MINI PROJECT
(2019-20)

College Counselling Website & ChatBot (IBM'sWatson API)

FINAL REPORT(13/05/2020)

Institute of Engineering & Technology

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Declaration

We hereby declare that the work which is being presented of Mini Project- "College Counselling Website and ChatBot" in partial fulfilment of the requirements for Mini Project viva voce, is an authentic record of my work carried under the supervision of our faculty.

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Abstract:

As technology advances the internet is becoming ever popular. Websites have become an essential part. Often the website of an institution is used as a major requirement to rate it. Thus having a website is essential for any major organization. Since a website can usually be accessed from anywhere, it was the best way for us to expand our reach of the College Counselling System.

College can be a stressful time for a lot of students. Effective stress management in young people goes a long way in their success. The benefits of counseling for college students include enhancement of their listening and social skills as well as empathy towards others. They will learn to express emotions (i.e. anger, frustration, fear) through a healthy way, plus they get to improve their decision-making skills. The benefits of counseling in general also include reliable social support from forming healthy peer relationships.

Hence, with the mission of aiding students with better decision making abilities for their college and stream selection, we have made a website for college counselling, integrated with a ChatBot.

TABLE OF CONTENTS:

INTRODUCTION

ABOUT THE PROJECT

This project aims at developing a chatbot that can help students in choosing the right stream and course for their under graduation. The project is being developed for the school passed out students who face a lot of problems while deciding which course and branch they should opt-in college/university.

The chatbot will work as an android app with a proper user interface. IBM's Watson is a powerful AI API that can be used to develop such bots. The chatbot uses IBM's Watson API as its backbone, which will provide the AI strength to the bot. A user can give his/her area of interest or future goals along with educational choices and the bot will provide the possible courses along with the college which he can opt for. It will also help the user with the scope and demand of the suggested course.

The user can head over the website and can provide his choices and options in the form of text or voice, which will then be converted into text by the backend of the app. This text query will be sent to Watson for further processing. Watson will analyze the user's query and will return the proper output using AI. This result will be displayed
to the user in the form of voice and text depending on the mode user prefers.
In this way, the chatbot will work as a counsellor for the students and will be beneficial to them.

Requirements:

a) Hardware:

- Laptop(minimum i3 processor or equivalent/4gb of ram)
- Android powered smartphone

b) Software:

- Android Studio
- Grudle
- Java
- Watson API
- Git for vcs and github.

c) **Technology used for Web Development**

- HTML
- CSS
- JavaScript

About College Counselling

Wellbeing and a balanced mental health are key elements for a fruitful college experience. Much of the students' stress comes from balancing relationships, school, work, and other personal issues. There are many advantages to seeing a counselor and seeing one can help students with these sorts of issues.

Selecting College is a crucial period because this is when students make career decisions. They'll need professional help that will guide them in the right direction. College counseling aids them in understanding better their weaknesses and strengths regarding their current course/profession. They'll also be able to identify which career is best suited for them.

The growth of new technologies has made it possible for the online delivery of psychological support The expansiveness of technology in people's lives has been noticed by mental health professionals. Further, it is predicted that the increasing growth and prevalence, as well as the demand of users, will solidify technology as an integral aspect of healthcare into the future Many forms of internet-delivered psychological support have been researched, including online counselling.

Concerns Addressed

How counseling helps is that students don't feel their behaviors are being judged or that they are told what to do. Moreover, they will also understand that there aren't any quick and easy answers to complex problems.

The advantages of seeing a counselor include:

- Providing a safe zone where the students can speak honestly about their passions.
- Offering students guidance and support about their decisions
- Helping them cope better with reality
- Assisting them (and facilitating) positive behavior changes

In spite of the fact that a considerable amount of college students are experiencing depression or stress, not many are seeking help from their campus counseling centers. Students need to see the advantages of seeing a counselor and they have to be made aware of the benefits of counseling in general.

About ChatBot

WHO's Mental Health Action Plan 2013-2020 suggests that health systems have not yet adequately responded to the burden of mental disorders. As a consequence, the gap between the need for treatment and its provision is wide all over the world. In low- and middle-income countries, between 76% and 85% of people with mental disorders receive no treatment, the report reveals. In high-income countries, between 35% and 50% of people with mental disorders are in the same situation, it states. People with mental illness require social support and help in accessing educational programmes or finding employment and housing, which enable them to live and be active in their communities. Prakriti Poddar, expert in mental health and the managing trustee of Poddar Foundation, works closely with schools, government organisations, gram panchayats, social workers and communities to create a support network.

Chatbots can be used to monitor one's mood or track exercise/sleep routine as is done by a therapist. They provide companionship and therapy support that can lessen the load on therapists. It emerges as an option for people who have problems with accessibility and affordability, in terms of time, distance, and finances.

These were the ideas referred to by us. When we could bring the regular age chatbot to the students who couldn't go to a counselor to seek advice. We got the advice from them, through our real time chatbot.

Motivation:

Once after passing out school most of the students are confused in choosing the right stream and course for themselves. This choice is based on various factors such as area of interests, marks, and future choices. For example most of the students are confused whether to go with CSE or ECE branch of engineering. Many of the school's passed out students do not have a proper idea about possible streams and available courses in them.

There are several firms which claim to provide proper guidance to such students. A chatbot that can recommend possible streams, courses, colleges and other information to a student can be of great help to him in his choice making.

Research into online counselling has produced a small number of empirical studies that, for the most part, show positive results. In addition, the broad area of computer-aided psychotherapy has produced a multitude of studies that attest to the positive potential of online and remote delivery of psychological support

FUTURE PROSPECTS

As the practice has shown, most popular chatbots based on **NLP** (natural language processing) aren't as skilled as they were thought to be. They aren't able to deal with all encountered tasks, they get lost in the context and become confused. The technology needs constant improvements.

We need to come up with another solution that would help to understand the users intent better and that would fulfil the same functions. The hybrid approach which includes the use of chatbots together with the **conversational interface (CI)** could help us improve this technology in the future.

INFERENCE

Chatbots has emerged as a hot topic in the latest years, and it is used by numerous companies in various areas - help desk tools, automatic telephone answering systems, e-commerce and so on. Even though the technology has been around since the 60's (Atwell & Shawar, 2007). The world has now a large prospect for this technology. This can likely be explained by the recent year's advancements in messaging applications and AI technology. A lot of companies are looking forward to automating their services in return for a long term gain and accuracy in tasks. This has led to them, using such technologies.

WEB DEVELOPMENT

Web development is a broad term for the work involved in developing a website for the Internet (World Wide Web) or an intranet (a private network). Web development can range from developing the simplest static single page of plain text to the most complex web-based internet applications, electronic businesses, and social network services.

A more comprehensive list of tasks to which web development commonly refers, may include web engineering, web design, web content development, client liaison, client-side/side scripting, web server and network security configuration, and e-commerce development. Among web professionals, "web development" usually refers to the main non-design aspects of building web sites: writing markup and coding. Most recently.

Web development has come to mean the creation of content management systems or CMS. These CMS can be made from scratch, proprietary or open source. In broad terms the CMS acts as middleware between the database and the user through the browser. A principal benefit of a CMS is that it allows non-technical people to make changes to their website without having technical knowledge.

For larger organizations and businesses, web development teams can consist of hundreds of people (web developers) and follow standard methods like Agile methodologies while developing websites. Smaller organizations may only require a single permanent or contracting developer, or secondary assignment to related job positions such as a graphic designer or information systems technician. Web development may be a collaborative effort between departments rather than the domain of a designated department. There are three kinds of web developer specialization: front-end developer, back-end developer, and full-stack developer.

CREATING THE WEBSITE

HTML 5

Hypertext Markup Language (**HTML**) is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript it forms a triad of cornerstone technologies for the World Wide Web. Web browsers receive HTML documents from a web server or from local storage and render them into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.

HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects, such as interactive forms, may be embedded into the rendered page. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. HTML elements are delineated by tags, written using angle brackets. Tags such as <img /> and <input /> introduce content into the page directly. Others such as ... surround and provide information about document text and may include other tags as sub-elements. Browsers do not display the HTML tags, but use them to interpret the content of the page.

HTML can embed programs written in a scripting language such as JavaScript which affect the behavior and content of web pages. Inclusion of CSS defines the look and layout of content. The World Wide Web Consortium (W3C), maintainer of both the HTML and the CSS standards, has encouraged the use of CSS over explicit presentational HTML since 1997.

