

Chatbot for Patient Screening

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I. Abstract

As we have noticed, patients have to wait outside the doctors cabin before actual diagnosis. Also doctors ask some screening questions to the patients before actual diagnosis. In this project we have developed components to help the doctors in initial pre consultation screening of the patient. We have developed two components that will help doctors patient screening. The first one is chatbot. The chatbot is a type of adaptive chatbot that will take input as problems/symptoms patients are experiencing. These inputs can be pertaining to a symptom that the patient is experiencing or a sense of discomfort a patient is experiencing in a certain body part . The chatbot will then ask questions related to these symptoms to the patients. The questions asked along with responses can be used by a doctor to know the problems that the patient is experiencing. This will utilize the patient waiting time and the doctor can screen the patient by looking at the responses. This will help the doctor in diagnosing the patient in less time .This would also reduce the amount of time a doctor spends asking repetitive questions about a certain condition.

Also we added functionality using which new symptoms and signs data can be added into the database. The form is dynamic with a flexible number of questions and conditional questions. Also we added a flow visualizer using a tree and graph based approach.

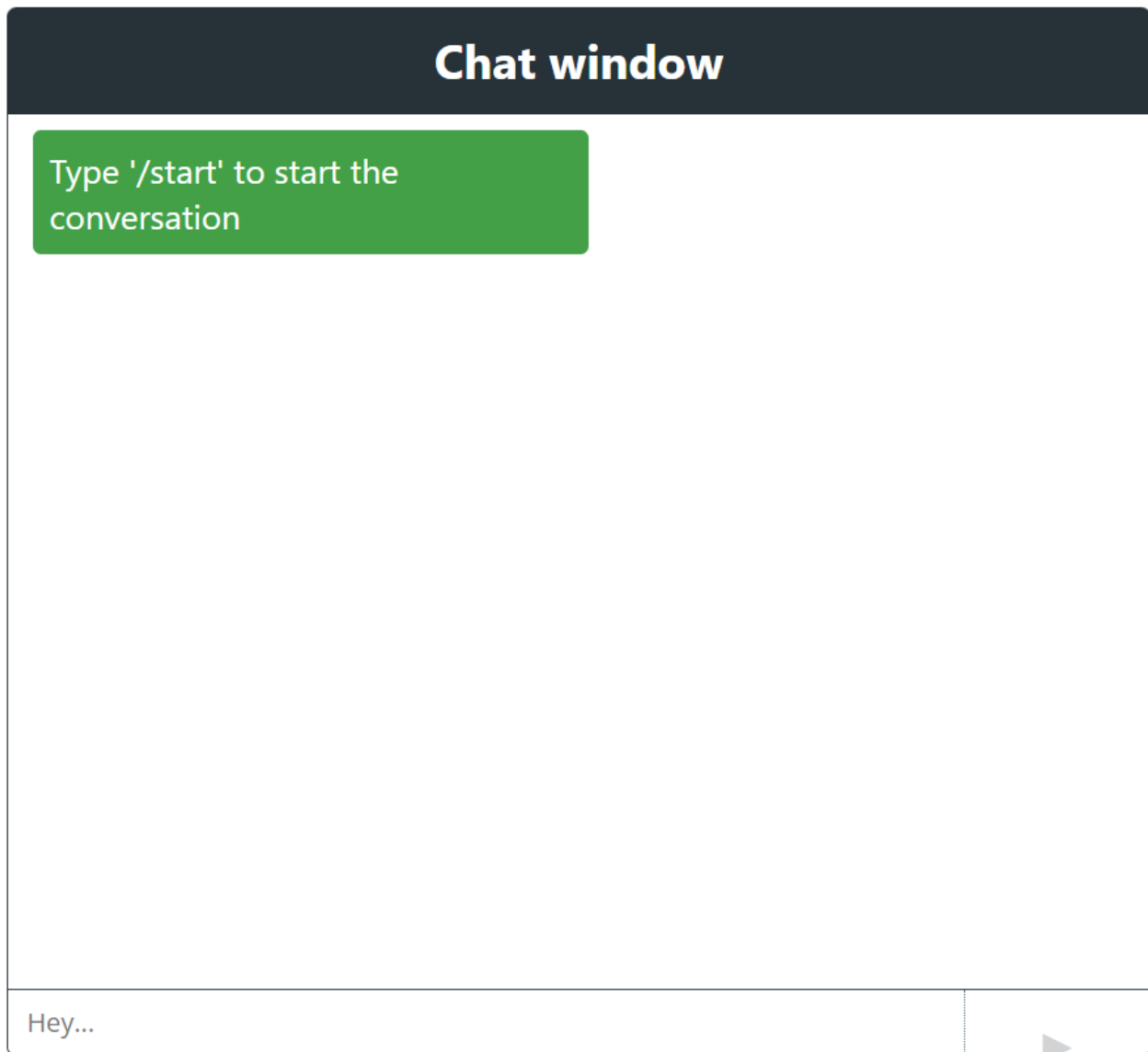
We also built an interface through which the patient can mark the locations at which they are having pain. This functionality would complement our chatbot by allowing the patient to demarcate the area where he/she is feeling pain or irritation.

