Institute of Engineering & Technology

MINI PROJECT REPORT

On

College Counselling Chat bot using IBM's Watson API

Submitted by

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Declaration

I hereby declare that the work which is being presented in the Mini Project**" AI CHAT BOT FOR COLLEGE CONCELLING",** in partial fulfillment of the requirements for Summer Training viva voce, is an authentic record of my own work carried under the supervision of Vivek Kumar, GLA University, Mathura.

Ashwani Singhal
Signature:

Kaustubh Srivastava
Signature:

Harsh Kumar Singh
Signature:

Punit Ramani
Signature:

CONTENT

ABSTRACT

After 12th students get confused on choosing the best college according to their various competition exams marks. They have to search on various sites to find the best college. Because of such large number of sites and different ranking on them they get confused and not able to decide the right college.

Our ChatBot is specifically build for Engineering aspirants. They can search ranking on different colleges at a single place. Also they can get the information regarding the top branch w.r.t every college. It reply with the precise information according to each query with a link attached with it. This prevents students from getting confused and give them precise information.

We have build our ChatBot on IBM Cloud and have integrated with facebook messenger so that it also can be assessed by facebook messenger. It can also be assessed by anyone using the link we have generated with our project and with the help of that link, it can is easily assessable on mobile phones, laptops and any other devices.

ACKNOWLEDGMENT

It gives us a great sense of pleasure to present the report of the B. Tech Mini Project undertaken during B. Tech. Third Year. This project in itself is an acknowledgement to the inspiration, drive and technical assistance contributed to it by many individuals. This project would never have seen the light of the day without the help and guidance that we have received.

Our heartiest thanks to Dr. (Prof). Anand Singh Jalal, Head of Dept., Department of CEA for providing us with an encouraging platform to develop this project, which thus helped us in shaping our abilities towards a constructive goal.

We owe special debt of gratitude to Vivek Kumar, Department of CEA, for his constant support and guidance throughout the course of our work. His sincerity, thoroughness and perseverance have been a constant source of inspiration for us. He has showered us with all his extensively experienced ideas and insightful comments at virtually all stages of the project & has also taught us about the latest industry-oriented technologies.

We also do not like to miss the opportunity to acknowledge the contribution of all faculty members of the department for their kind guidance and cooperation during the development of our project. Last but not the least, we acknowledge our friends for their contribution in the completion of the project.

Ashwani Singhal

Kaustubh Srivastava

Harsh Kumar Singh

Punit Ramani

INTRODUCTION

About the Project:

This project aims at developing a chat bot 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 chat bot 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 chat bot 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 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 chat bot will work as a counsellor for the students and will be beneficial to them.

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 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 a proper guidance to such students. A chat bot that can recommend possible streams, courses, colleges and other information to a student can be of great help to him in his choice making.

Objective:

Our objective is to develop a platform where B.tech aspirants can get the solution of their career regarding problems.

As we already know after higher secondary, Student find a serious problem of finding colleges of their choice and according to their interest. For this they have to do a lot of surfing and research on different websites and also have to consult number of people regarding this.

So, we are providing a chatting platform where they can easily find a college of their interest and details about it to start their career with a boom by just chatting with an AI chat bot.

Future Prospects:

The chat bot can be integrated with a website of similar goals and therefore can help Students in a much more enhanced way.

WHAT IS A CHAT BOT ?

A chat bot is a program that communicates with you.

It is a layer on top of, or a gateway to, a service. Sometimes it is powered by machine learning (the chat bot gets smarter the more you interact with it). Or, more commonly, it is driven using intelligent rules (i.e. if the person says this, respond with that).

The services a chat bot can deliver are diverse. Important life-saving health messages, to check the weather forecast or to purchase a new pair of shoes, and anything else in between.

The term chat bot is synonymous with text conversation but is growing quickly through voice communication… "Alexa, what time is it?" (other voice-chat bot are available!)

The chat bot can talk to you through different channels; such as Facebook Messenger, Siri, WeChat, Telegram, SMS, Slack, Skype and many others.

Consumers spend lots of time using messaging applications (more than they spend on social media). Therefore, messaging applications are currently the most popular way companies deliver chat bot experiences to consumers.