HTML markup consists of several key components, including those called tags (and their attributes), character-based data types, character references and entity references. HTML tags most commonly come in pairs like <h1> and </h1>, although some represent empty elements and so are unpaired, for example <img>. The first tag in such a pair is the start tag, and the second is the end tag (they are also called opening tags and closing tags)

The following is an example of the classic Hello world program, a common test employed for comparing programming languages, scripting languages and markup languages. This example is made using 9 lines of code:

General Syntax of HTML

```
<!DOCTYPE html>
<html>
    <head>
        <title>This is a title</title>
    </head>
  <body>
        <p>Hello world!</p>
  </body>
</html>
```

CSS:

Cascading Style Sheets (**CSS**) is a style sheet language used for describing the presentation of a document written in a markup language. Although most often used to set the visual style of web pages and user interfaces written in HTML and XHTML, the language can be applied to any XML document, including plain XML, SVG and XUL, and is applicable to rendering in speech, or on other media. Along with HTML and JavaScript, CSS is a cornerstone technology used by most websites to create visually engaging web pages, user interfaces for web applications, and user interfaces for many mobile applications.

CSS is designed primarily to enable the separation of presentation and content, including aspects such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple HTML pages to share formatting by specifying the relevant CSS in a separate .css file, and reduce complexity and repetition in the structural content.

Separation of formatting and content makes it possible to present the same markup page in different styles for different rendering methods, such as on-screen, in print, by voice (via speech-based browser or screen reader), and on Braille-based tactile devices. It can also display the web page differently depending on the screen size or viewing device. Readers can also specify a different style sheet, such as a CSS file stored on their own computer, to override the one the author specified.

Changes to the graphic design of a document (or hundreds of documents) can be applied quickly and easily, by editing a few lines in the CSS file they use, rather than by changing markup in the documents.

The CSS specification describes a priority scheme to determine which style rules apply if more than one rule matches against a particular element. In this so-called cascade, priorities (or weights) are calculated and assigned to rules, so that the results are predictable.

BOOTSTRAP

Twitter Blueprint to Bootstrap, and released as a

open source project on August 19, 2011. It has continued to be maintained by Mark Otto, Jacob Thornton, and a small group of core developers, as well large community of contributors.

On January 31, 2012, Bootstrap 2 was released, which added a twelve-column responsive grid layout system, inbuilt support for Glyphicons, several new components, as well as changes to many of the existing components.

On August 19, 2013, Bootstrap 3 was released, which redesigned components to use flat design, and a mobile first approach.

On October 29, 2014, Mark Otto announced that Bootstrap 4 was in development. The first alpha version of Bootstrap 4 was released on August 19, 2015.

Bootstrap 3 supports the latest versions of Google Chrome, Firefox, Internet Explorer, Opera, and Safari (except on Windows). It additionally supports back to IE8 and the latest Firefox Extended Support Release (ESR).

Since 2.0, Bootstrap supports responsive web design. This means the layout of web pages adjusts dynamically, taking into account the characteristics of the device used (desktop, tablet, mobile phone).

Starting with version 3.0, Bootstrap adopted a mobile-first design philosophy, emphasizing responsive design by default.

The version 4.0 alpha release added Sass and flexbox support.

Installing and linking bootstrap to the HTML page:

Install bootstrap from https://getbootstrap.com/

SCRIPTING

There are two scripting methodologies.

1. Server side scripting: This scripting is done at the server end
2. Client side scripting: This scripting is done at the client end or the browser.

SERVER SIDE SCRIPTING

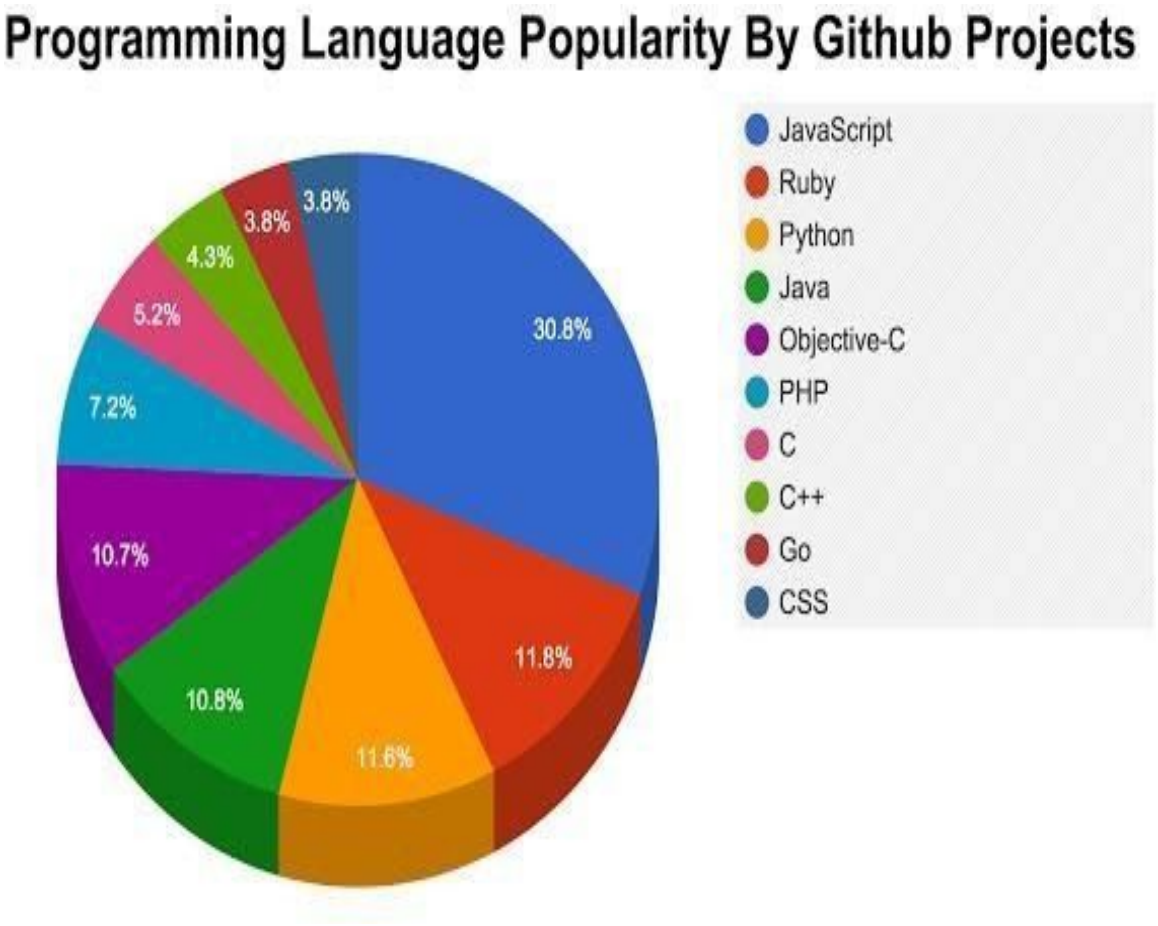
Server-side scripting is a technique used in web development which involves employing scripts on a web server which produce a response customized for each user's (client's) request to the website. The alternative is for the web server itself to deliver a static web page. Scripts can be written in any of a number of server-side scripting languages that are available (see below). Server-side scripting is distinguished from client-side scripting where embedded scripts, such as JavaScript, are run client-side in a web browser, but both techniques are often used together.

Server-side scripting is often used to provide a customized interface for the user. These scripts may assemble client characteristics for use in customizing the response based on those characteristics, the user's requirements, access rights, etc. Server-side scripting also enables the website owner to hide the source code that generates the interface, whereas with client-side scripting, the user has access to all the code received by the client. A down-side to the use of server-side scripting is that the client needs to make further requests over the network to the server in order to show new information to the user via the web browser. These requests can slow down the experience for the user, place more load on the server, and prevent use of the application when the user is disconnected from the server.

Server Side scripting Languages

There are several languages that can be used for server-side programming:

PHP
ASP.NET (C# OR Visual Basic)
C++
Java and JSP
Python
Ruby on Rails and so on.



