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Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science and Engineering

CSE4015 - Human and Computer Interaction

PROJECT REPORT

Submitted to Dr.Jenicka S

**Voice chatbot app and website for community based
forums**

Team members

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SLOT

G2

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Acknowledgement

The project report entitled “**Voice chatbot android app and website for community based forums**” is prepared and submitted by **Arpit Khandelwal(19BCE0888), 19BCB0086**
Arshdeep Singh and 19BCE2101 Gurtavrein Singh

We would like to thank our supervisor, **Ma’am Jenicka**, for her great support and help through the process of doing this project, and through this tough phase of pandemic.

We are also grateful to VIT to have given us this opportunity to develop such projects to improve our expertise on languages such as HTML, CSS, and JavaScript.

This project has made the two of us learn web development which helped us land internship opportunities. We would like to thank everyone who helped us with this project and guided us every time.



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Abstract

Speech is one of the oldest and most natural means of information exchange between humans. Over the years, attempts have been made to develop vocally interactive computers to realise voice/speech synthesis. Our project is also another attempt to decrease the gap between text and speech and increase the interaction between humans and computers.

We have 2 components in our project -an app and a website.App is actually a voice Chatbot and our website is a community forum.Chatbot as the name suggests has features to chat via text as well as speech based on questions asked by user and forum has all major features tat user expects from community forum.Chatbot and forum are attached which help chatbot to answer questions available on our forum.All the working and technical analysis has been done in our report below.

1. Introduction

1.1) Motivation

The motivation of this project is to experiment with futuristic ways to interact with our devices and help us connect the knowledge amongst different personalities in a community together. While the website is built for users to create their profiles and add questions based on categories, the mobile app is built as an alternative browsing solution to provide answers in a bot style fashion similar to whatsapp texts.

1.2) Aim

With this project, we aim to change the browsing experience. This Project provides an alternative way to get information as compared to the standard boring way to displaying as much as we can fit on the screen and instead only provides us with the concise information from the answer which have been fed into the database while using the web application.

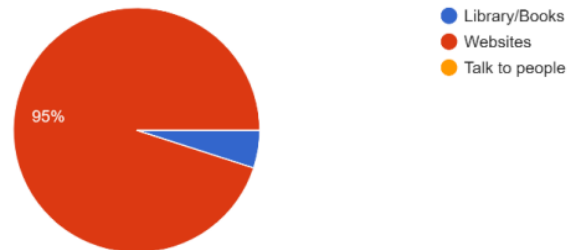
1.3) Objective

- To create a web application that will allow the user to create and read and post new questions to the website.
- The user may also provide support by answering the questions which have been posted in the unanswered section.
- The users will also be able to customise their user profiles based on the questions and answers they provide
- The questions of the website are categorically sorted and the categories are a filtration capability provided to the users which also have the same interests as one of the categories provided.
- Then we plan to use google dialog flow API that will connect this database and create intents to answer such questions
- The application built in flutter will provide the users to type or speak the questions into a microphone which will later give answers by referencing the API.
- There will be a few design elements like dark and light mode etc.

2. Online Surveying and Response Analysis (Google Forms)

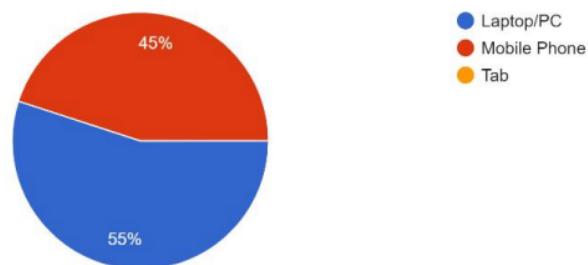
Which source do you use the most when you need some information?

20 responses



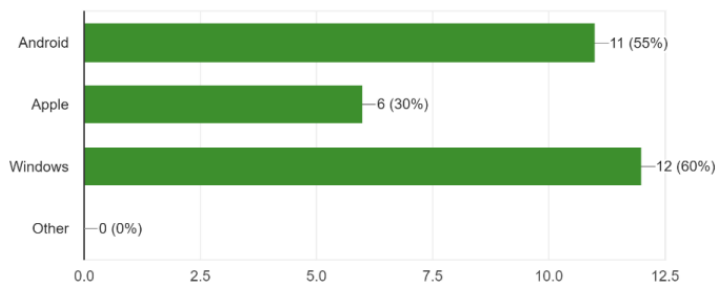
Which type of device do you use the most?

20 responses



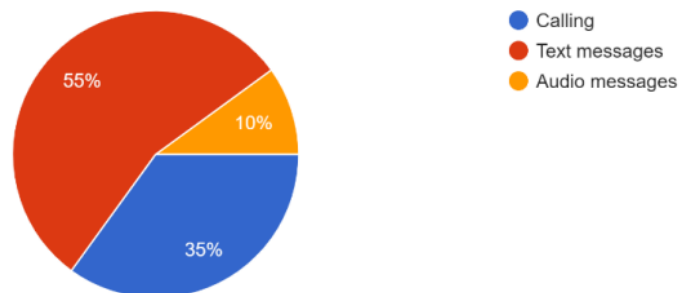
Which OS do you use ?

20 responses



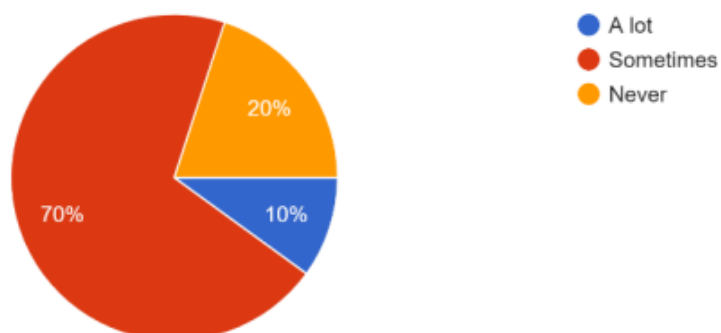
What mode of communications do you prefer?

20 responses



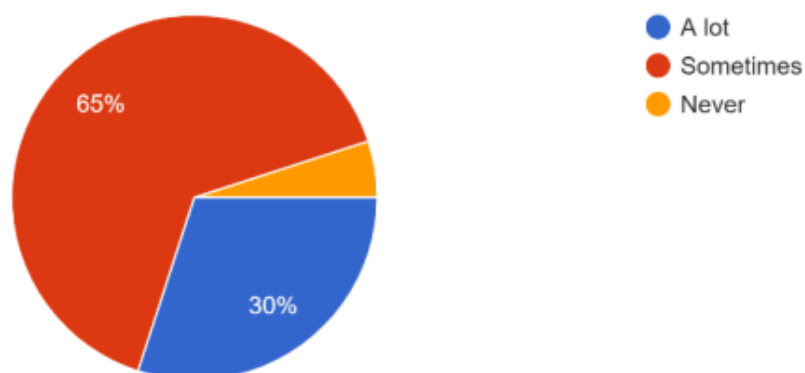
Do you use voice assistants like google assistant ,Siri ,Alexa?

20 responses



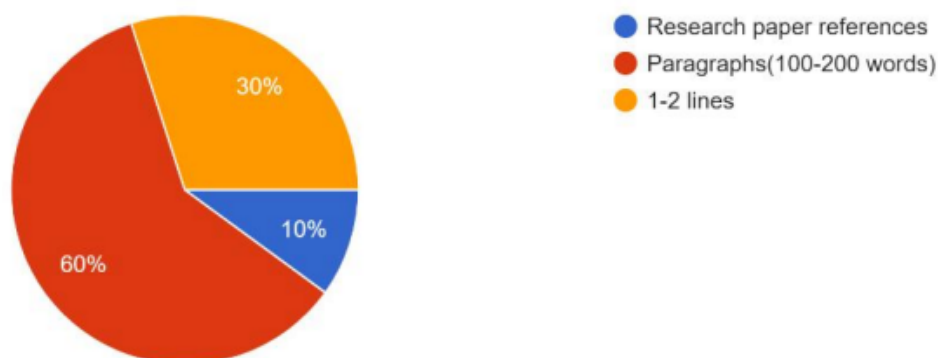
Do you use websites like Quora and Stack Overflow ?

20 responses



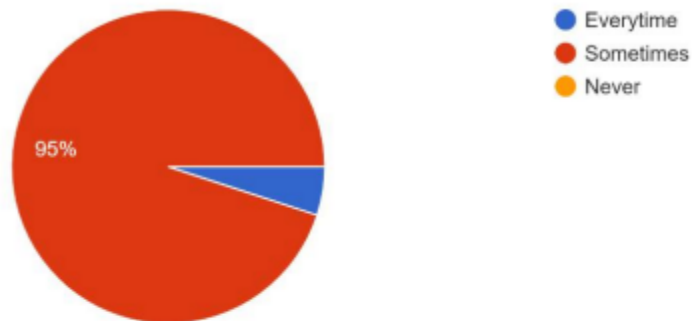
What type of answers do you prefer on these websites?

20 responses



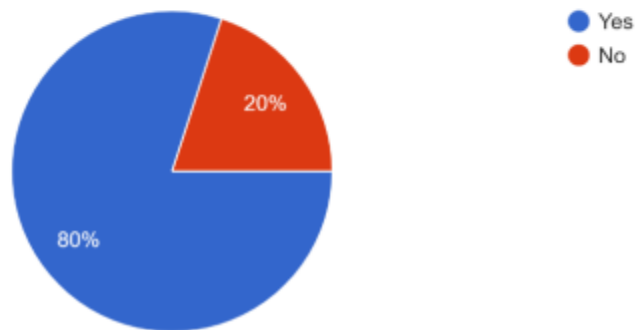
How much do you trust information on these websites?