Chat bot, or conversational interfaces as they are also known, present a new way for individuals to interact with computer systems. Traditionally, to get a question answered by a software program involved using a search engine, or filling out a form. A chat bot allows a user to simply ask questions in the same manner that they would address a human. The most well known chat bot currently are voice chat bot: Alexa and Siri. However, chat bot are currently being adopted at a high rate on computer chat platforms.

The technology at the core of the rise of the chat bot is natural language processing ("NLP"). Recent advances in machine learning have greatly improved the accuracy and effectiveness of natural language processing, making chat bot a viable option for many organizations. This improvement in NLP is firing a great deal of additional research which should lead to continued improvement in the effectiveness of chat bot in the years to come.

A simple chat bot can be created by loading an FAQ (frequently asked questions) into chat bot software. The functionality of the chat bot can be improved by integrating it into the organization's enterprise software, allowing more personal questions to be answered, like "What is my balance?", or "What is the status of my order?".

Most commercial chat bot are dependent on platforms created by the technology giants for their natural language processing. These include Amazon Lex, Microsoft Cognitive Services, Google Cloud Natural Language API, Facebook DeepText, and IBM Watson. Platforms where chat bot are deployed include Facebook Messenger, Skype, and Slack, among many others.

SOFTWARE REQUIREMENT ANALYSIS

PROBLEM STATEMENT:

To design a chat bot which can help the user to get information about colleges, ranking, location of college, and branches of engineering.

IBM Watson:

Watson was created as a question answering (QA) computing system that IBM built to apply advanced natural language processing, information retrieval, knowledge representation, automated reasoning, and machine learning technologies to the field of open domain question answering.

The key difference between QA technology and document search is that document search takes a keyword query and returns a list of documents, ranked in order of relevance to the query (often based on popularity and page ranking), while QA technology takes a question expressed in natural language, seeks to understand it in much greater detail, and returns a precise answer to the question.

When created, IBM stated that, "more than 100 different techniques are used to analyze natural language, identify sources, find and generate hypotheses, find and score evidence, and merge and rank hypotheses."

In recent years, the Watson capabilities have been extended and the way in which Watson works has been changed to take advantage of new deployment models (Watson on IBM Cloud) and evolved machine learning capabilities and optimised hardware available to developers and researchers. It is no longer purely a question answering (QA) computing system designed from Q&A pairs but can now 'see', 'hear', 'read', 'talk', 'taste', 'interpret', 'learn' and 'recommend'.

Powered by the latest innovations in machine learning, Watson is the open, multi-cloud platform that lets you automate the AI lifecycle.