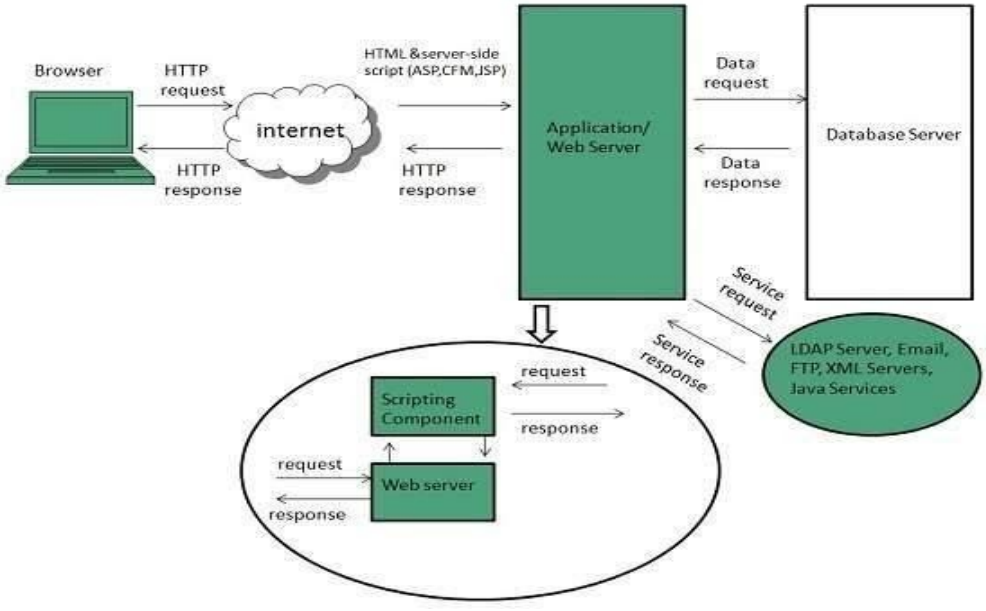
CLIENT SIDE SCRIPTING

Client-side scripting is changing interface behaviors within a specific web page in response to mouse or keyboard actions, or at specified timing events. In this case, the dynamic behavior occurs within the presentation. The client-side content is generated on the user's local computer system.
Such web pages use presentation technology called rich interfaced pages. Client-side scripting languages like JavaScript or ActionScript, used for Dynamic HTML (DHTML) and Flash technologies respectively, are frequently used to orchestrate media types (sound, animations, changing text, etc.) of the presentation. Client-side scripting also allows the use of remote scripting, a technique by which the DHTML page requests additional information from a server, using a hidden frame, XML Http Requests, or a Web service.

Example:

The client-side content is generated on the client's computer. The web browser retrieves a page from the server, then processes the code embedded in the page (typically written in JavaScript) and displays the retrieved page's content to the user.

The most popularly used client side scripting languages is **Javascript**. Flow of request from browser to server:



Different Modules

1. Frontend Development

a. Home

b. About

c. Reviews

g. Contact

2. Chatbot Training

a. Watson Assistant Creation b. Training

i. Intents

ii. Entities

iii.Dialogs

ABOUT IBM WATSON

What is IBM Watson?

IBM Watson is a data analytics processor that uses natural language processing, a technology that analyzes speech for meaning and syntax and translates this into actionable answers.

IBM Watson was named after IBM's first CEO, Thomas J. Watson. The technology behind Watson was originally developed in an IBM research project known as DeepQA. The goal of the project was to develop a natural language-responsive system that could interpret questions asked in a human language and then analyze vast amounts of data and return answers that it would take human researchers days, weeks, or even months to derive.

The 2011 Jeopardy! the contest against the game show's champions Ken Jennings and Brad Rutter was IBM Watson's first public test; in the end, Watson was victorious.

Two years later, IBM announced the first commercial application of Watson was designed for Sloan Kettering Cancer Center and WellPoint insurance. The application performed cost management analysis in the treatment of lung cancer.

Today, IBM Watson is used in a multitude of industry sectors with specialized information needs, including veterinary science, environmental and geotechnical engineering, education, government, food and beverage, legal, and music and entertainment.

Why does IBM Watson matter?

What distinguishes IBM Watson from other analytics software is its direct relevance to business problem-solving. Watson has the ability to rapidly analyze gargantuan repositories of data, documents, and other artifacts; it also comes with a level of human speech pattern recognition and language understanding that was elusive for many artificial intelligence applications in the past. IBM Watson uses cognitive learning practices that combine the data analytics and statistical reasoning of machines with uniquely human qualities, such as self-directed goals, common sense, and ethical values.

As a top layer to all of this, IBM has packaged various versions of Watson to address the specific business concerns and questions of different industry verticals.

Watson also plays a key role in managing unstructured data, which according to IBM, comprises around 80% of data under management in a majority of companies. Watson processes unstructured text and documentation by "learning" a subject by pairing questions and answers after the user loads all related materials (e.g., Word documents, .pdf files, web pages, etc.). The platform is capable of processing millions of documents and reading 800 million pages of data per second.

IBM Watson also processes natural language, which can help businesses be more efficient. For example, an insurance company or a healthcare company can use Watson to review medical reports in order to isolate key medical terms; or a physician might use Watson to pore through millions of pages of clinical research in an attempt to isolate a medical condition, and arrive at a diagnosis and treatment plan.

Watson is now offered by IBM in the cloud. This means that companies can start small in their use of Watson and pay for only what they need, without having to invest in expensive on-premises computing.Also, a robust set of APIs enables developers to incorporate the capabilities of IBM Watson into other business applications.

Who does IBM Watson affect?

IBM Watson technology can apply to a broad range of companies, institutions, and public sector entities because it has been customized to many of these industries' knowledge bases. Within companies, the use of Watson can fall under the purview of, for example:

- a data architect who is tasked with big data and analytics responsibilities; or
- a data scientist who must develop algorithms and queries and can use Watson technology to derive the answers; or
- an end business user, like a doctor in a medical practice who wishes to describe a physical condition to Watson and obtain Watson's assessments about a probable diagnosis.

ABOUT CHATBOT

Our college counseling chatbot is for students who have just passed out from 12th and are searching for good colleges in which they can take admission according to their marks in different fields or the students who are a bit confused about which branch they should opt according to their interests.

In this chatbot, students can take virtual counseling by giving an answer to only a few questions. After that, they will get the answer of which branch they should opt for or in which college they can go to.

The aim of our project is to host it on a website so that anyone can use it according to their comfort on any platform he/she wants to use.

