CovidDectector System

**Abstract:** With the recent low number of community cases of covid-19, mass gathering is allowed. However, participants will have to take an antigen rapid test for Covid-19 and obtain a negative result before admission. Hence, event planner must ensure the participants safety/health condition before allowing participants to enter the event venue. This project proposes solution to this problem by using a machine learning model to determine the likelihood of participant having Covid-19. In addition, it includes a chatbot to allow the participants to know current information about Covid-19 and the event itself.

1. **Business Case**

This current law enforced mainly target huge events. Before a participant can enter the venue, the event organizer has to ensure that he/she is not contacted with Covid-19. To implement this, the event organizer will have to check with each participant individually on their health status before letting them in. As social distancing enforcement is a must, a long queue will be expected. Meaning, more manpower is needed to maintain the queue. If a shorter time can be implemented to handle these, the queue will be shorted thus lesser manpower is needed.

We propose that this can be handled with a web application (mobile-friendly) that has a survey for the participants to answer to get their health status. Participants with a mobile device would be able to answer the necessary questions before reaching the front of the queue. The result of the survey will let the queue maintainer either guide the participant to the swap test area or letting the participant into the venue. Moreover, it also includes a chatbot that allows the user to know (real-time) information about Covid-19 and the event itself. This may keep the participants occupied while waiting for their turn to enter the venue. The solution may be tailored to suit different type of events.

1. **System Model**

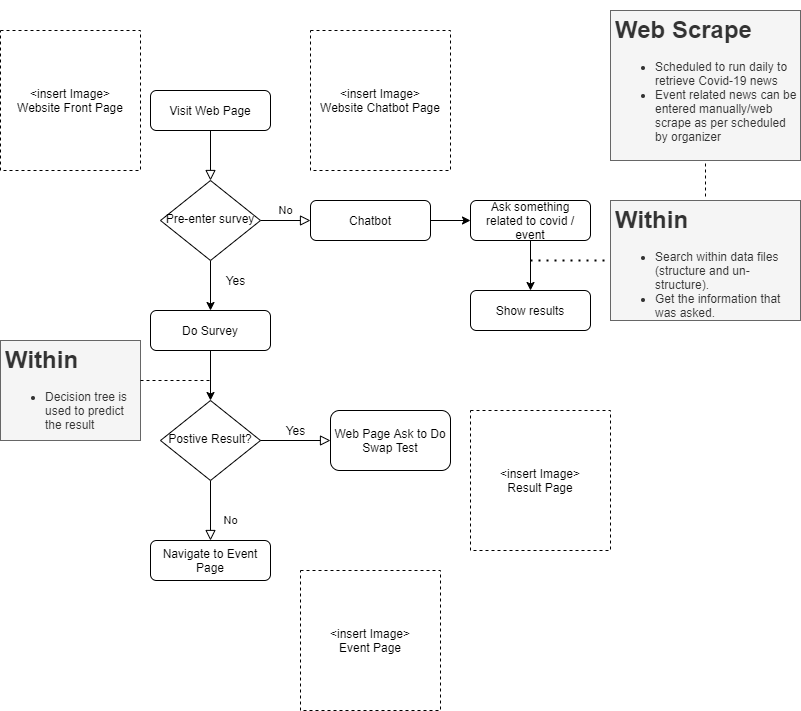
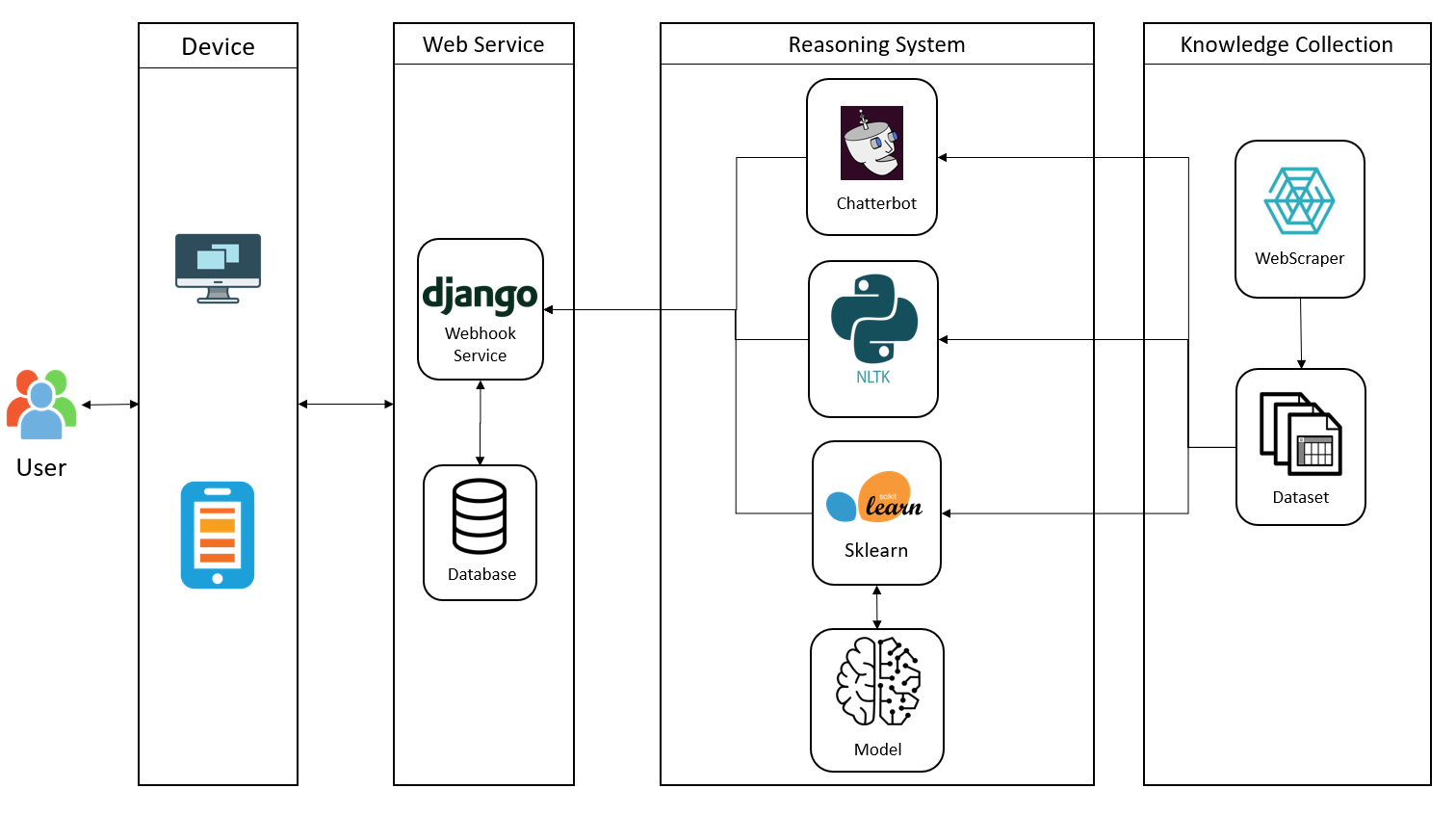
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Figure 1 CovidDetector System - Flowchart