20 responses



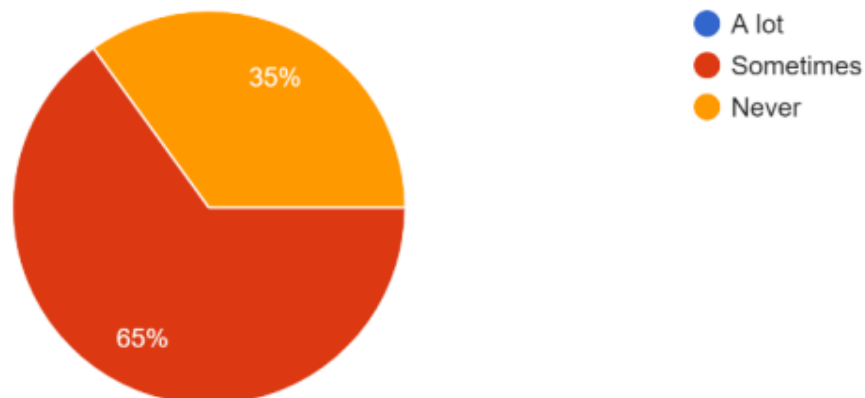
Would you like to have your own Chat bot voice assistant linked with websites like these?

20 responses



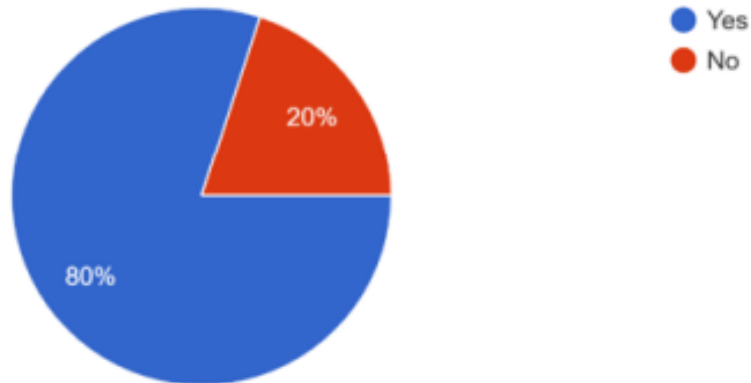
Do you help answer question asked on platforms like Quora or Stack Overflow?

20 responses

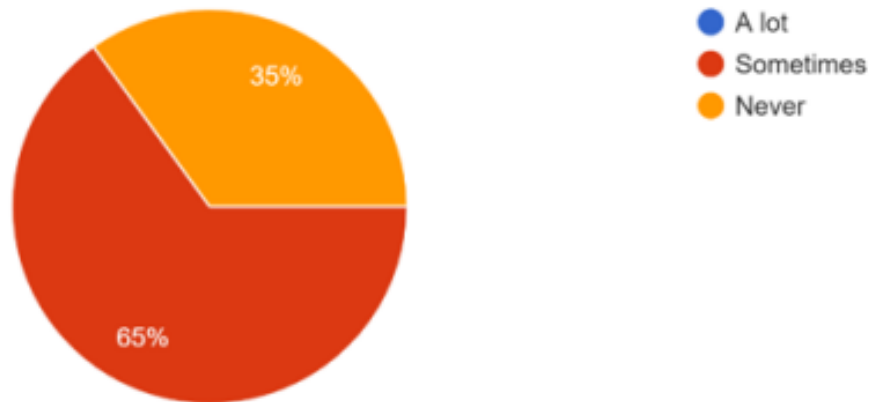


User Profiles

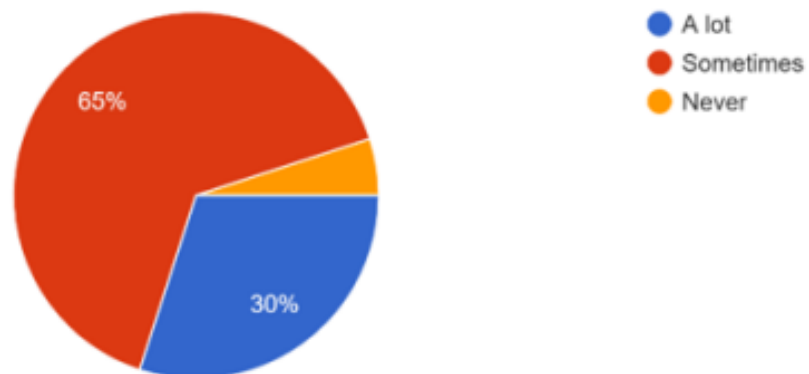
1. Enthusiasts – 80% of all users



2. Contributors – 65%



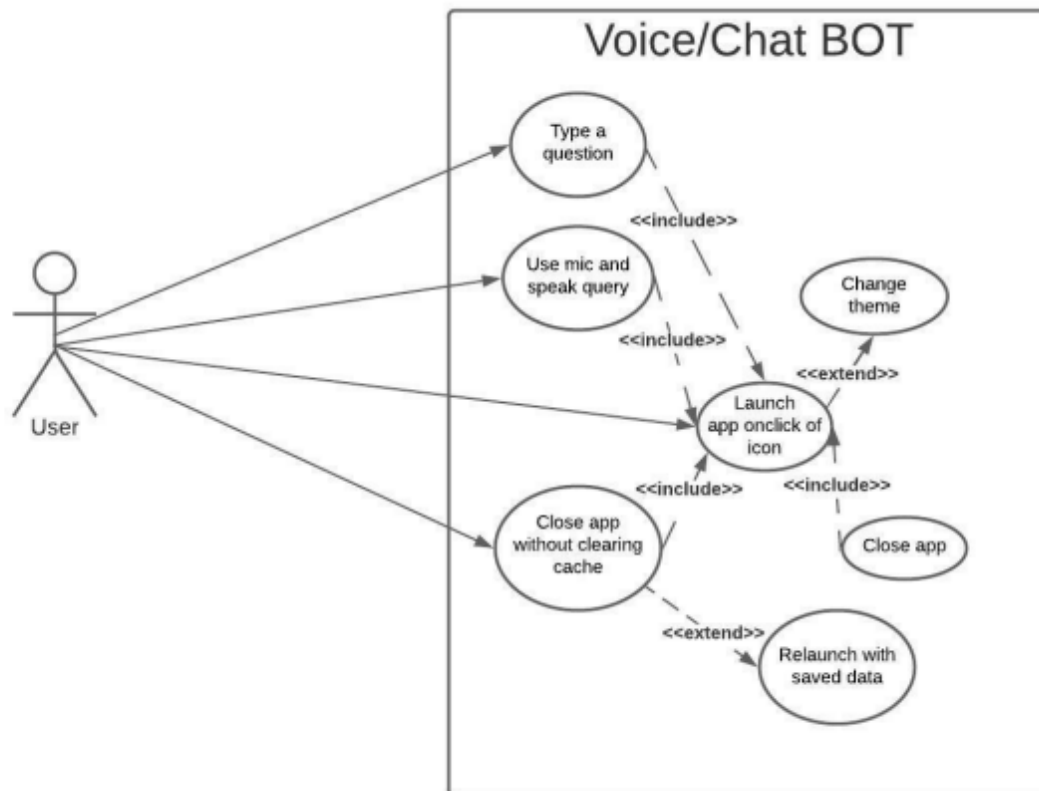
3. 95% users familiar with similar application.



3. Requirement Analysis

Use Case Diagrams - Arshdeep

Mobile App Module



Use Case Descriptions - Arshdeep

1.Type a question

ID:	1
Brief Description:	The user uses his phone to type the question
Primary Actors:	User
Secondary Actors:	none
Preconditions:	The user should have launched the app with internet connected.
Main Flow:	<ol style="list-style-type: none"> 1. User selects the text box. 2. The keyboard is launched 3. The query is typed 4. The send button is clicked 5. The UI updates with the question and the question is sent.
Post Conditions:	A response is generated from the server and showed on screen
Alternative Flow:	none

2.Speak question

ID:	2
Brief Description:	The user uses his phone and talks the question.
Primary Actors:	User
Secondary Actors:	none
Preconditions:	The user should have launched the app and internet is active.
Main Flow:	<ol style="list-style-type: none"> 1. User selects the mic. 2. The mic is activated. 3. The query is spoken into the mic. 4. The send button is clicked 5. The audio message is processed into text. 6. The UI updates with the question and the question is sent.
Post Conditions:	A response is generated from the server and showed on screen
Alternative Flow:	none

