Specification & Design Report

by syed jaseem Uddin

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VICTORIAN INSTITUTE OF TECHNOLOGY
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“A DIGITAL ASSISTANT”

Specification and Design

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PREPARED:		Date:	11 / 09 / 2020
(for acceptance)	Syed Jaseem Uddin Project Manager, Student Group		
ACCEPTED:		Date:	/ /
(for release)	Dr Paul Darbyshire Project Sponsor, VIT		

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Executive Summary

We are using Google's Dialogfow NLU model to build our chat bot which help us understand human intentions through its NLP understanding feature. End user will interact with our university's digital assistant integrated on the website and get desired response from Dialogflow. Dialogflow takes query from the user, process it to detect what the user wants and communicate with webhook to get the desired user response and give response back to the end user. Keeping the complexities, and human understanding level, of English language this bot may or may not respond abnormally. Although the probability is low but still we cannot ignore this fact.

Specification

System Description

Our chat bot can be integrated with any universities web site. So, as such there are no specific high fidelity hardware requirements that are to be met to support our project. Any system which meets the basic demands of software requirements today is sufficient enough to run our project. Consequently, our project can be executed on browsers like Google chrome, Firefox, Opera etc.

Feasibility Analysis

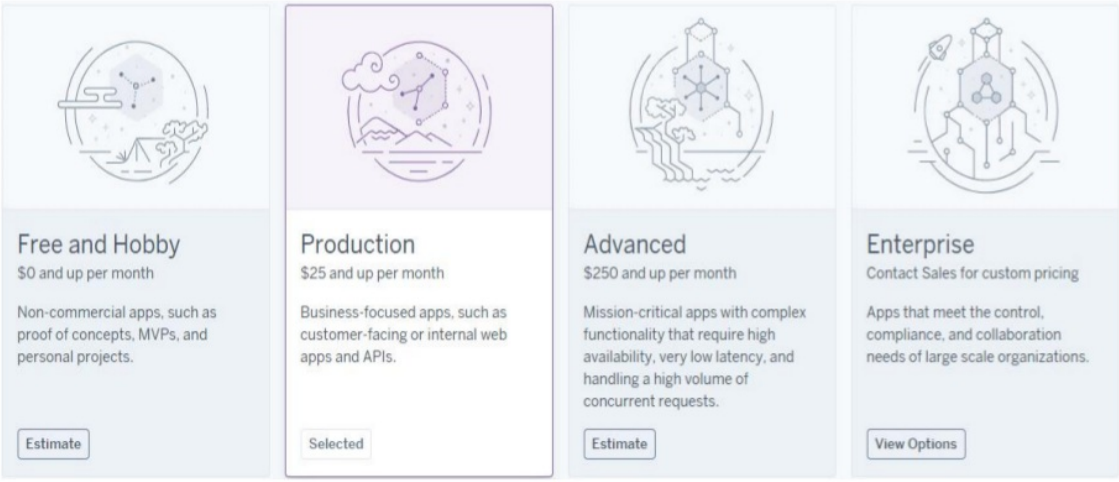
Technical Feasibility

We have designed this project to minimize human involvement at the fullest. Even if we desire any human to be involved then that would be the last and least case when all the possibilities have failed. Further we are using services of two most popular vendor i.e Heroku and Google so the downtime is almost negligible. Hence our project is technically feasible in all aspects.

Economic Feasibility

The overall cost of this project is almost negligible as compared to its outclassed benefits and the amount of money one has to spend on employees to get this task done. Normally the paid plans of Google Dialogflow and Heroku are feasible according to the use. Initially we can go for free plans then if there is a shoot in demand of users we can go for paid plans which is few dollars. Pricing criteria of both is given below for review:

Here is Heroku Pricing criteria



Here is Dialogflow pricing criteria

Feature	Trial Edition	Essentials Edition
Text ¶	• Free *	• $0.002 per request
Audio input (also known as speech recognition, speech-to-text, STT)	• Free *	• $0.0065 per 15 seconds of audio †
Audio output (also known as speech synthesis, text-to-speech, TTS)	• Free *	• Standard voices: $4 per 1 million characters • WaveNet voices: $16 per 1 million characters
Knowledge Connectors (Beta)	• Free *	• Free
Sentiment analysis	• Not available	• 0-1 million requests: $1.00 per 1,000 requests • 1-5 million requests: $0.50 per 1,000 requests • 5-20 million requests: $0.25 per 1,000 requests
Dialogflow phone gateway (Beta) Includes audio input and output.	• Tolled number: Free * • Toll-free number: Not available	• Tolled number: $0.05 per minute of phone call processed ‡ • Toll-free number: $0.06 per minute of phone call processed ‡
Mega agent	• Free *	• <2k intents: $0.002 per request §

Organizational Feasibility

Almost all the financial experts mutually agree on the fact that having a digital assistant is far more feasible than having more employees to get this task done. It is in the own benefit of the organization to having once such digital assistant which is not just economical in terms of money but is also available 24/7 and its depletion rate is once again negligible. Implementing our project in the professional environment requires a huge venture in the beginning that is adjusted with the passage of time.

Requirements Specification

Functional

- API which takes user query to dialogflow and response back to user should up and running 24/7
- API which takes response from webhook to dialoglow should be up and running 24/7
- Automatic up-gradation must be avoided. The developer has to intervene to complete this process.
- Apparently latest browser with latest version is preferable.
- User friendly

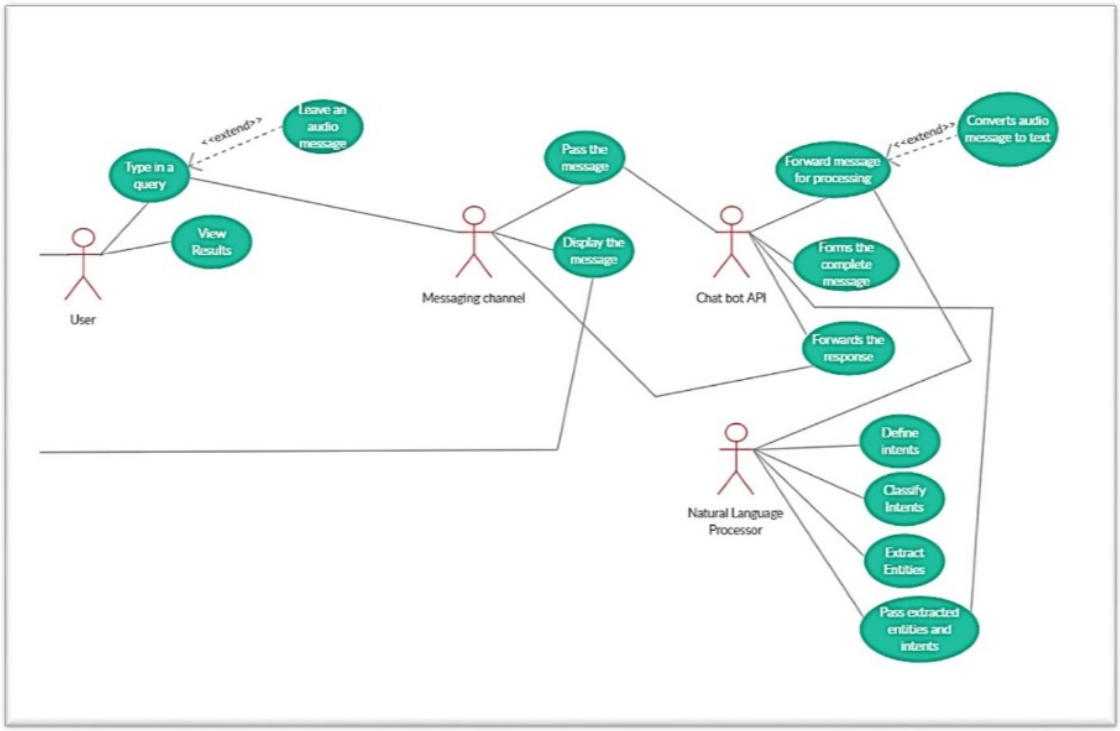
Non Functional

- Sufficient network bandwidth
- Mean time to failure and repair must be as less as possible
- Speak to text conversion