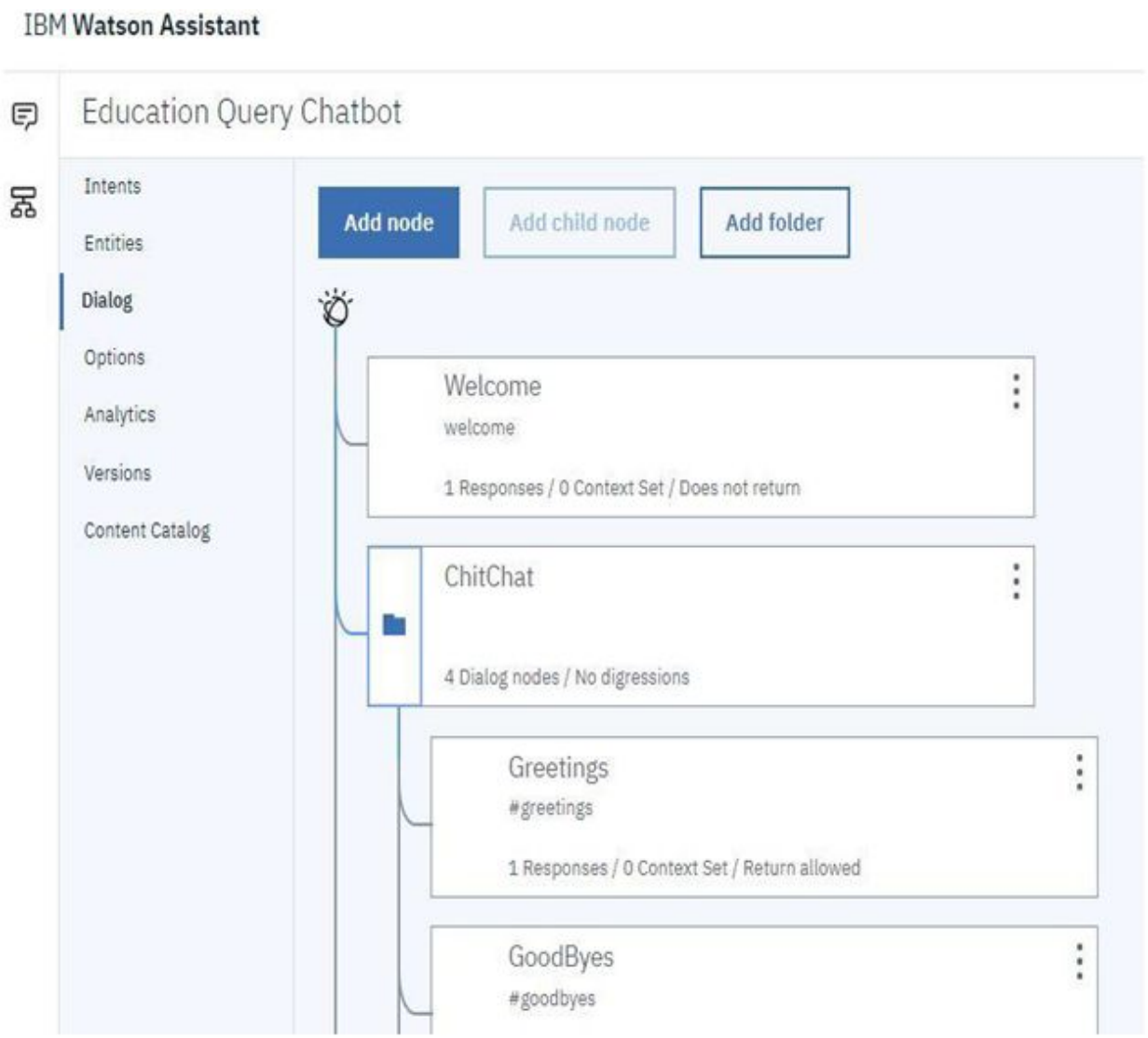
Working Of ChatBot

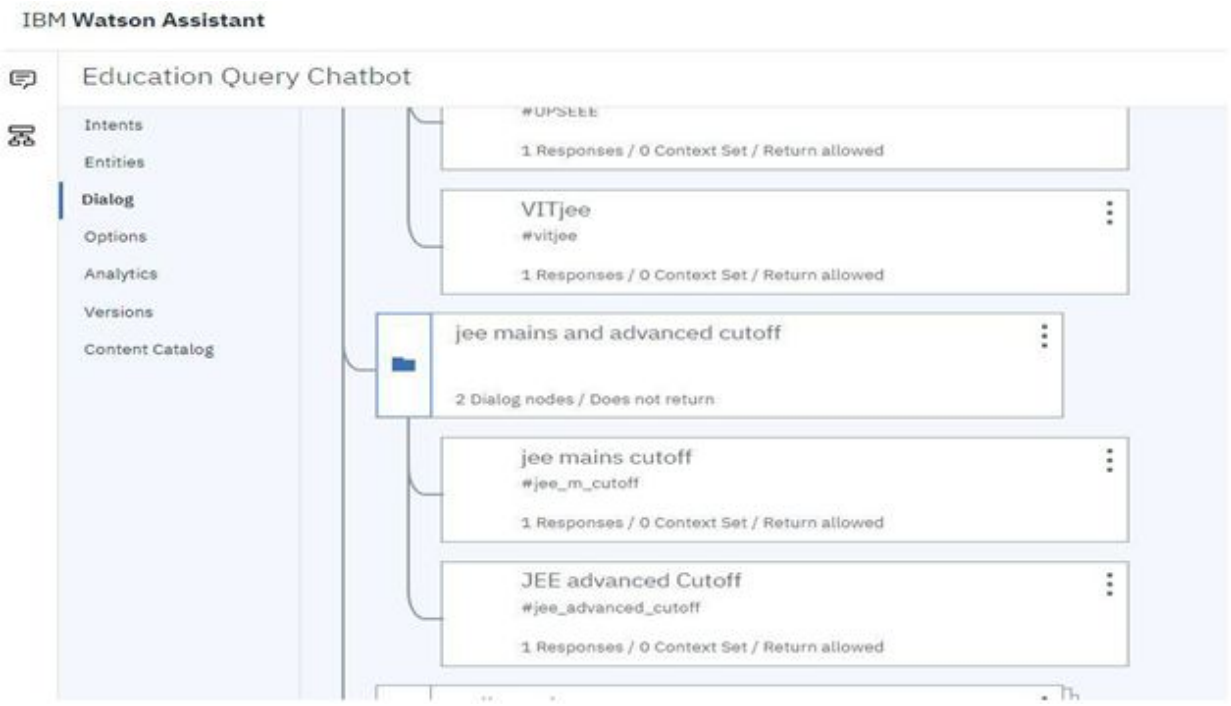
Our chatBot works on the basis of questions we have fixed on the IBM cloud storage of it. The questions are ordered in a sequence such that chatbot finds the next question which it has to ask according to the reply given by the user and after finding an answer after each question it gives the user the result for which he/she has logged in to use this chatBot.