3.Launch app

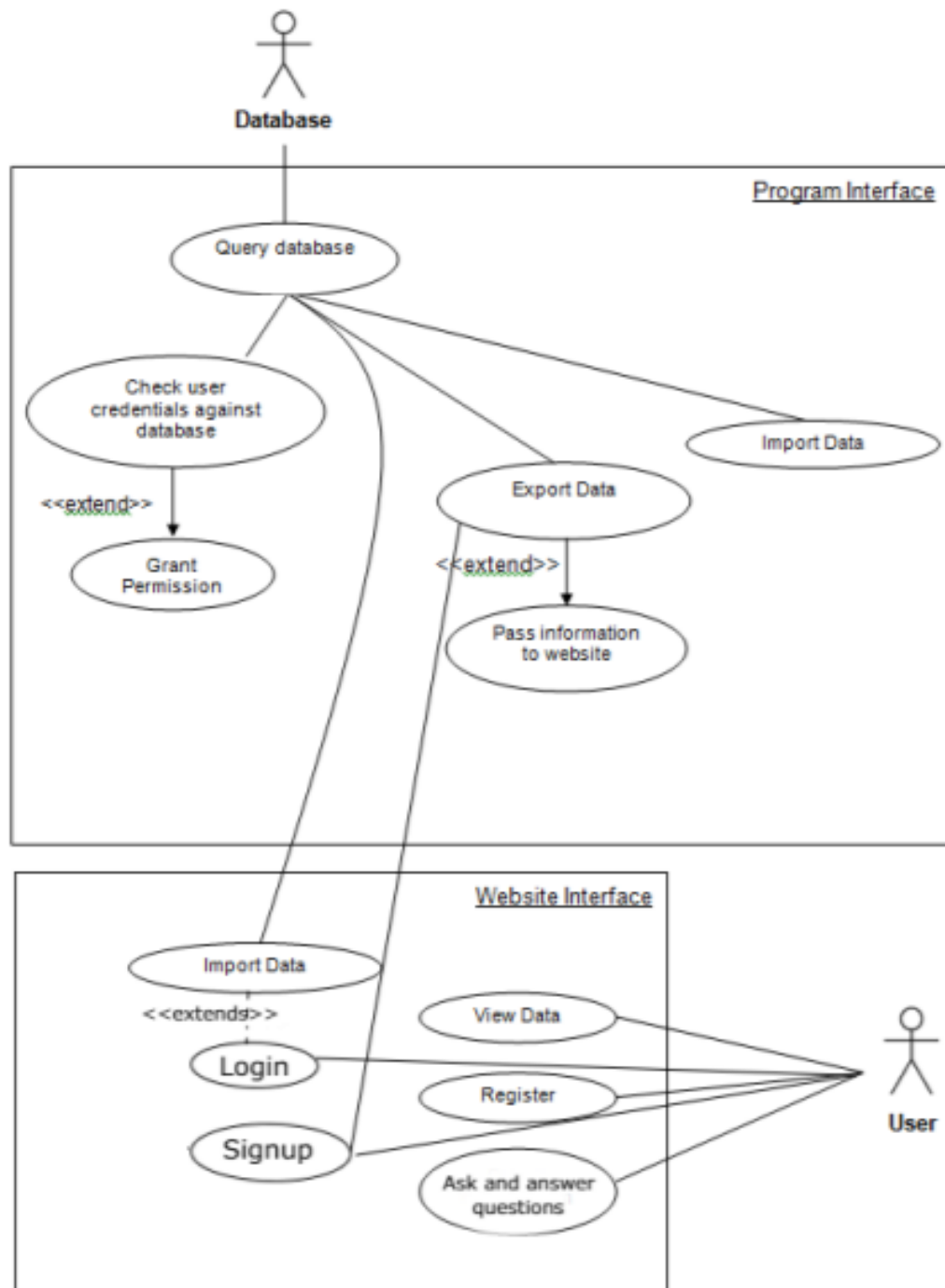
ID:	3
Brief Description:	The user clicks icon to launch the app
Primary Actors:	User
Secondary Actors:	none
Preconditions:	The user should have installed the app
Main Flow:	<ol style="list-style-type: none"> 1. User selects the icon of the app. 2. The system launches the app.
Post Conditions:	none
Alternative Flow:	none

4.Close App without clear cache.

ID:	4
Brief Description:	The user closes app without clearing the cache.
Primary Actors:	User
Secondary Actors:	none
Preconditions:	The user should have launched the app
Main Flow:	<ol style="list-style-type: none"> 1. User simply closes the app by clicking the back button.
Post Conditions:	<ul style="list-style-type: none"> • You can relaunch app and the data will reload with your past questions. • You can clear the app completely by removing the cache.
Alternative Flow:	none

5.Change theme

ID:	5
Brief Description:	The user sets new theme of the device.(light/dark)
Primary Actors:	User
Secondary Actors:	none
Preconditions:	The user should have launched the app
Main Flow:	<ol style="list-style-type: none">1. The system theme is changed2. The UI is rendered with the new system theme with all data intact.
Post Conditions:	A response is generated from the server and showed on screen
Alternative Flow:	none

Use case diagram - Arpit Khandelwal(19BCE0888):**Development of Community based form - BACKEND**

Use Case Descriptions - Arpit Khandelwal

Use case descriptions

1.Login

ID:	1
Brief Description:	The registered user logs in to website
Primary Actors:	Registered User
Secondary Actors:	none
Preconditions:	The user should already have an account
Main Flow:	<ol style="list-style-type: none"> 1. User clicks on login button 2. Login page opens 3. Login id and password is typed 4. Data is sent to server to verify user and appropriate actions are taken
Post Conditions:	User redirected to main dashboard
Alternative Flow:	User is not logged in due to incorrect details

2. Add question to forum

ID:	2
Brief Description:	Registered user wants to add question
Primary Actors:	Registered User
Secondary Actors:	none
Preconditions:	The user should have an account and must be logged in
Main Flow:	<ol style="list-style-type: none"> 1. Click on COMPOSE on navbar 2. Type Question 3. Click on Submit button 4. Data is sent to database
Post Conditions:	Main page appears with Question added
Alternative Flow:	none

3. Answer a question

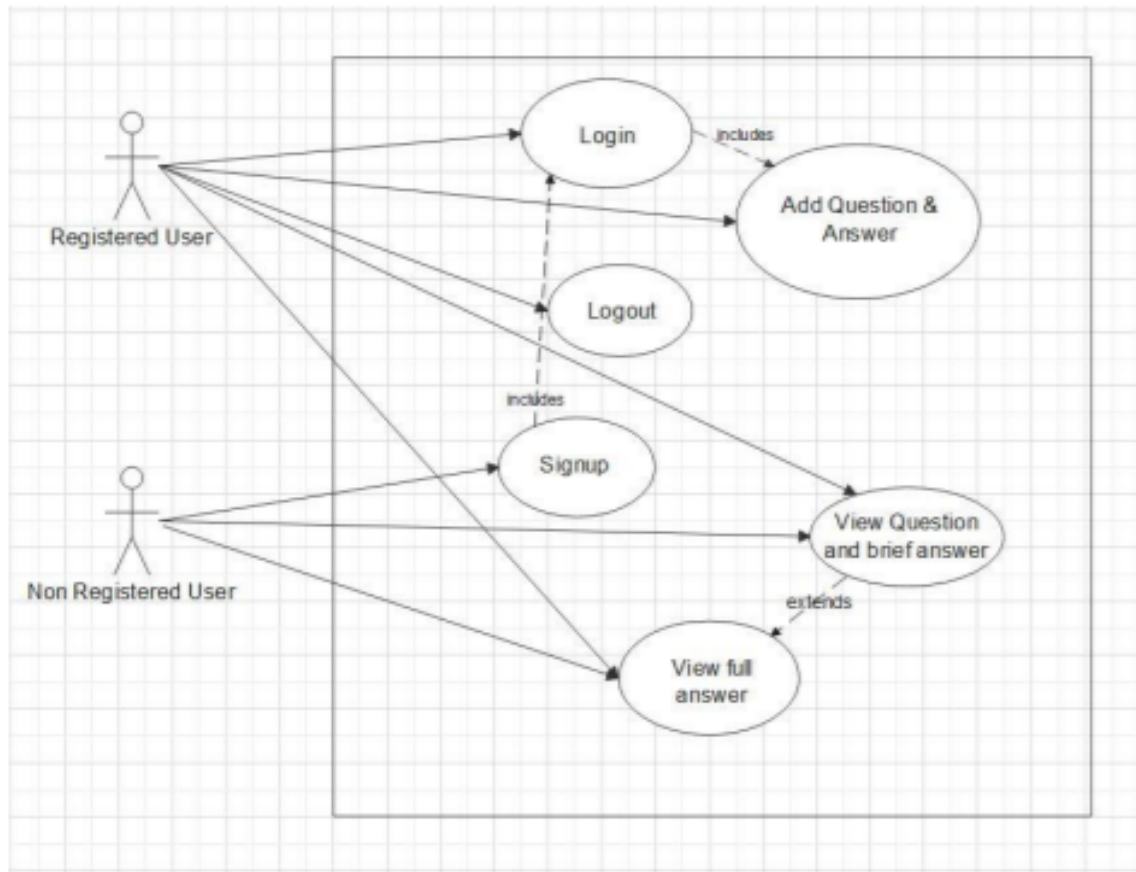
ID:	3
Brief Description:	Registered user wants to answer a question
Primary Actors:	Registered User
Secondary Actors:	none
Preconditions:	The user should have an account and must be logged in
Main Flow:	<ol style="list-style-type: none"> 1. User clicks the question he wants to answer 2. User types the answer with necessary formatting 3. User presses submit and everyone on forum can see the answer
Post Conditions:	Answer is listed under the Question
Alternative Flow:	none

4.Signup

ID:	4
Brief Description:	The user wants to signup
Primary Actors:	Non Registered User
Secondary Actors:	none
Preconditions:	User email should not be registered with forum
Main Flow:	<ol style="list-style-type: none"> 1. User clicks on SIGNUP button 2. On Signup page, user enters id and password 3. Data is sent to database where email-id is checked. 4. If User is already registered, automatically redirected to sign-in page