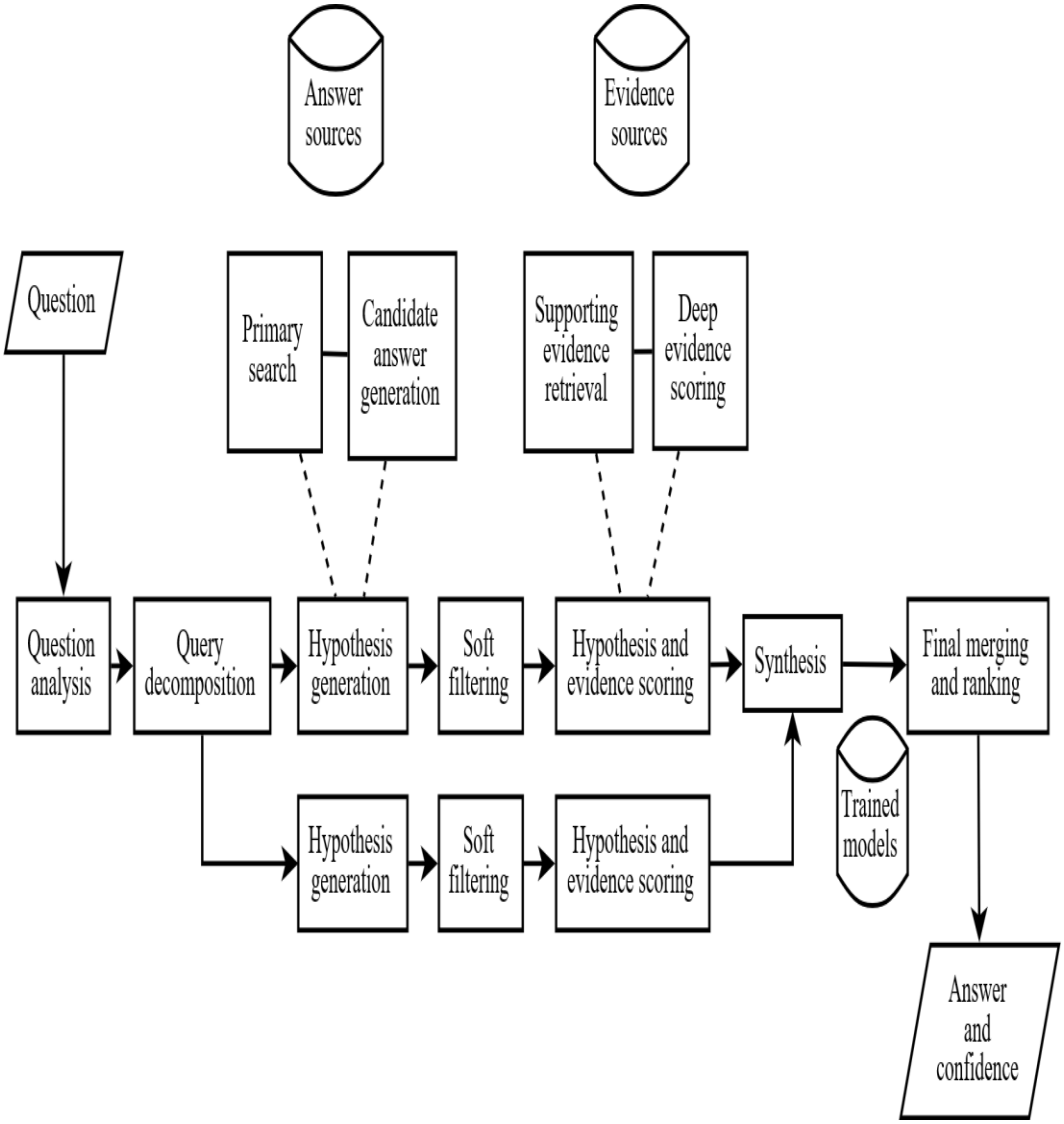
Watson Assistant is IBM’s AI product that lets you build, train, and deploy conversational interactions into any application, device, or channel.

Most chat bots try to mimic human interactions, which can frustrate users when a misunderstanding arises. Watson Assistant is more. It knows when to search for an

answer from a knowledge base, when to ask for clarity and when to direct users to a human. Watson Assistant can be deployed in any cloud or on-premises environment – meaning smarter AI is finally available wherever you need it.

Software:

Watson uses IBM's DeepQA software and the Apache UIMA (Unstructured Information Management Architecture) framework implementation. The system was written in various languages, including Java, C++, and Prolog, and runs on the SUSE Linux Enterprise Server 11 operating system using the Apache Hadoop framework to provide distributed computing.



THE ARCHITECTURE OF IBM QADeep

MODULES AND FUNCTIONALITIES:

Skills:

A skill is a container for the artificial intelligence that enables an assistant to help your customers.

An assistant directs requests down the optimal path for solving a customer problem. Add skills so your assistant can provide a direct answer to a common question or reference more generalized search results for something more complex.

Skill types:

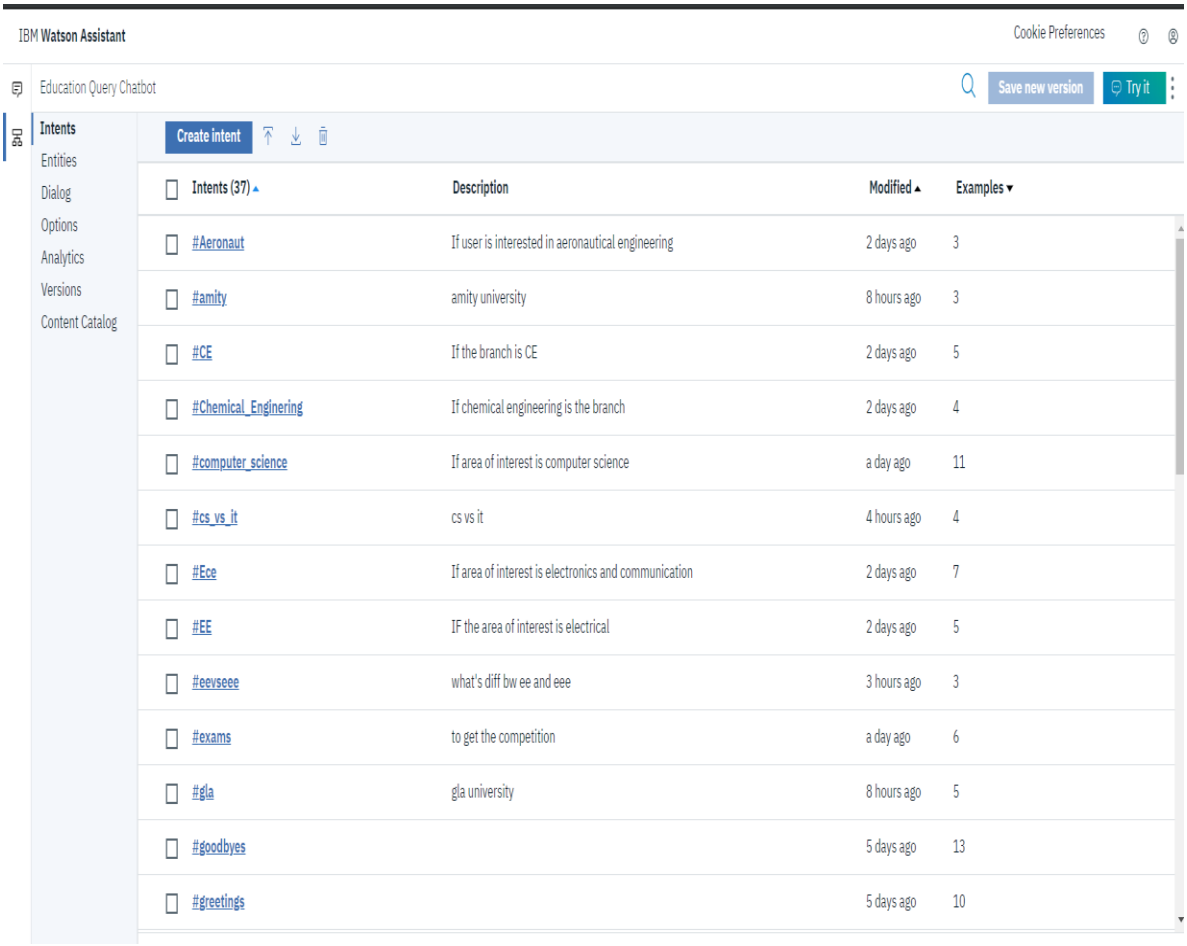
You can add the following type of skill to your assistant:

- Dialog skill: Understands typical questions or requests from users and answers or fulfills them by following a dialog that is scripted by you.
- Search skill: Answers a user's question by searching for relevant information from an external data source, extracting the passage, and returning it as the assistant's response.

Dialog skill:

A dialog skill contains the training data and logic that enables an assistant to help your customers. It contains the following types of artifacts:

Intents: An intent represents the purpose of a user's input, such as a question about business locations or a bill payment. You define an intent for each type of user request you want your application to support. The name of an intent is always prefixed with the # character. To train the dialog skill to recognize your intents, you supply lots of examples of user input and indicate which intents they map to.



A content catalog is provided that contains prebuilt common intents you can add to your application rather than building your own. For example, most applications require a greeting intent that starts a dialog with the user. You can add the General content catalog to add an intent that greets the user and does other useful things, like end the conversation.

Dialog: A dialog is a branching conversation flow that defines how your application responds when it recognizes the defined intents and entities. You use the dialog editor to create conversations with users, providing responses based on the intents and entities that you recognize in their input.