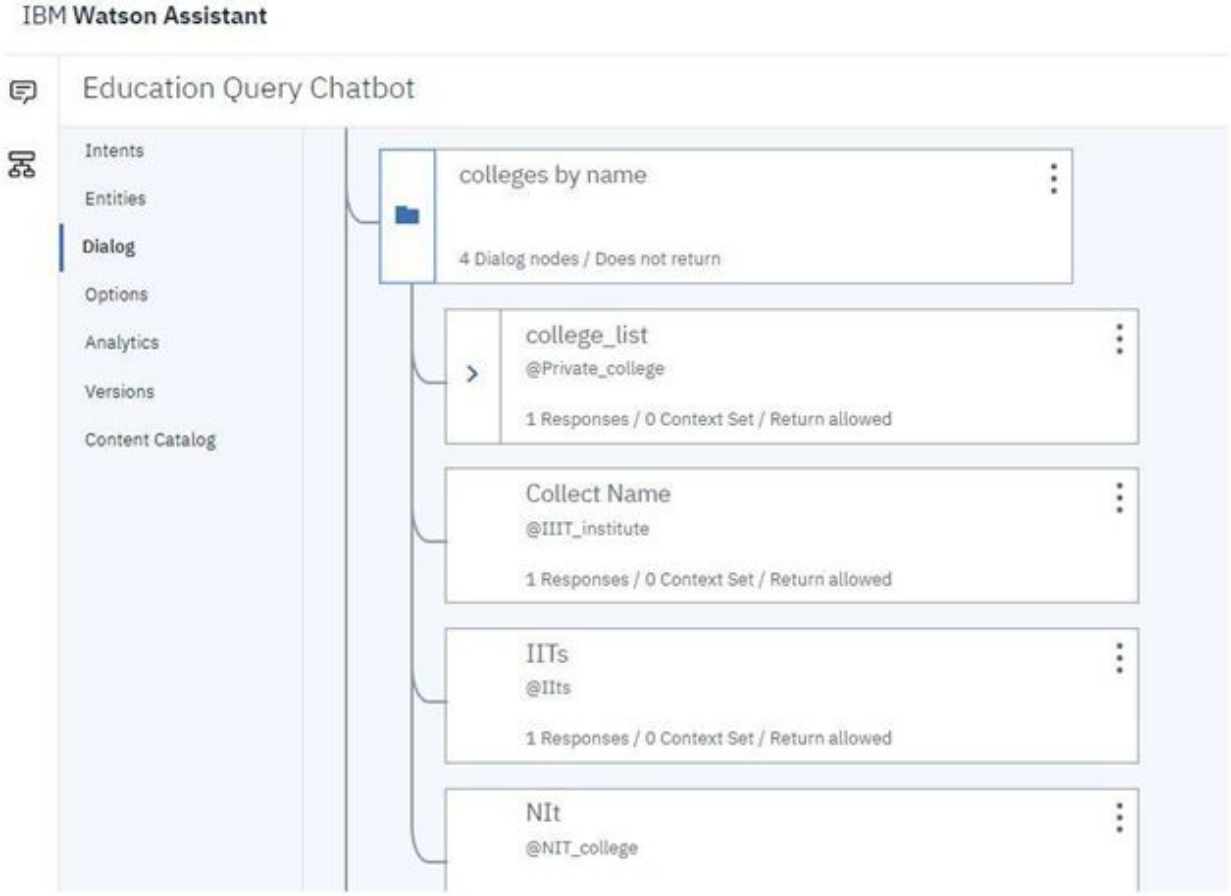
DESIGN OF APPLICATION

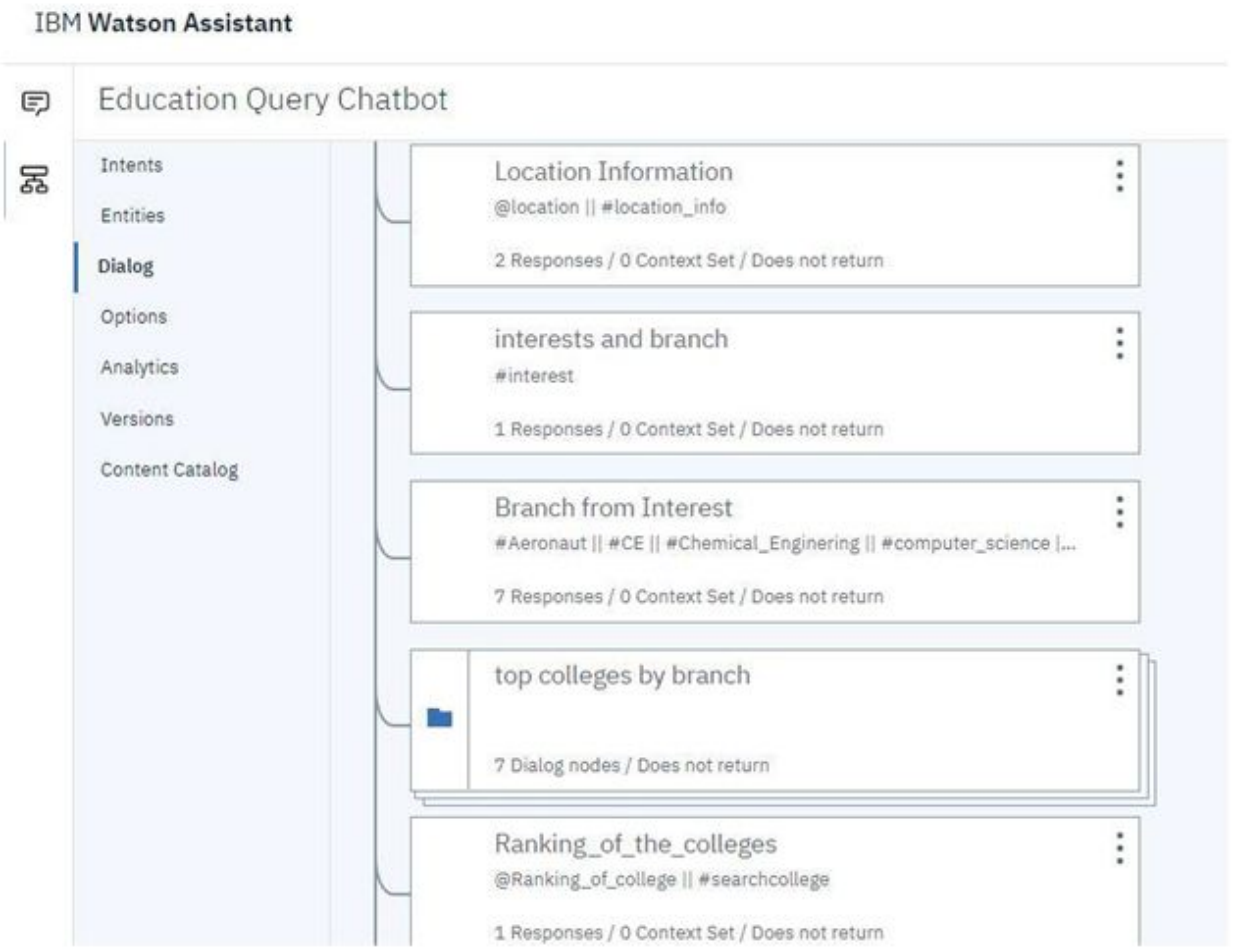
Data Flow Diagram:

DFD for Chat Bot:-




IBM Watson Assistant
Education Query Chatbot
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
1 Responses / 0 Context Set / Return allowed
VITjee
#vitjee
1 Responses / 0 Context Set / Return allowed
jee mains and advanced cutoff
2 Dialog nodes / Does not return
jee mains cutoff
#jee_m_cutoff
1 Responses / 0 Context Set / Return allowed
JEE advanced Cutoff
#jee_advanced_cutoff
1 Responses / 0 Context Set / Return allowed


IBM Watson Assistant
Education Query Chatbot
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
colleges by name
4 Dialog nodes / Does not return
college_list
@Private_college
1 Responses / 0 Context Set / Return allowed
Collect Name
@IIIT_institute
1 Responses / 0 Context Set / Return allowed
IITs
@IIts
1 Responses / 0 Context Set / Return allowed
NIt
@NIT_college

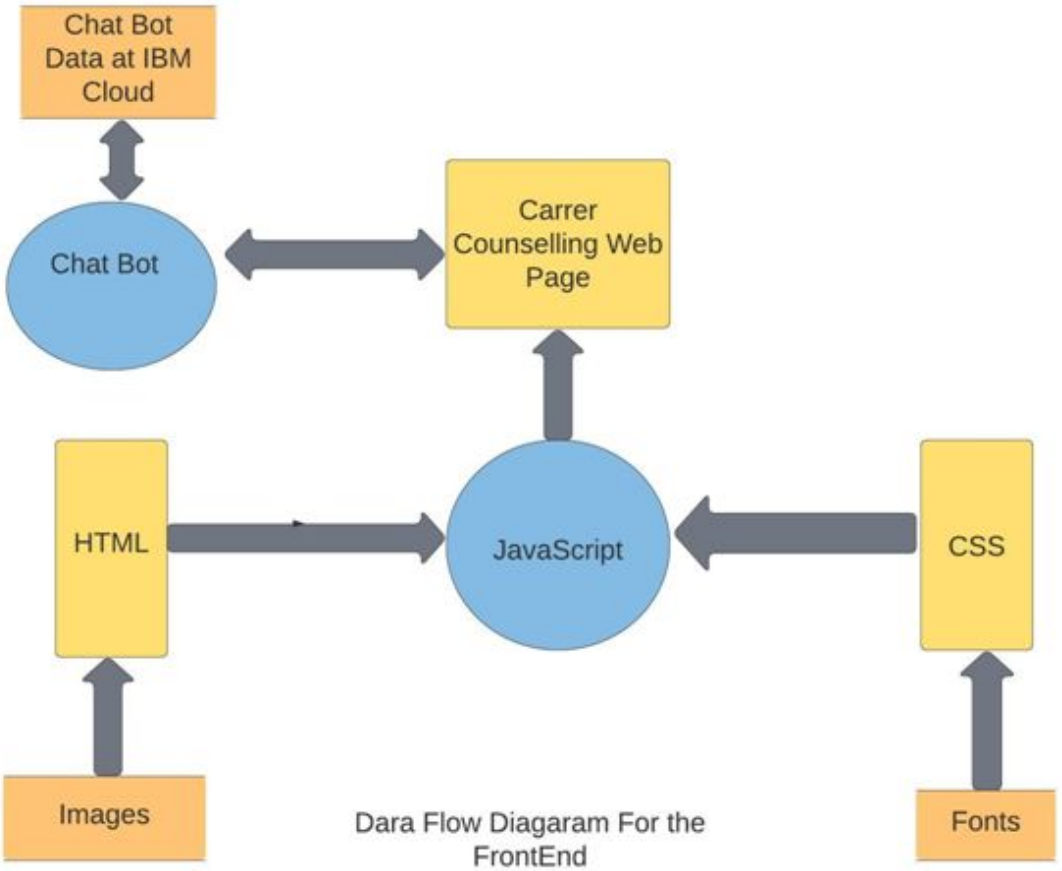


The program tries to match. It's the content which has to reply by checking every node of the dialogs:

The flow is like:

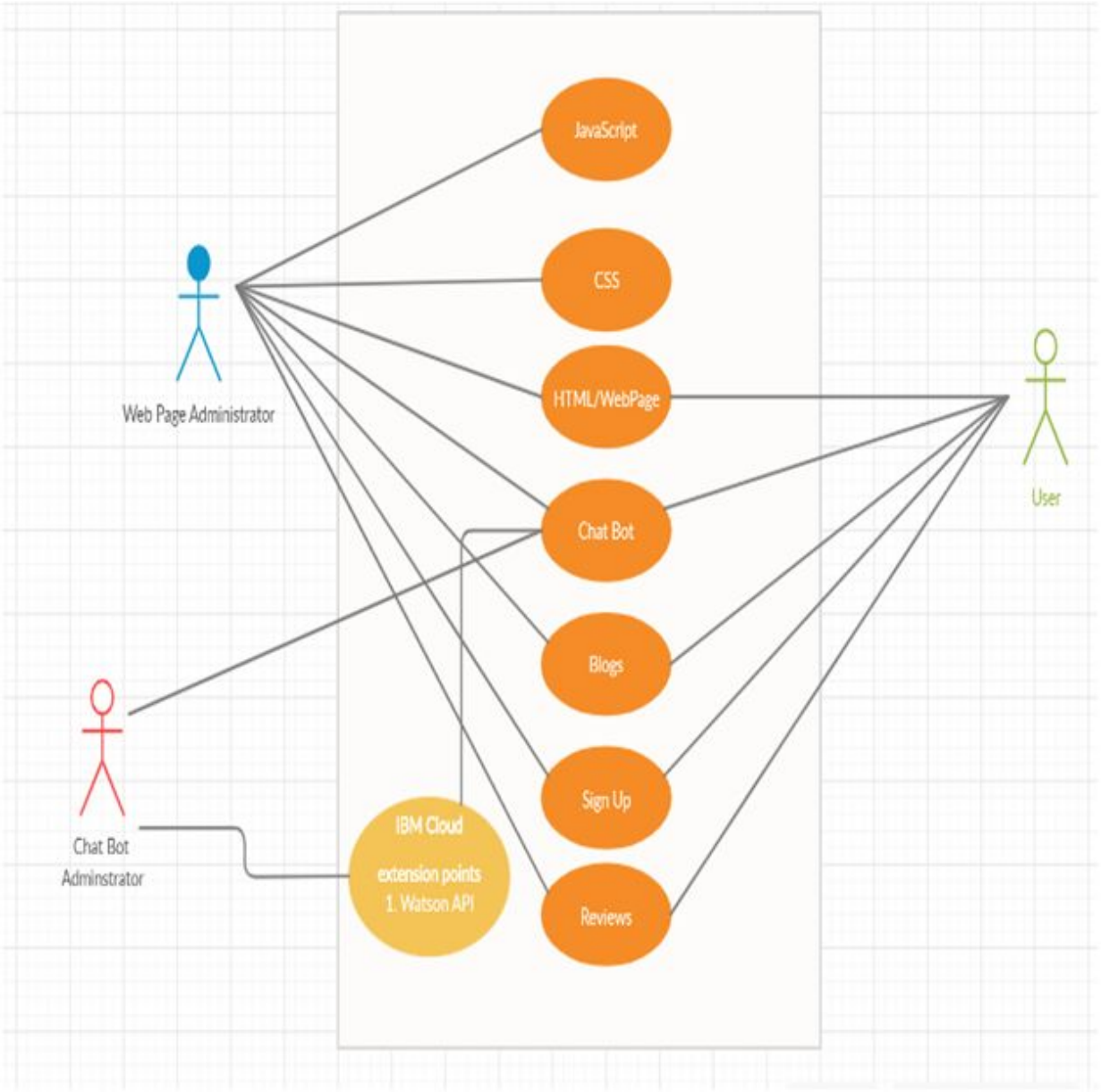
Welcome → ChitChat → Few Colleges → Location Information → Interests and Branches → Branch from Interest → Top College By Branch → Ranking of the college → Answers to Questions → Exams → Different Exams → Jee Mains And Advance Cutoff → Colleges By Name → Anything Else.