Use Case Diagram - Gurtavrein Singh

Use Case Diagram



Use Case Description- Gurtavrein Singh

1.Login

ID:	1
Brief Description:	The registered user logs in to website
Primary Actors:	Registered User
Secondary Actors:	none
Preconditions:	The user should already have an account

Main Flow:	User clicks on login button Login page opens Login id and password is typed The send button is clicked Data is sent to server to verify user
Post Conditions:	COMPOSE page appears
Alternative Flow:	none

2.Add question and answer

ID:	2
Brief Description:	Registered user wants to add question and answer
Primary Actors:	Registered User
Secondary Actors:	none
Preconditions:	The user should have an account and must be login to website
Main Flow:	Click on COMPOSE on navbar Type Question and Answer Click on Submit button Data is sent to database
Post Conditions:	Main page appears with Question and Answer added
Alternative Flow:	none

3.Launch website

ID:	3
Brief Description:	The user opens website
Primary Actors:	Both Users
Secondary Actors:	none
Preconditions:	The user should have web browser and internet
Main Flow:	User types url to web browser The system launches the websites
Post Conditions:	Main page appears with Question and brief answer
Alternative Flow:	none

4.Signup

ID:	4
Brief Description:	The not registered user wants to signup
Primary Actors:	Non Registered User
Secondary Actors:	none
Preconditions:	The user should have opened website
Main Flow:	User clicks on SIGNUP button On Signup page,user adds id and password Clicks on SUBMIT button Data is sent to database
Post Conditions:	COMPOSE page appears
Alternative Flow:	none

5.View Full Question and Answer

ID:	5
Brief Description:	See full answer
Primary Actors:	Both Users
Secondary Actors:	none
Preconditions:	The user should have opened website
Main Flow:	The user clicks on Read More link after brief answer Get request is sent to server
Post Conditions:	A response is generated from the server and new tab opens with full answer.
Alternative Flow:	none

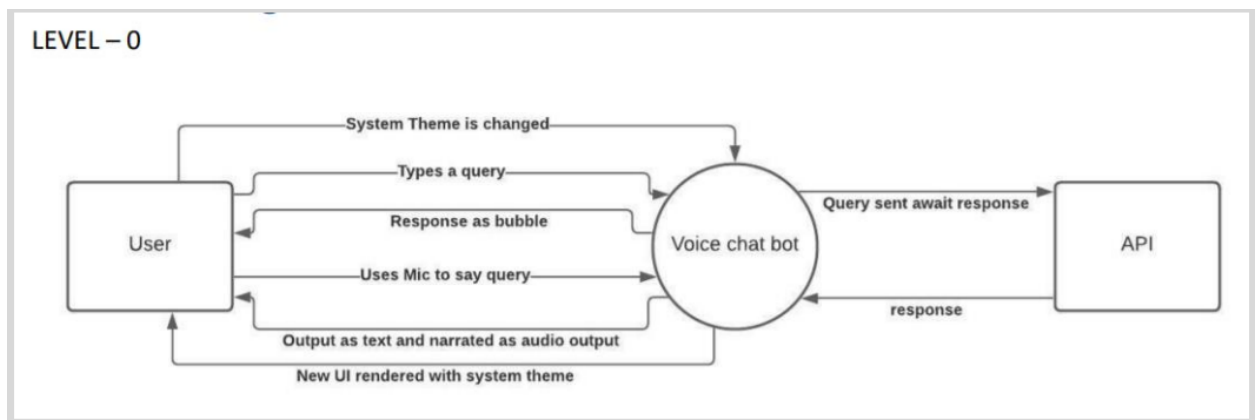
Non-Functional Requirement Analysis

- Ease of usage
- Quick and hassle free setup
- The Language supported is only English
- The questions it will be able to answer are limited by the websites data
- The response time should be under 5 seconds
- Database maintenance is done regularly to filter out ambiguity.