1. **System Development & Implementation**
   1. **System Architecture**

**3.1.1. Overview**



* 1. **Data Resources**

The data used for the training of model is from the Isralei Ministry of Health website. The description of the data is shown in the table below.

|  |  |
| --- | --- |
| Data Columns | Value/Format |
| Test\_date | In the format of dd/mm/yyyy |
| Cough | 0 and 1 |
| Fever |
| Sore\_throat\_ |
| Shortness\_of\_breath |
| Head\_ache |
| Corona\_result | Negative, Positive, Other |
| Age\_60\_and\_above | Yes, No |
| Gender | Female, Male |
| Test\_indication | Aboard, Contact with confirmed, Other |

The Covid-19 data used for the chatbot feature is web scraped from the Singapore Ministry of Health website and Worldometer website. The Covid-19 information provided in Worldometer are gathered through official reports, directly from government’s communication channels. The information was also used by Johns Hopkins CSSE, Financial Times, The New York Times, Business Insider and many others. Information that was scraped from these websites are the number of Covid-19 cases currently and latest article regarding to Covid-19.

* 1. **Knowledge Elicitation and Extraction**
     1. **Manual Extraction**
     2. **Web scrape (Backend)**
  2. Beautiful Soup Python library:
     1. Visit the websites to retrieve Covid-19 related information.
     2. Study the html website and identify the information to extract.
     3. Html parser is utilised to extract the identified information.   
        Extract relevant information from the html and write to the data file.  
        Extract relevant urls and visit those websites to get relevant information.
  3. **Reasoning System**
     1. **Overview**
     2. **Predictive Model**
  4. **Cognitive System**
     1. **Chatterbot Library**
     2. **NLTK Chatbot**
  5. **User Interface (UI)**
  6. Web application

Web application uses Django Web Framework for these functions:

* + 1. UI for user to check event information and answer the survey question before entering the venue.   
       This UI is form based, requiring information for decision tree to predict the result.
    2. User may navigate to the event tab to get event information (e.g queue waiting time etc).
    3. User may navigate to the chatbot tab to seek information with regards to the event and Covid-19 that is not stated in the website.

1. **Challenge and Recommendation**
   1. **challenges**
   2. **Future Improvements**

If we have a longer timeframe to work on this project, we would have work on these areas:

1. Include database to store data

A database could be added to store the survey answer, result and personal information (e.g name and last 4 char of NRIC) of every participant. If one of the participants happened to be a covid-19 confirmed case, necessary information could be provided to the relevant authorities for contact tracing.

1. Real-time API for web scrape

Currently, the web scrape could only be triggered by schedule. With a real-time API and adding more relevant and trustable websites for web scrape, the user could be more informed of the latest news every time they ask a relevant question via the chatbot.

1. Chatbot icon to be shown at the bottom right of the webpage.

Currently, the chatbot is within a tab. However, the ideal placement for the chatbot should be at the bottom right of every web page. The reasons being, most of the people are right-handed and they will not be comfortable with the bottom left placement because they are used to things being catered for right-handed people. In addition, having a chatbot not within the webpage, user might forget the question to ask regarding the content when they clicked on a new tab.