2 Use Cases

Use Case Diagrams

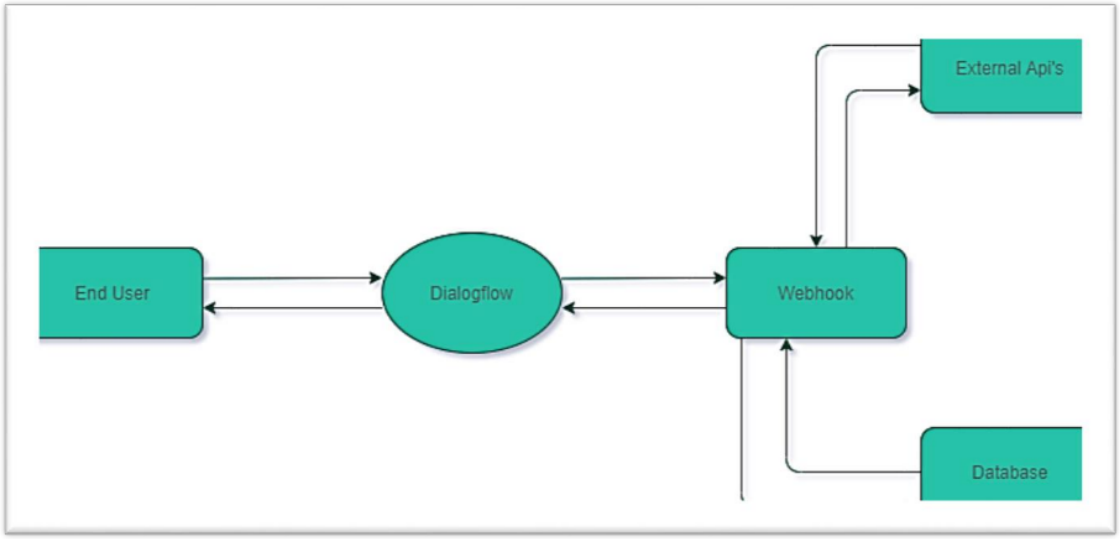
Use case diagrams are a visual representation of the software being developed. It gives the idea of the users, functionalities and the interaction between them.



Use Case Descriptions

The user will interact with bot with a simple UI available on the bottom right corner of the website where user can type his query. This UI will pass the query or message to chat bot API. That chatbot API is responsible to pass that query message to Dialogflow platform where this message/query is processed to detect what the user want based on the training phrases in different intents with entities, if the intent is matched than its respective response will forward to chatbot API and from that API response will be displayed at that interface. If the query doesn't match then exceptional handling comes into action and necessary action is taken. When all the options fail to solve the problem then and only then the query will be routed to human operator.