DFD for Web Page:-

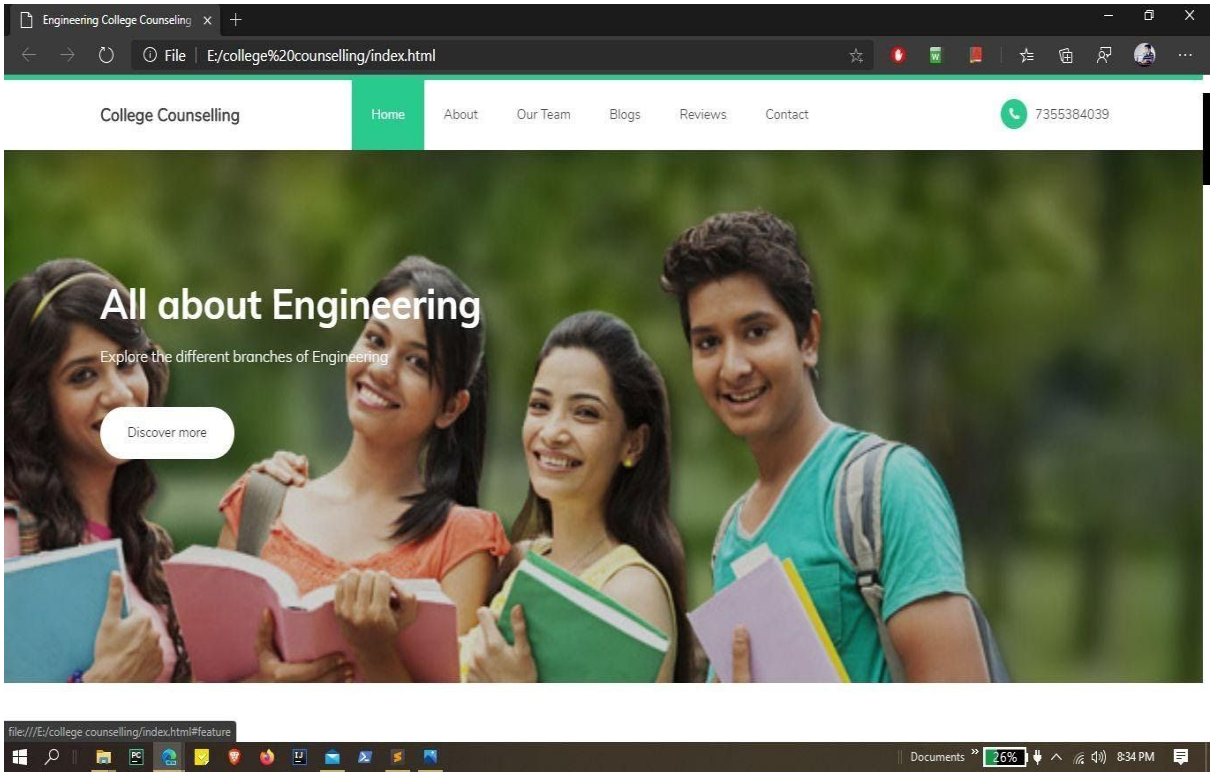


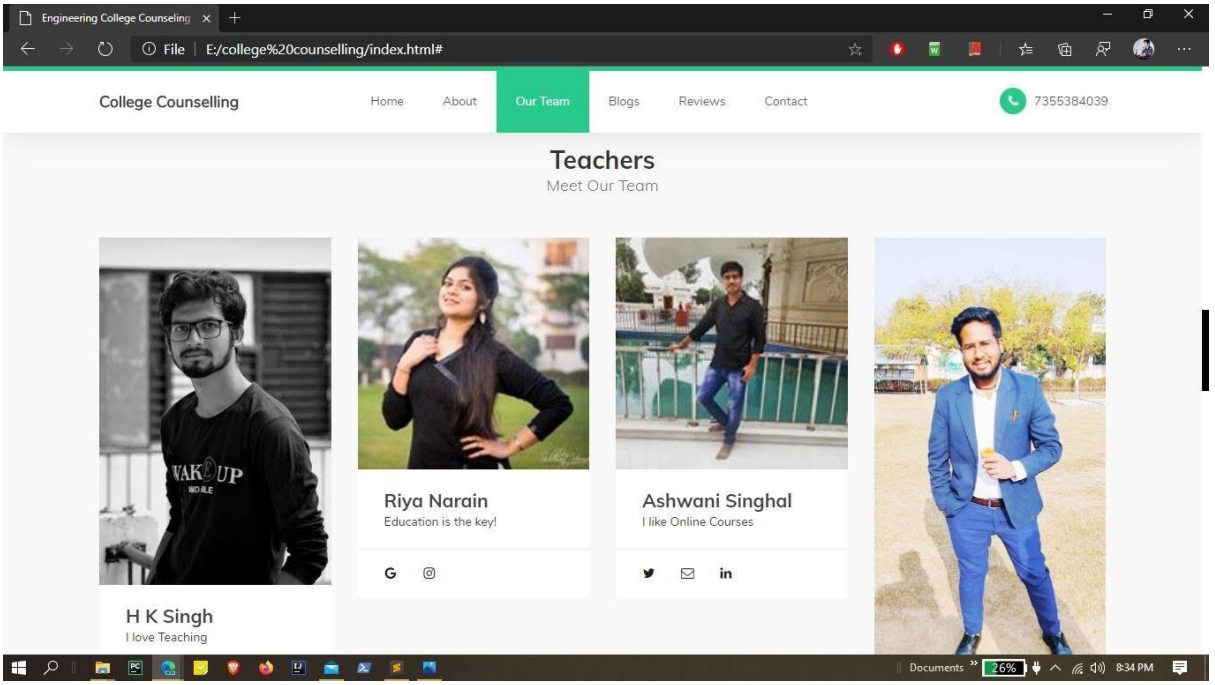
Dara Flow Diagaram For the FrontEnd

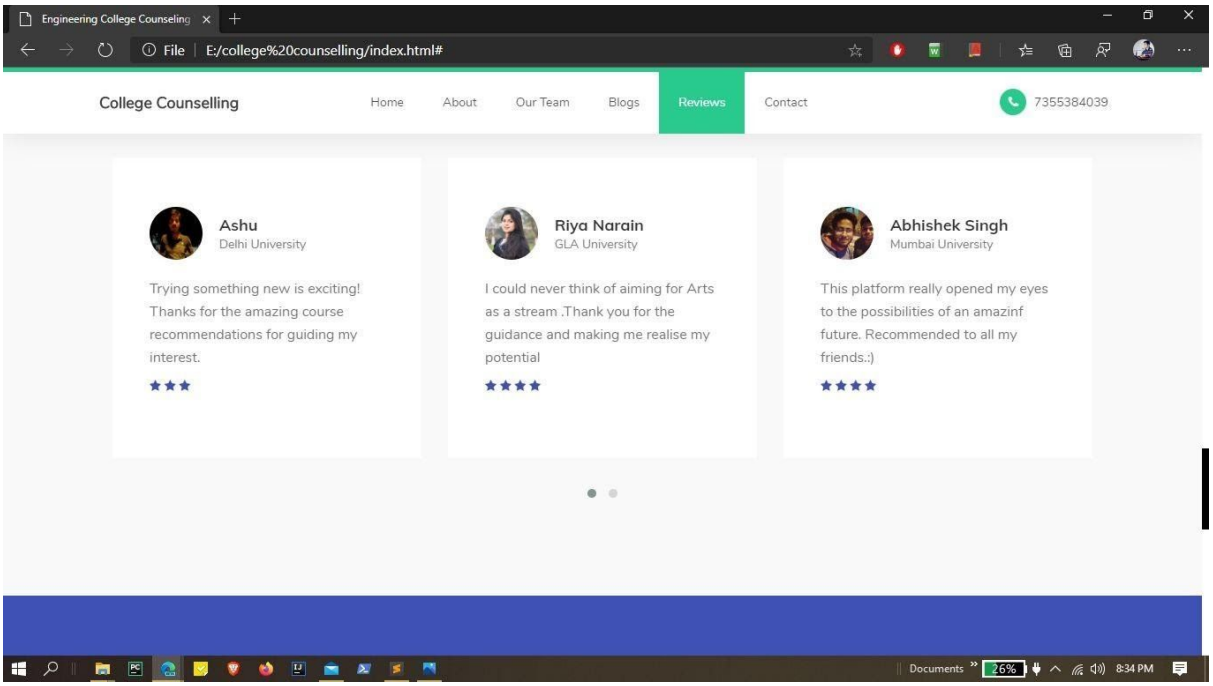
Use Case Diagram:-

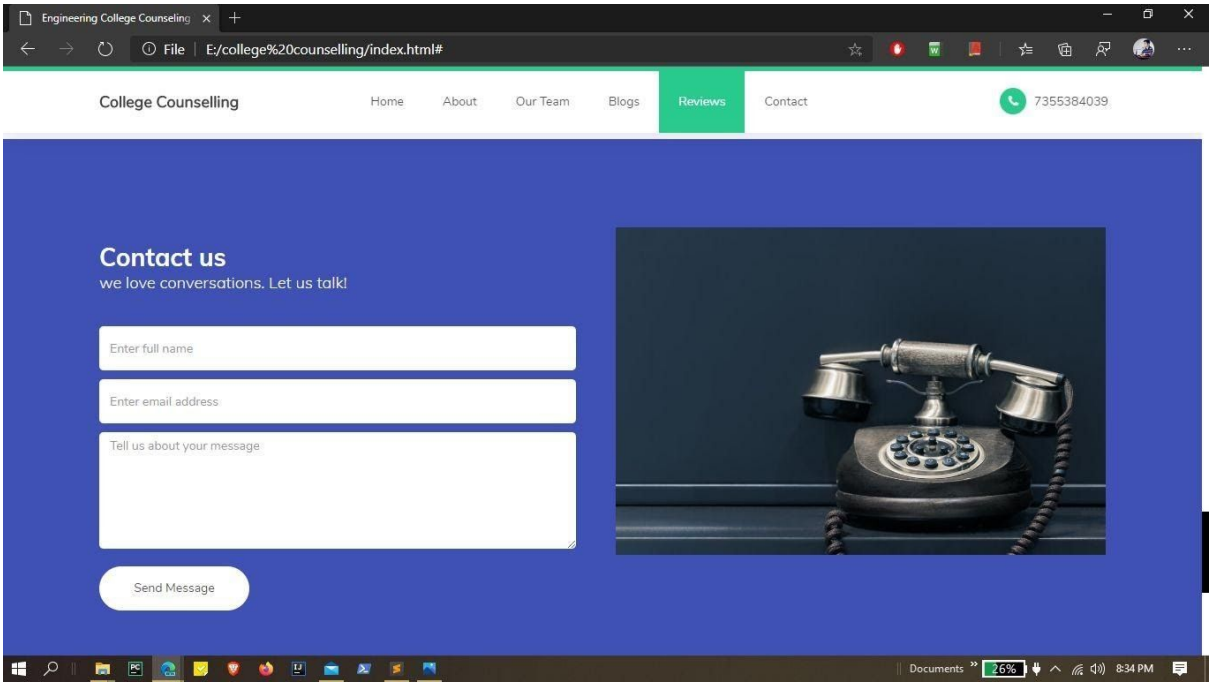


SCREENSHOTS OF THE PROJECT






Engineering College Counseling
File | E:/college%20counselling/index.html#
College Counselling
Home
About
Our Team
Blogs
Reviews
Contact
7355384039
Ashu
Delhi University
Trying something new is exciting! Thanks for the amazing course recommendations for guiding my interest.
Riya Narain
GLA University
I could never think of aiming for Arts as a stream .Thank you for the guidance and making me realise my potential
Abhishek Singh
Mumbai University
This platform really opened my eyes to the possibilities of an amazinf future. Recommended to all my friends.:)
Documents
26%
8:34 PM

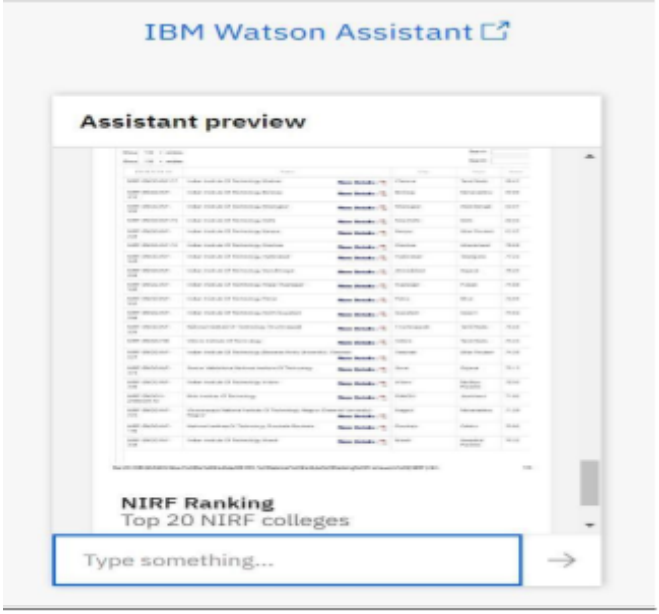

Engineering College Counseling
File | E:/college%20counselling/index.html#
College Counselling
Home
About
Our Team
Blogs
Reviews
Contact
7355384039
Contact us
we love conversations. Let us talk!
Enter full name
Enter email address
Tell us about your message
Send Message
Documents
26%
8:34 PM

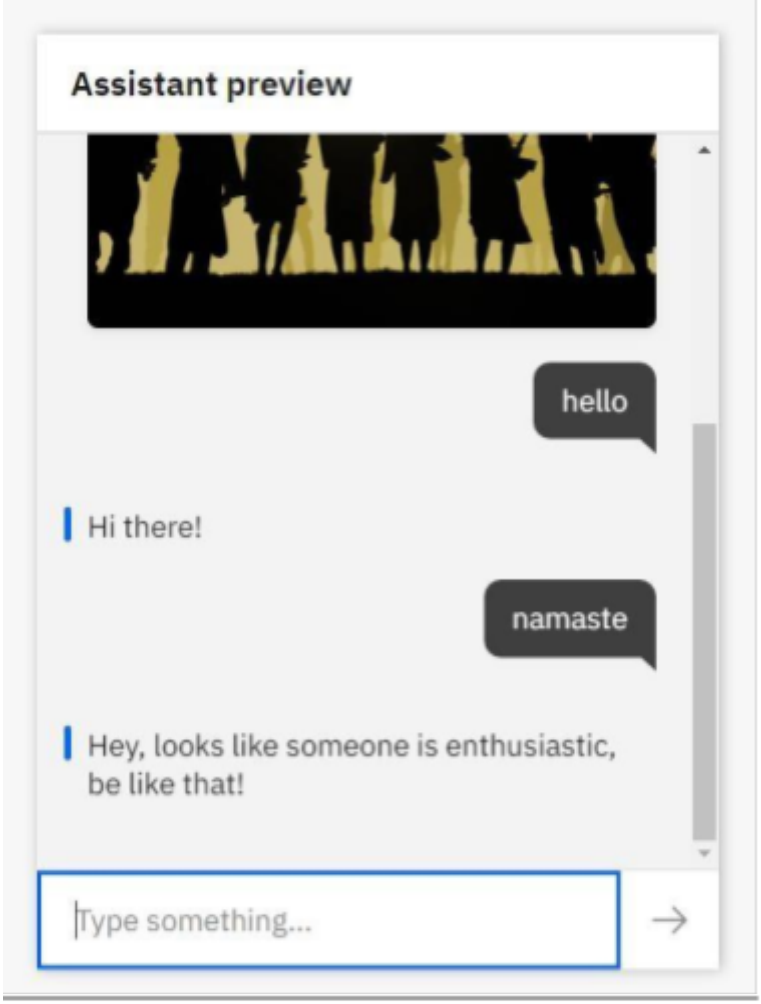
Chat Bot Training:

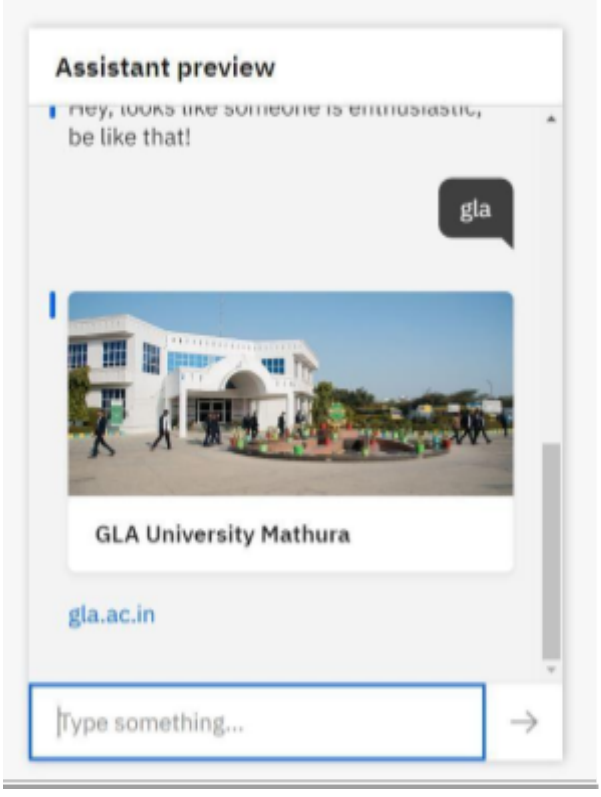
Watson Assistant has been created and can be currently used over IBM cloud. Login to cloud.ibm.com with the login id and password then head to Resources, launch the "Education Query Chatbot" in the services.
Link of the Web API:

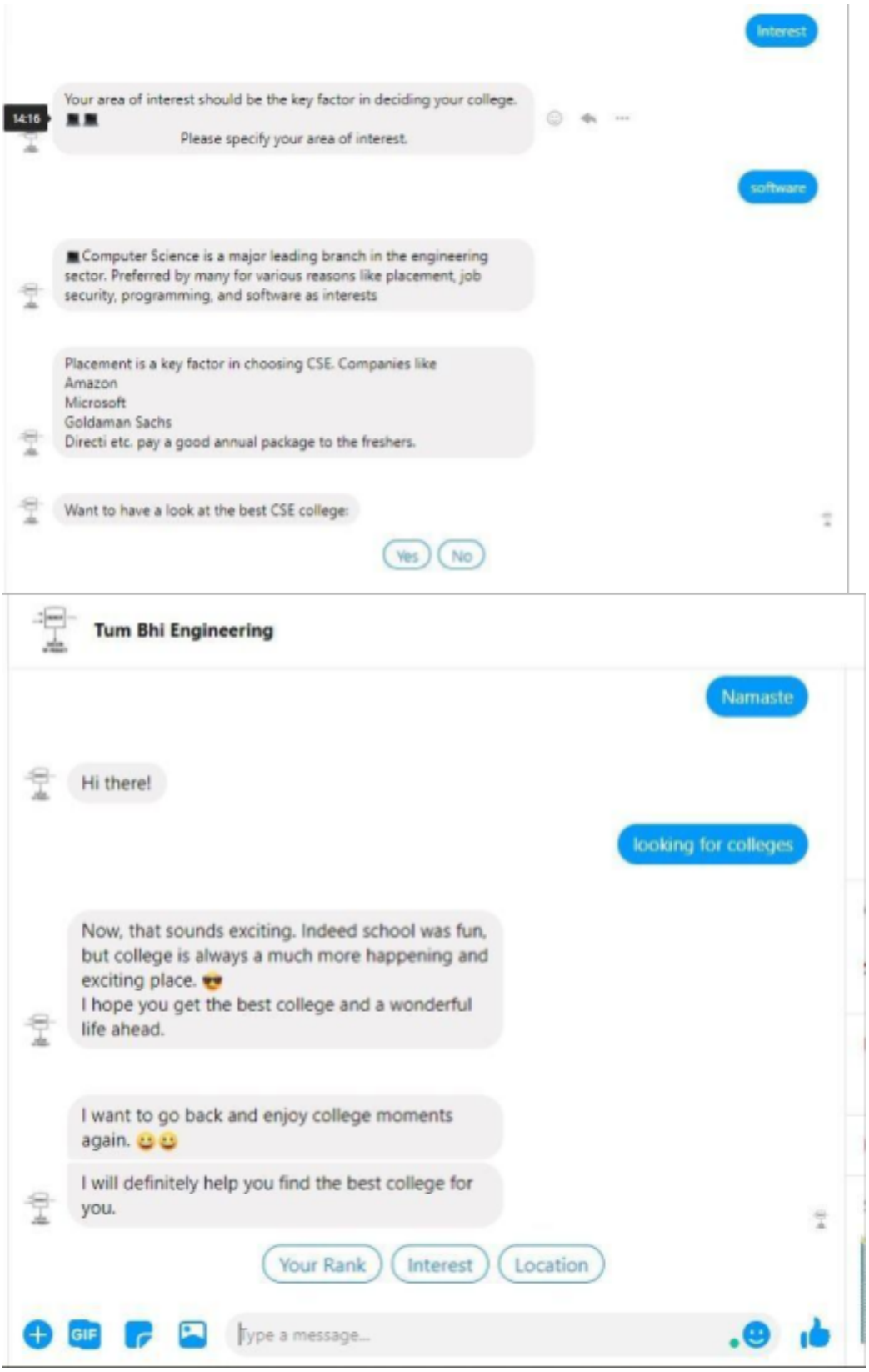
https://assistant-chat-eu-gb.watsonplatform.net/web/public/de957e08-8426-4e9e-954f-f30dda
e47eba

The Chat bot is fully functional and works properly.The chatbot is integrated to Facebook messenger with a dedicated page. By clicking on the send message option on the page the chatbot can be accessed in messenger. Below are the few screenshots of the chat bot and its development:




Assistant preview
hello
Hi there!
namaste
Hey, looks like someone is enthusiastic, be like that!
Type something...


Assistant preview
be like that!
gla
GLA University Mathura
gla.ac.in
Type something...


Interest
14:16
Your area of interest should be the key factor in deciding your college.
Please specify your area of interest.
software
Computer Science is a major leading branch in the engineering sector. Preferred by many for various reasons like placement, job security, programming, and software as interests
Placement is a key factor in choosing CSE. Companies like
Amazon
Microsoft
Goldaman Sachs
Directi etc. pay a good annual package to the freshers.
Want to have a look at the best CSE college:
Yes
No
Tum Bhi Engineering
Namaste
Hi there!
looking for colleges
Now, that sounds exciting. Indeed school was fun, but college is always a much more happening and exciting place.
I hope you get the best college and a wonderful life ahead.
I want to go back and enjoy college moments again.
I will definitely help you find the best college for you.
Your Rank
Interest
Location
GIF
Type a message...

CONCLUSION

The focus of this project is the delivery of online counselling to students at university. Online counselling involves, in this case, the creation of a website where individual students can post a submission online and receive a reply from a counsellor which is the ChatBot.

Researching online counselling can potentially support the development of effective evidence-based practice and can be compared with traditional face-to-face effectiveness studies; in doing so the potential effectiveness of online counselling can be established for the students seeking advice on college choices and streams.

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