II. Challenges

- **Library to Use:** There are a lot of libraries in react that build flow. The challenge was to find the best one that satisfies our requirements. We choose ReactFlow as it is easy to use and builds the flow dynamically using the nodes and edges given as props to the Component.
- **Add Flow Form:** The challenge in building form was to make it dynamic so that the number of questions and conditional questions can be flexible.

III. Results

- Chat Window



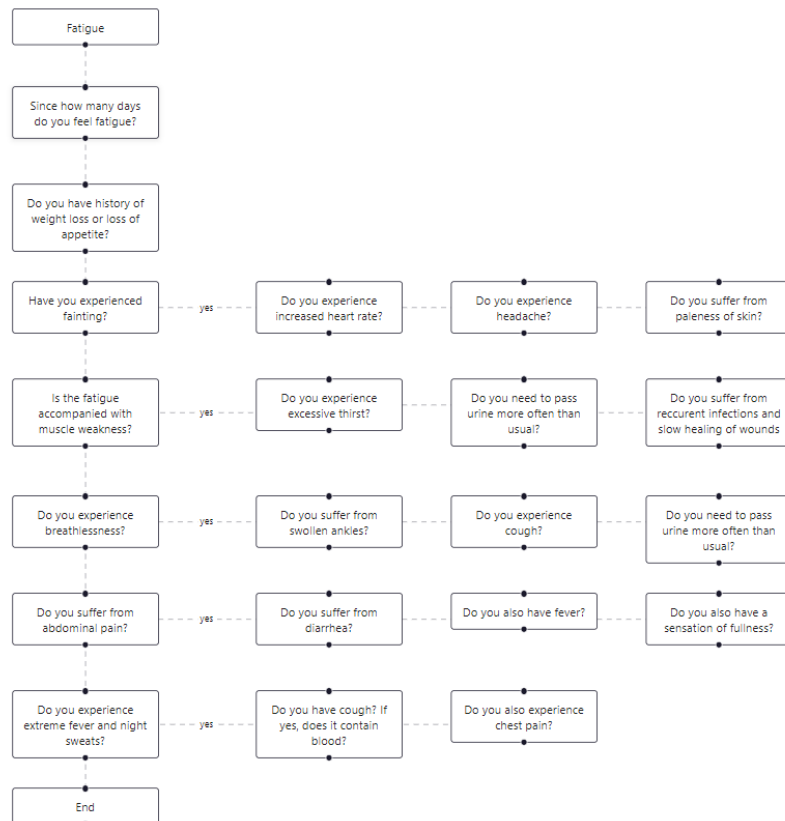
- Flow as a Tree

```
▼ [
  ▼ 0 : {
    ▼ "questions" : [
      ▼ 0 : {
        "ques" : "Please specify where the symptom is occurring?"
      }
      ▼ 1 : {
        "ques" : "Describe what you are feeling?"
      }
      ▼ 2 : {
        "ques" : "How long have you experienced this symptom"
      }
      ▼ 3 : {
        "ques" : "What is the frequency of the symptom, is it constant or intermittent?"
      }
      ▼ 4 : {
        "ques" : "Have you noticed what might have cause the problem?"
      }
      ▼ 5 : {
        "ques" : "Describe, if anything, seems to improve your symptoms?"
      }
      ▼ 6 : {
        "ques" : "Describe, if anything, appears to worsen your symptoms?"
      }
      ▼ 7 : {
        "ques" : "Have you taken any medicine for this symptom in the past?"
      }
      ▼ 8 : {
        "ques" : "Are there any other symptoms that you are experiencing?"
      }
    ]
    "symptom" : "general_questions"
  }
  ▼ 1 : {
    ▼ "questions" : [
      ▼ 0 : {
        "ques" : "How long have you experienced fever?"
      }
    ]
  }
]
```

- FLOW as Graph

Select an option ▼

Add Custom Name Node



- Dynamic Form to add data

IV. Components

- Chatbot: chat.js
 - Contains the UI component of Chat Window
- Addflow: addflow.js
 - Contains the Form Component to Add New Data to the Database
- Visualize flow as tree: flowtree.js
 - Contains the Flowtree Component that visualizes the json data as a expandable and collapsible tree
- Visualize flow as graph: graph/ReactFlowRenderer
 - Contains the FLOW maker component that converts the nodes and edges into a graph based visualization

V. Results

We have collected data and designed questions that doctors ask if the patient is experiencing those symptoms. We then developed a chatbot using NLP that can be

used as pre consultation screening of a patient by questionnaire. The response of the user is recorded and can be shown to the doctor. The chatbot can be used to reduce the time taken by a doctor in screening a patient. It will also utilize the waiting time of the patient. We have also designed an interface where a patient can mark the place along with the type of pain and it can be then shown to the doctor. Also build functionality using which new data can be added dynamically to the data. Furthermore, the data visualizers are built using which the data can be visualized in the form of trees as well as graphs.