THE DEPARTMENT OF
COMPUTER SCIENCE
& ENGINEERING
計算機科學及工程學系

Chatbots as Personal Caregivers for Diabetics

Project by: Shivang Gupta and Kin Wai Allen Fok

Supervised by: Prof. Sung Kim

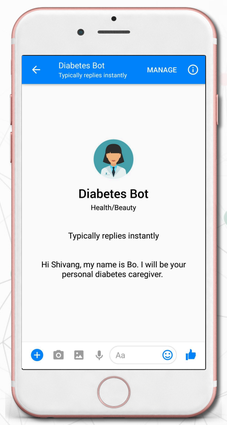
One in eleven adults has diabetes...

... to stay healthy, diabetics need to manage their daily food intake, blood glucose levels, and take their medication on time. While existing mobile apps have been able to help some patients with managing their sugar levels, most users, especially older users, find the traditional tap-and-click interface too cumbersome to use regularly.

Our project is a chatbot that can help diabetics manage their disease in an easy and intuitive way.

Chatbots have recently risen in popularity, this rise is primarily due to advances in artificial intelligence technology and natural language processing (NLP) techniques that give chatbots the ability to understand and interpret human language.

The motivation behind this project was to evaluate if current technology is suitable to create a complex, multi-purpose chatbot that caters to a wide audience like diabetics.



Say hello to Bo!

Bo is a Facebook Messenger bot that users can connect with like any other Facebook friend. Bo's intelligence is powered by the Wit.ai NLP engine and Bo can understand and communicate in natural English like a real human.

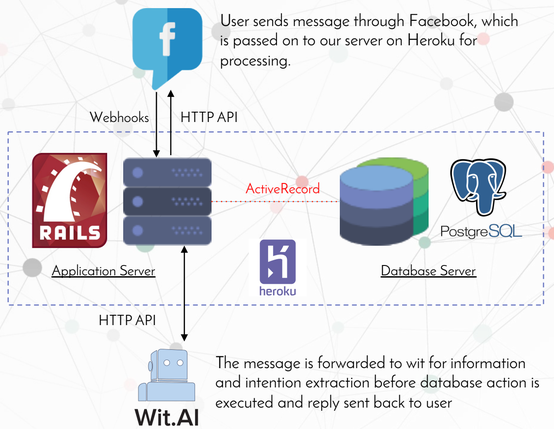
Bo is designed specially for diabetics and provides them with the following features:

Tracks BGL Values

Tracks Meals

Gives Reminders

System Design and Tools

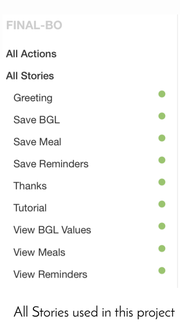


The web sever uses a typical Model-View-Controller architecture, with regular HTML views replaced by the Facebook Messenger chat interface. Control is shared between the Ruby on Rails application server and the Wit.ai engine. Models are stored on a PostgreSQL database system.

Training the AI

Training was performed on Wit.ai's web based GUI. Wit.ai uses a supervised learning approach to training the initial model. Our bot uses a total of nine stories and sixteen entities that to teach the bot how to understand the users' input.

After the initial training is completed, the bot continues to learn from every new input it receives using a reinforcement learning approach.

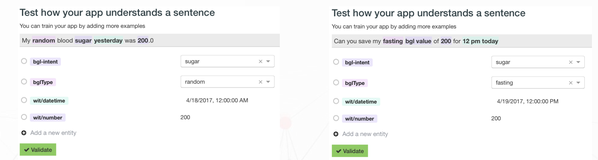


All Stories used in this project

Why is this better?

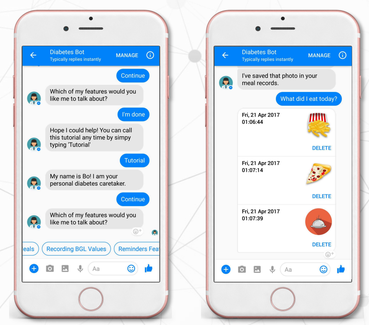
One of the key reasons why users don't regularly use traditional diabetes apps is that the rigid UI and lack of flexibility make self-reporting values feel like a chore. Our chatbot on the other hand accomplishes the same task of storing information, with a 'conversational interface'.

This means that the user does not have to use fixed input or even the same sentence structure while talking to our bot. Bo is capable of understanding and extracting the user's meaning over a wide range of inputs, and even provides feedback if necessary to get more inputs from the user. Some examples of this are shown below:



In addition to natural language, our chatbot can also make use of traditional UI elements such as buttons and lists to deliver a blended user experience which is easy to understand and learn.

However, our design is limited by the options offered by the Facebook Messenger platform and the Wit.ai engine.



Conclusion

Through the implementation of this project, we determined that existing chatbot technology and natural language understanding systems are suitable for making single-purpose and simple, multi-purpose chatbots. However, as the complexity of requirements increases, current artificial intelligence is likely to get more confused and deliver the wrong results.