3.Data Flow

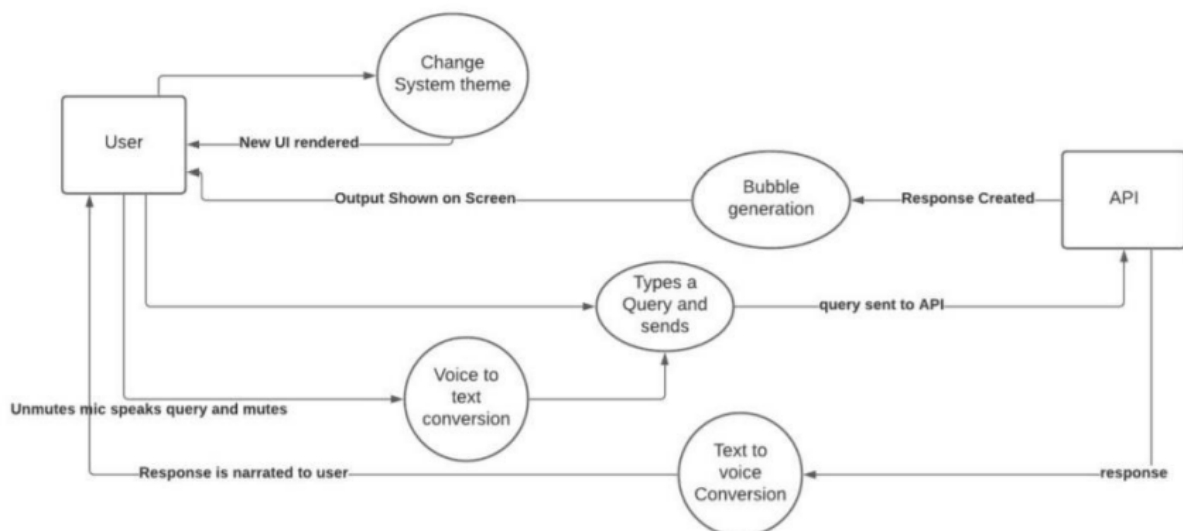
Flutter

Level-0

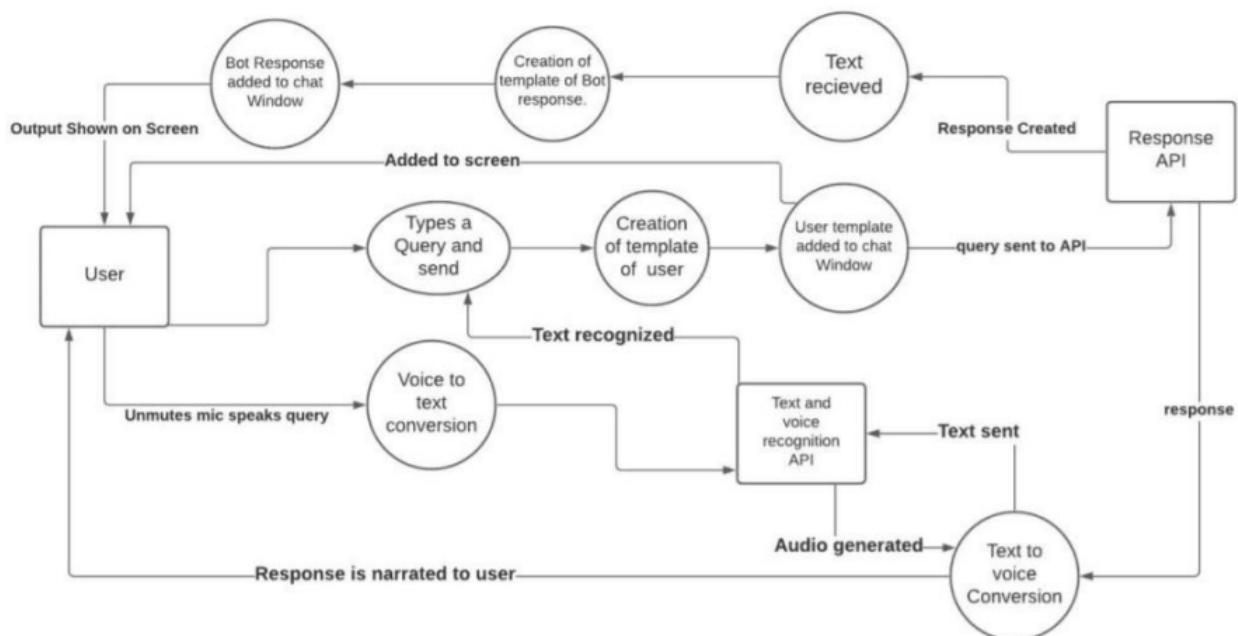


Level-1

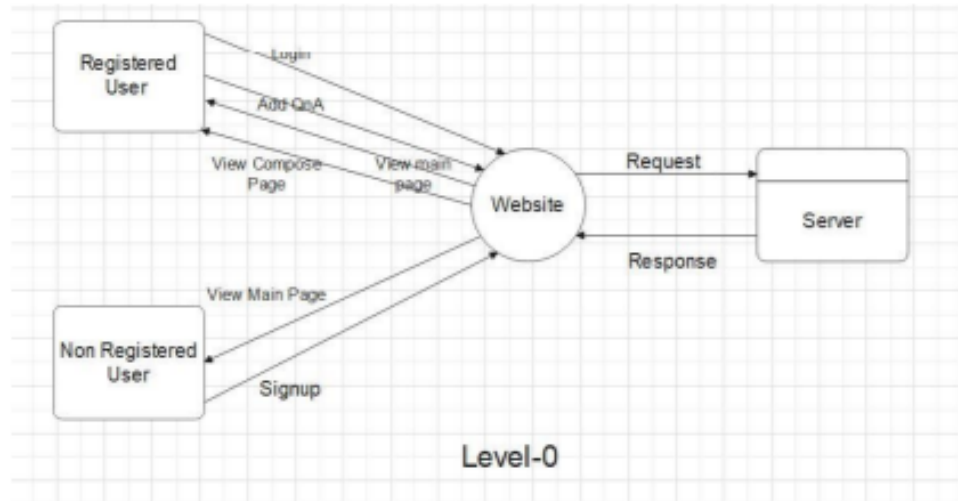
LEVEL – 1



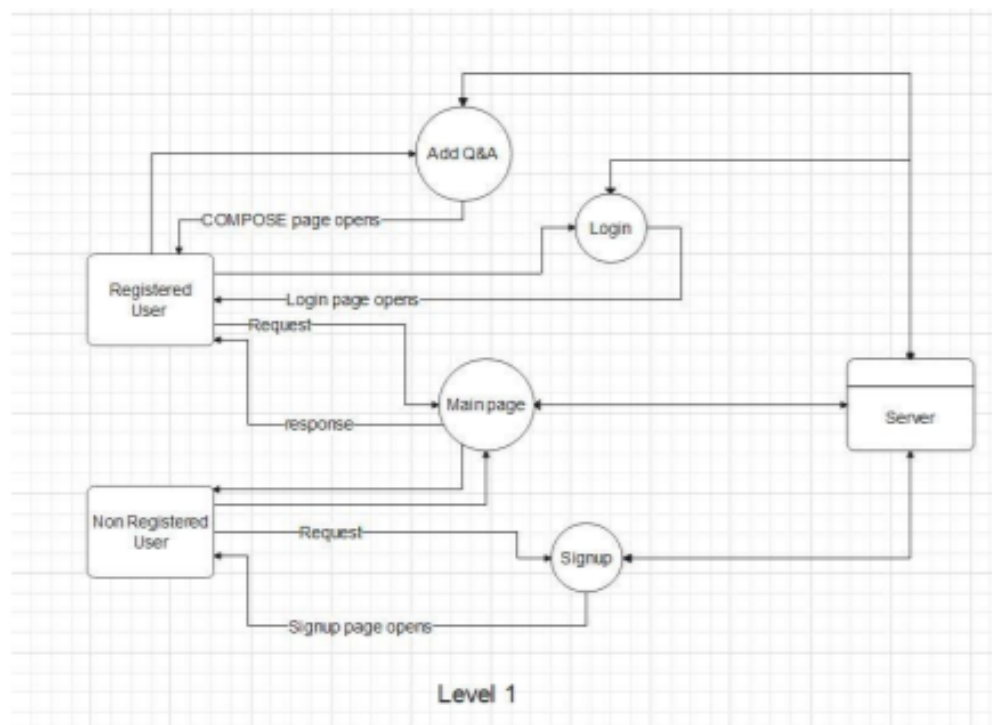
Level-2



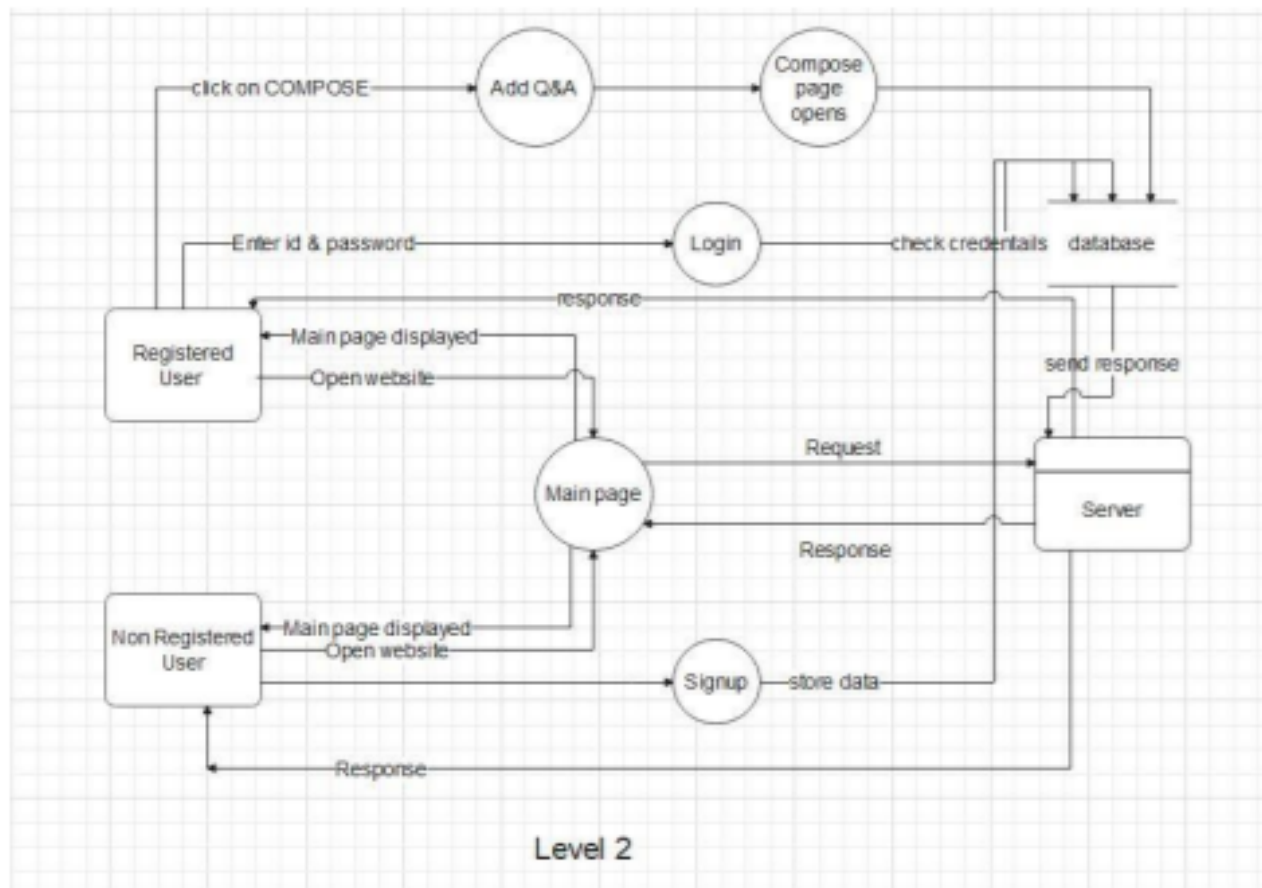
Website



Level 1

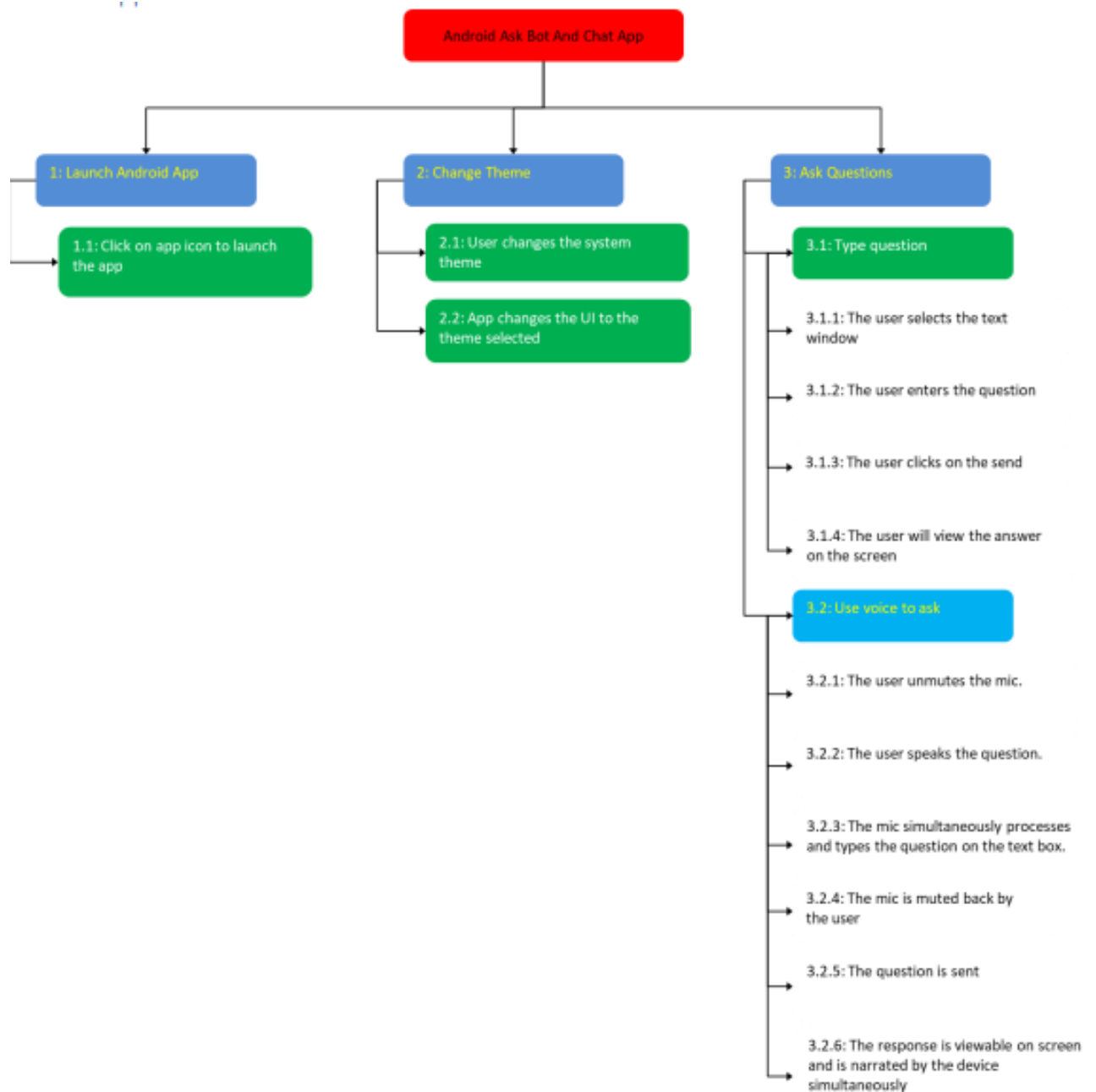


Level 2

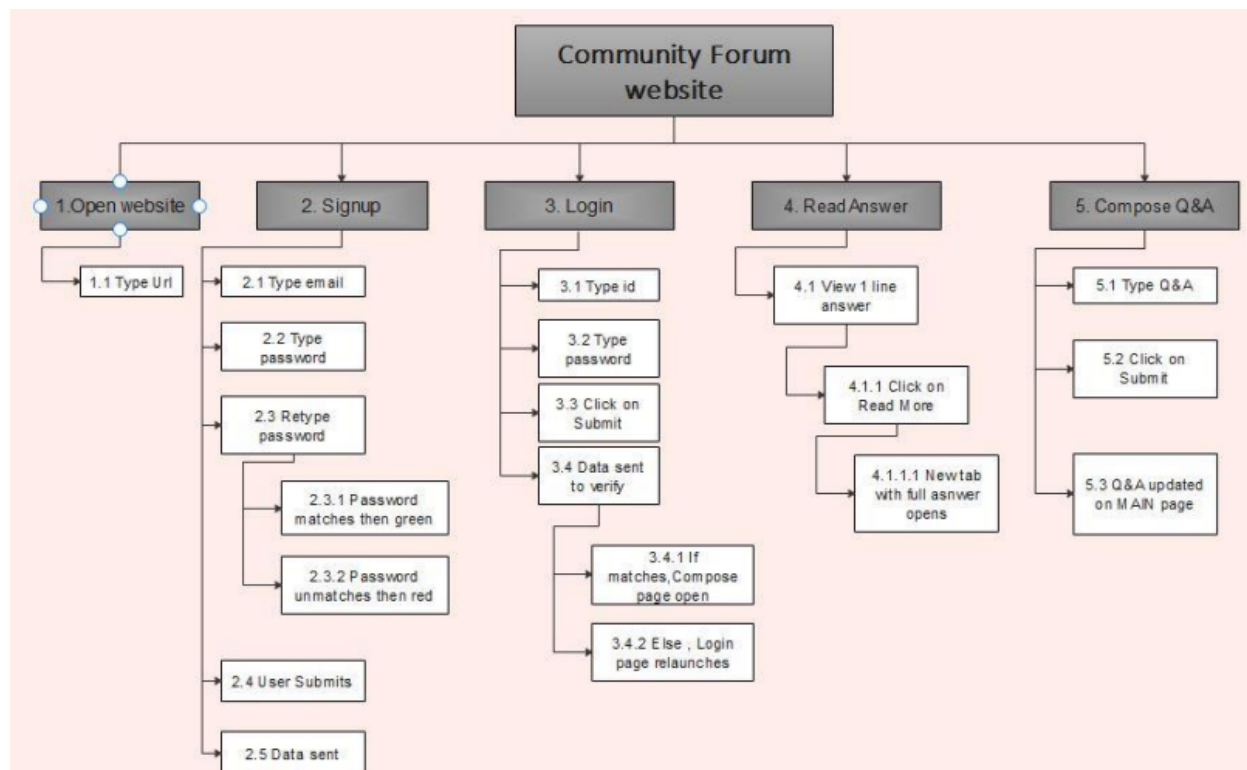


4. HTA

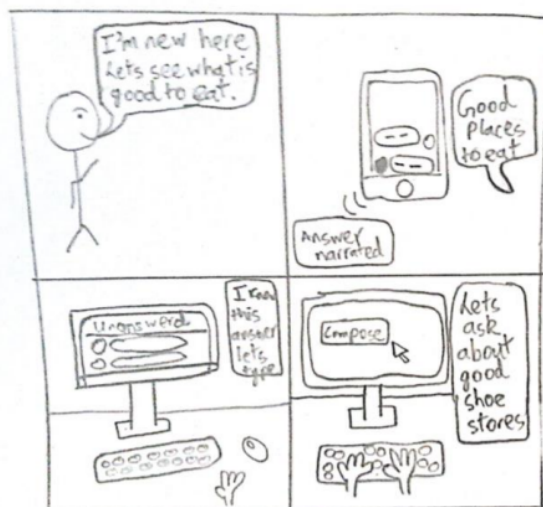
Android App



Website



5. StoryBoard



Other situations

- ① Common tamil words
 - ② Stationary Shops
 - ③ Best local tourists sites
- etc.

6. Project Description

System Features

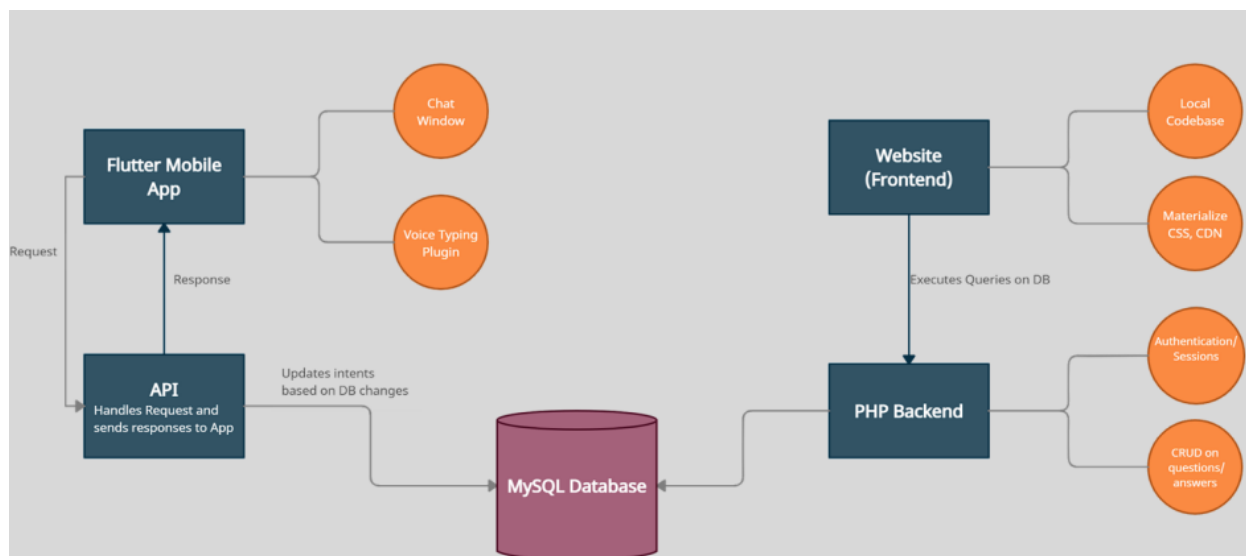
Android app

- The voice/chatbot shall be able to reply to questions if a particular answer is available on the website.
- The user can choose to type a question or narrate it using the mic.
- The theme of the app is decided by the end device system theme and is in line with the users' default choice like in many popular apps(WhatsApp, Instagram, Slack, MS teams etc)
- The answer will be narrated if the question is asked with the mic.
- All responses are answered in a format similar to text message bubbles.
- After a session is destroyed, the users' queries are immediately discarded to save storage and enhance privacy.
- The chatbot's knowledge updates in real time to the website's changes.

Web Application

- Users can view questions and answers without login.
- Users can sign up to the website to answer questions.
- Answer will be posted on main page once posted
- Only 1 line answer will be viewed on main page and will have "Read more" link
- Every question will have its own dynamic webpage to view the full answer.

Module Diagram



Module Description

Mobile App

Mobile app has 2 types of facilities to ask questions . We can either ask a question by speaking or by typing the question. The answer is returned in the same manner as asked. The App's API is connected with a database of websites which searches the question and answers it.

Website

Every user has his/her own account. Users can answer any question, type questions to get answers. In the user's profile, there is info of all the questions asked, answered etc. There is also a separate page to search all the questions and questions can also be searched by categories. Whenever there is an unanswered question, the user can answer it.