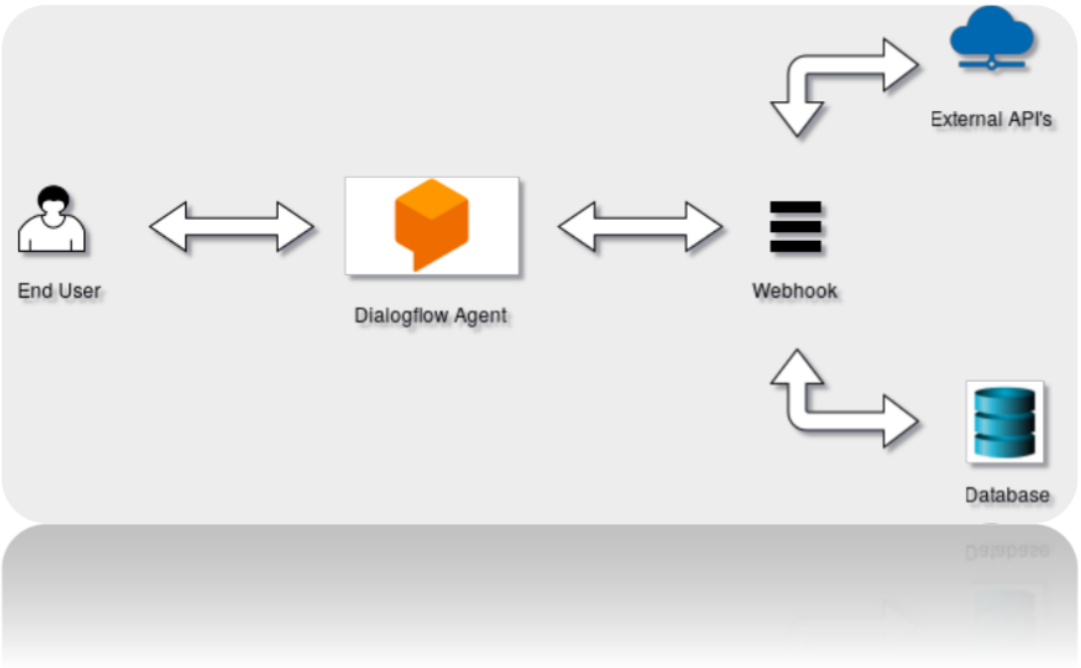
Context Model



Design

Product is designed as the end user will interact with dialogflow agent. User will provides some sort intention by communicating with the agent. To detect every single intention we'll provide vast number of similar phrases to dialogflow then dialogflow with its super strong and efficient Natural Language Understanding (NLU) algorithm help us by training its AI model according to our provided phrases. After a successful intention detection dialogflow looks for the response, if the response needs data from database or need to connect with external API's we will be going for write a WEBHOOK that receives request from dialogflow then call external API's , get data from database , do some calculations etc and last generate response back to dialogflow and dialogflow will give response to End User. Alternatively, if response doesn't need to call external API or get data from database we can define response in dialogflow itself.

Architectural Design



Database Structure

If need be we'll be using MongoDB (NoSQL database). Highly scalable and independent of defined schema

Hardware Specification

A system with minimum of 4 GB RAM and C drive of capacity 50 GB plus is required. To summarize, any general personal computer that meets all the software requirements of today will suffice for this project.

