showing few symptoms for tuberculosis. She rushes to the nearest doctor takes an expensive appointment but has to wait for hours to get examined by the doctor. Due to this waiting time she has to take a paid leave from her office.

If our system, Baymax was installed in the doctor's clinic. The clinic would have been able to treat the patients with twice the speed. For example, if doctor takes 10 minutes to treat a patient, then with Baymax 1 patient will be treated by Baymax & 1 by the doctor now doctor takes another minute to verify Baymax's diagnosis thus treating 2 patients in 11 minutes. Effectively saving 9 minutes of the doctor.

# Implementation

## Desktop

Baymax can be implemented easily on a low-end desktop with a webcam, mic and a speaker system to enable all the features of the application. The desktop will need a moderate speed internet connection to communicate with the central database.

## Self-Help Kiosk

Baymax will be best used when installed in a self-help kiosk at different places like medical centers, hospitals, clinics and many more. As self-help kiosks can be made as per the requirement of the application which will help in cost cutting while installation.

## WhatsApp API

Baymax can also be converted into a Django server and could be hosted globally along with a WhatsApp API so that any person at any point of time can access Baymax and have them diagnosed for minor problems like fever, cough etc. For any critical or complex disease Baymax will suggest the user to visit their nearest hospital, clinic, medical center etc.



## Our vision

Talking about the real-world benefits, the first and foremost advantage of our med bot is that it is extremely beneficial in remote areas. There are numerous under-developed places with almost negligible medical officials. Baymax can be of great help at such places. It can not only assist the doctors but also it is capable of treating patients on its own, employing diagnosis and provision of a prescription. Also, the gender detection feature makes it user-friendly. Female patients belonging to conservative areas, find themselves in an uncomfortable and awkward position while explaining their symptoms to a male doctor. To ease that out, Baymax changes its voice to a female voice after detecting the patients' gender. The recent coronavirus outbreak has shown us how scarce and significant a doctor is. So, in such a pandemic, this Medical-chatbot cum Health care assistant can work wonders.