API

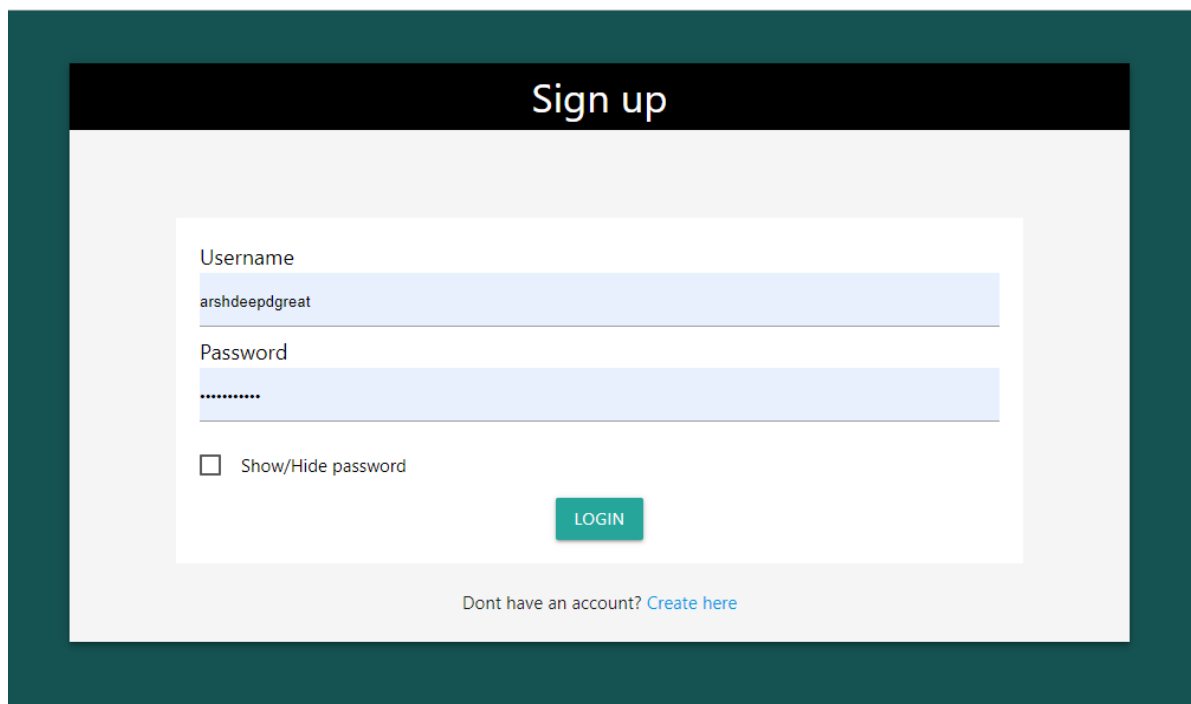
The Application Programming Interface allows the app and MySQL database to interact with each other. It relays the questions and answers to and from the app which in turn helps the voice module to convert received text from Database to speech

PHP Backend

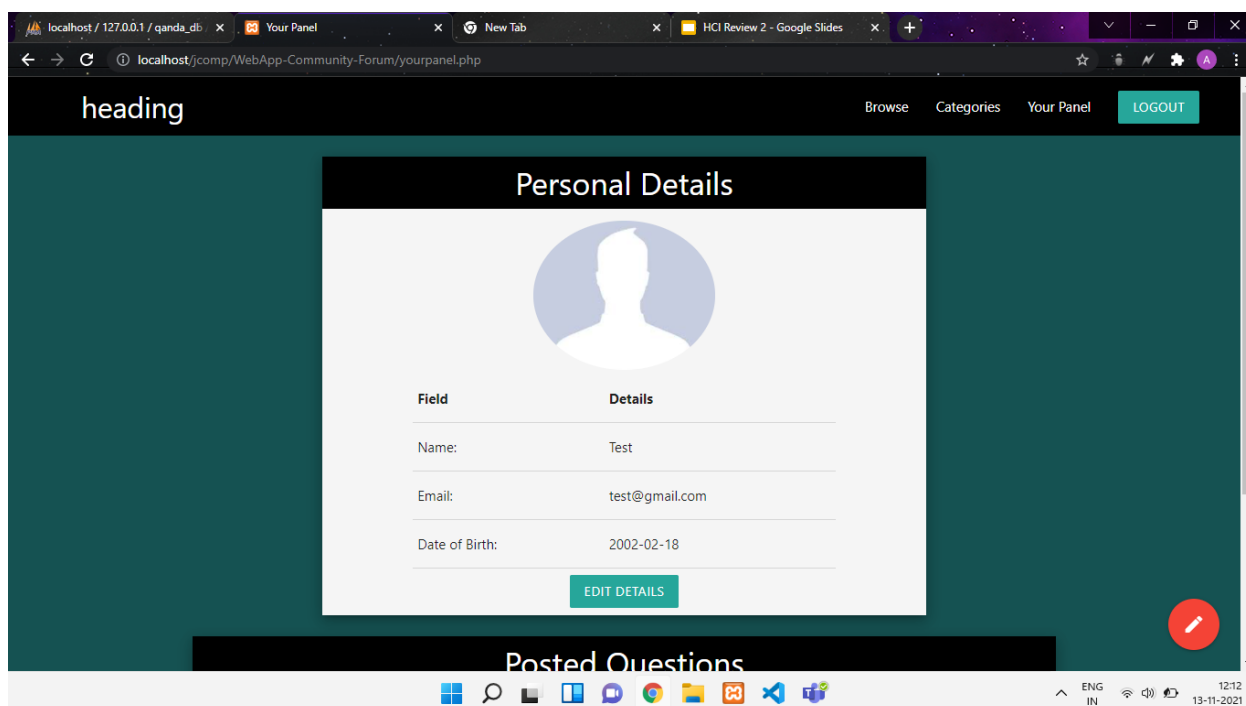
The PHP backend helps authenticate and setup/destroy the sessions on the website, and performs CRUD(create/read/update/delete) on the MySQL database.

7. Design Screenshots

Website



A design screenshot of a 'Sign up' form. The form is centered on a light gray background with a dark teal header and footer. The header contains the text 'Sign up' in white. The form itself is a white box with a light blue border. It contains two input fields: 'Username' with the text 'arshdeepdgreat' and 'Password' with masked characters '*****'. Below the password field is a checkbox labeled 'Show/Hide password'. A teal 'LOGIN' button is positioned below the form. At the bottom of the form area, there is a link: 'Dont have an account? [Create here](#)'.



A design screenshot of a 'Personal Details' form within a web application. The browser window shows the URL 'localhost / comp/WebApp-Community-Forum/yourpanel.php'. The page has a dark teal header with the word 'heading' on the left and navigation links 'Browse', 'Categories', 'Your Panel', and a teal 'LOGOUT' button on the right. The main content area has a dark teal background. The 'Personal Details' form is a white box with a light blue border. It features a circular profile picture placeholder. Below the picture is a table with two columns: 'Field' and 'Details'. The table contains three rows: 'Name: Test', 'Email: test@gmail.com', and 'Date of Birth: 2002-02-18'. A teal 'EDIT DETAILS' button is at the bottom of the form. Below the form, the text 'Posted Questions' is visible. The browser's taskbar at the bottom shows various application icons and the system clock indicating 12:12 on 13-11-2021.

Field	Details
Name:	Test
Email:	test@gmail.com
Date of Birth:	2002-02-18

The screenshot shows a web application interface. At the top, there's a navigation bar with 'Your Panel' and a 'Presenting...' button. Below this, a user profile section displays the name 'Arshdeep Singh', email 'arshdeepdgreat@gmail.com', and date of birth '2002-02-11', with an 'EDIT DETAILS' button. The main content area is titled 'Posted Questions' and contains a table with the following data:

Sno	Question	Category	Posted on	Status
1	What are the 8 planets of the solar system?	General Knowledge	2021-11-05 07:22:55	Answered
2	What is the capital of India?	General Knowledge	2021-11-05 16:15:21	Unanswered
3	What are the union territories of India?	General Knowledge	2021-11-05 16:19:09	Answered

Below the table is a section titled 'Answers contributed' with another table:

Sno	Question	Posted on	Answer
1	What are the 8 planets of the solar system?	2021-11-05 15:21:43	The eight planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Mercury is closest to the Sun. Neptune is the farthest. Planets, asteroids, and comets also orbit our Sun.
2	What are the union territories of India?	2021-11-05 16:20:13	Union Territories of India Andaman and Nicobar Islands. Dadra and Nagar Haveli and Daman and Diu. Chandigarh. Lakshadweep. Puducherry. Delhi. Ladakh. Jammu and Kashmir.

The screenshot shows a web application interface for 'Questions'. The navigation bar includes 'Questions', 'Browse', 'Categories', 'Your Panel', and a 'LOGOUT' button. The main heading is 'Questions in General Knowledge category'. Below this, three question cards are displayed:

Q: What are the 8 planets of the solar system?

Asked By: Anonymous

[VIEW FULL POST](#)

Q: What is the capital of India?