Interface Design

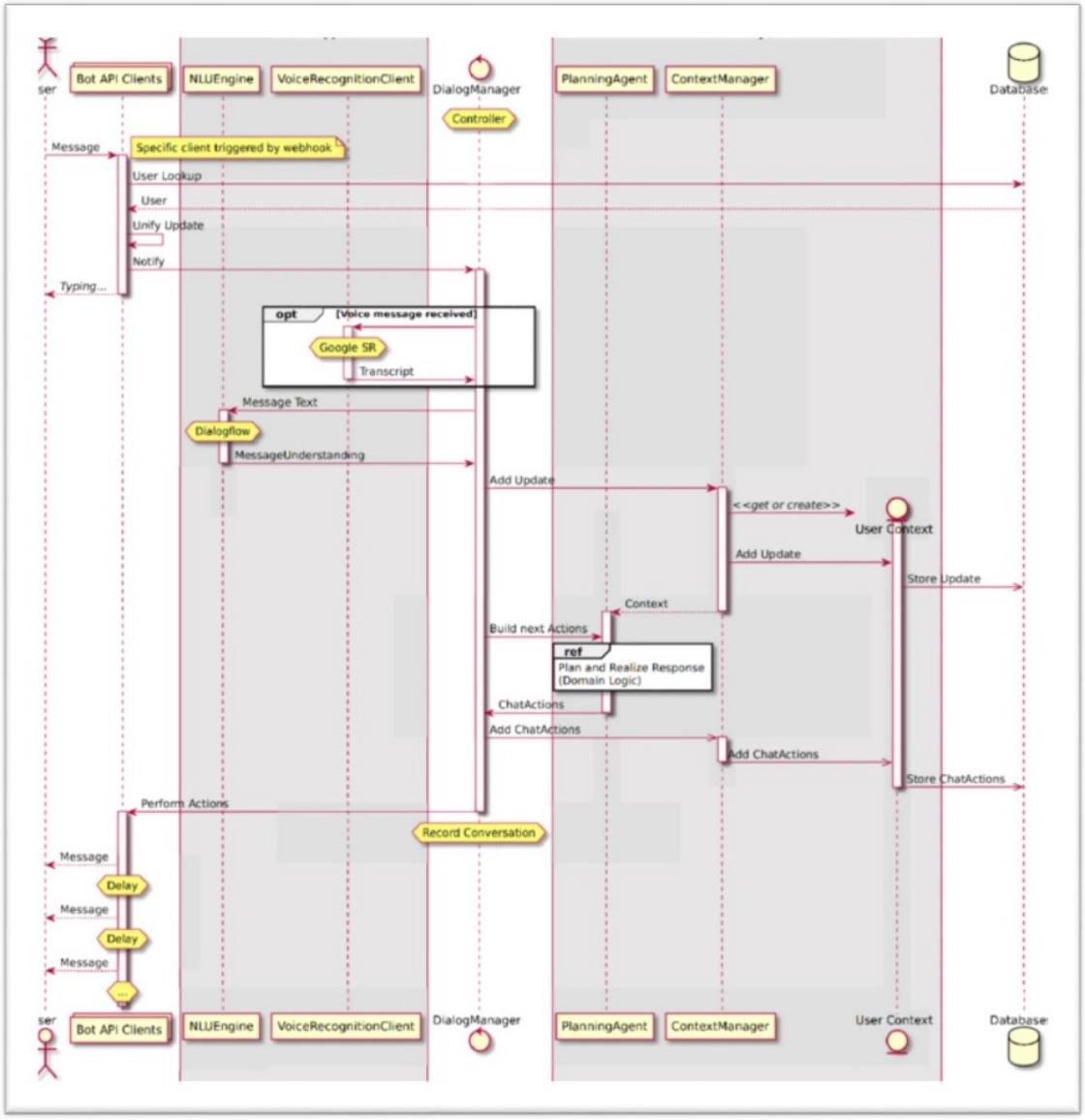
Chat bot Avatar

User Interface View

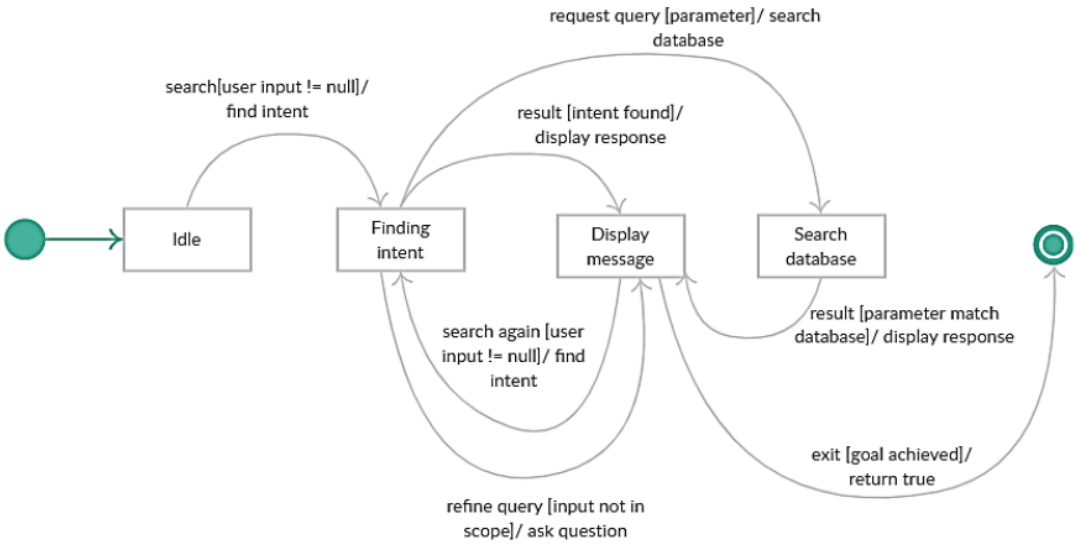
Explanation:

User visits the website he will notice the chatbot Avatar appearing at the bottom right corner of every webpage. When user clicks the avatar chat bot User Interface appears and the two way communication between the bot and the user takes place.

Sequence Diagrams



State Diagram



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GENERAL COMMENTS

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