Asked By: Anonymous

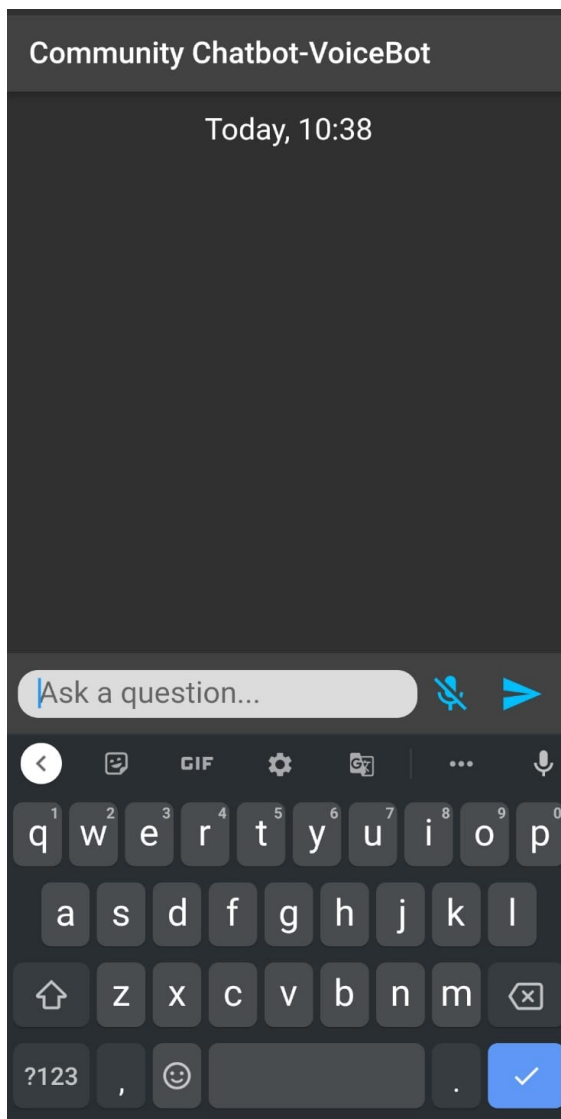
[COMPOSE ANSWER](#)

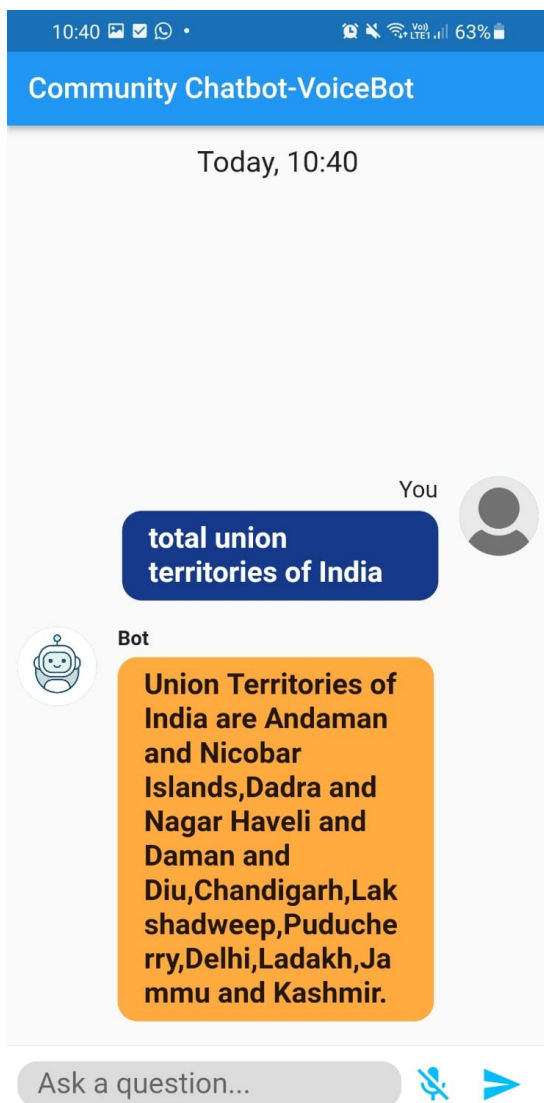
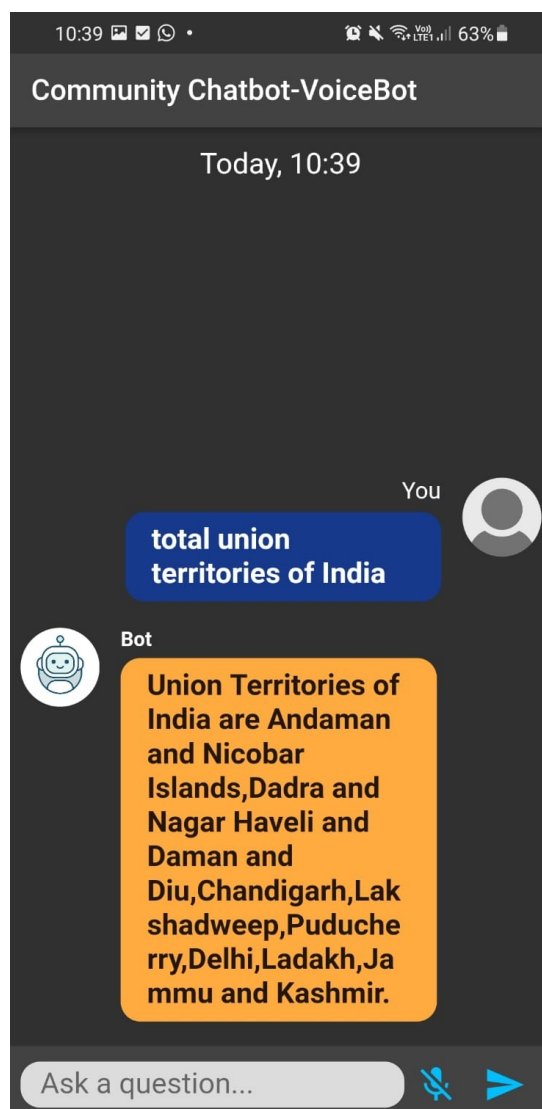
Q: What are the union territories of India?

Asked By: Arshdeep Singh

[VIEW FULL POST](#)

Flutter



**Light Mode****Dark Mode**

8.Heuristic evaluations

1.Visibility of system status

- a.Violations:There is no loading screen
- b.Suggestions:We can add a small loading animation
- c.Severity Rating:1(it's a cosmetic problem)

2.Match between system and real world

- a.Violations:There should be a feedback for when a person is typing but here it missing
- b.Suggestions:Embed a typing animation to stimulate realism
- c.Severity Rating:1

3.User control and freedom

- a.Violations:Users cannot control the language supported
- b.Suggestions:using a translation tool and support languages
- c.Severity Rating:2 (minor problem since most people know english)

4.Helping diagnose error

- a.Violations:users are not prompted when disconnected from internet
- b.Suggestions:to add a dialog box for showing error
- c.Severity Rating:2 (minor problem)

5.Consistency and Standards

- a.Violations:consistency in margins missing
- b.Suggestions:to use simple and standard language and icons
- c.Severity Rating:1 (cosmetic problem)

6.Error prevention

- a.Violations:app may not ask for permissions and causes some features to not worry
- b.Suggestions:ask all permissions at first launch of app
- c.Severity Rating:3 (major issue and must be fixed)

7.Recognition rather than recall

- a.Violations:time and date are hidden and user must exit app to see
- b.Suggestions:show important information in top var
- c.Severity Rating:1 (cosmetic problem)

8.Flexibility and efficient

- a.Violations:voice recognition is slow
- b.Suggestions:decreases the animation steps which may happen during the process
- c.Severity Rating:2 (minor issue)

9.Aesthetic and minimal design

- a.Violations:creation of custom text window
- b.Suggestions:usage of a standard text window provided in apps like whatsapp
- c.Severity Rating:2 (minor issue)

10.Help and documentation

- a.Violations:no usage tutorial at first launch of app
- b.Suggestions:create a basic animation of users
- c.Severity Rating:3 (major issue)

9.Testing

LOGIN PAGE

No	Field/Button	Action	Input	Expected result	Pass/Fail
1.	LOGIN FIELD	Enter Data and Submit	Blank	Form not accepted. Message "Please enter data"	PASS
2.	LOGIN FIELD	Enter Data and Submit	Incorrect Data	Form not accepted. Message "Please reenter the details correctly"	PASS
3.	LOGIN FIELD	Enter Data and Submit	Valid Credentials	Form accepted. Redirected to seller page.	PASS
4.	Create new Account button	On-Click	None	Redirected to sign-up page	PASS

SIGN UP PAGE

No	Field/Button	Action	Input	Expected result	Pass/Fail
5.	All FIELDS	Enter Data and Submit	Blank	Form not accepted. Message "Please enter data"	PASS
6.	PASSWORD FIELD	Enter different values for password and Submit	DIFFERENT DATA FOR PASSWORD AND CONFIRM PASS	Form not accepted. Message "passwords don't match"	PASS
7.	Username Field	Enter data and submit	Username of already registered user	Form not accepted. Message "Username take use another username"	PASS
8.	EMAIL FIELD	Enter data and submit	INVALID EMAIL ADDRESS	Form not accepted. Message "@ SYMBOL MISSING PLEASE INCLUDE @ SYMBOL"	PASS
9.	ALL FIELDS	Enter Data and Submit	Valid data	Form accepted. HYPERLINK TO LOGIN DISPLAYED.	PASS
10.	LOGIN button	On-Click	None	Redirected to LOGIN page	PASS

10.Conclusions

With the increase in technologies like AI in speech and the integration of app and web based platforms it is inevitable that we have had a glimpse of how toolkits are able to enhance the core essential ways of Human-Computer Interaction. We definitely foresee Speech based interactions in the near future and in fact many of the Tech Giants like Amazon ,Google and apple have created products like Alexa,Siri and Google assistant that have captured the market very well and there is a small group of users which is increasing rapidly as more and more people familiarise themselves with speech based iot devices.

11. Future scope

1. The scope of the voice bot can be enhanced to search for answers all across the internet
2. This can be done by integration to search browsers like google
3. Website can be enabled with features like approval before actually pushing the answers to the website which will prevent redundant information from spreading
4. App could be enhanced to enable all the web features on the app.

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