To enable your dialog skill to handle more nuanced questions, define entities and reference them from your dialog.

Entities: An entity represents a term or object that is relevant to your intents and that provides a specific context for an intent. For example, an entity might represent a city

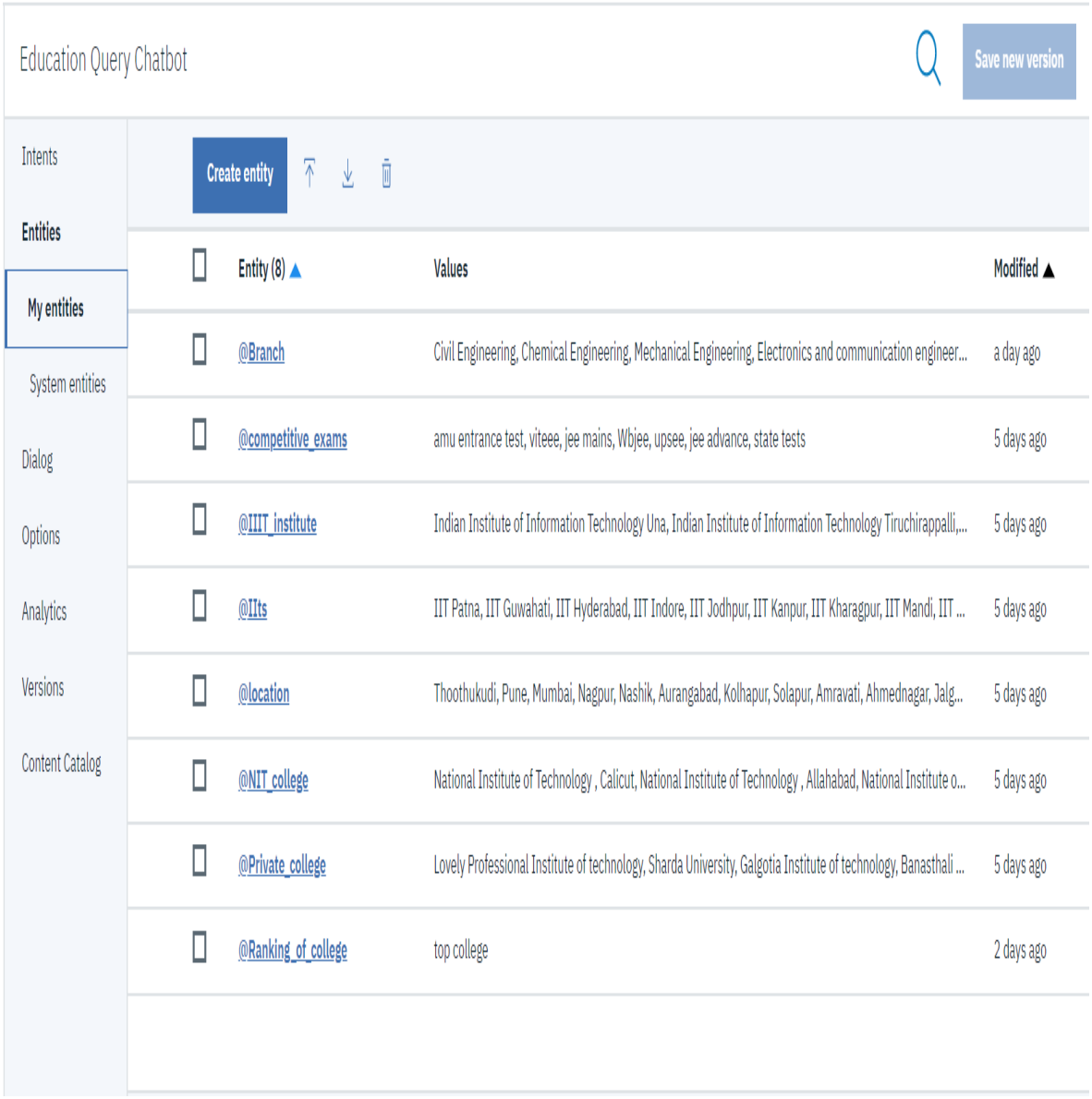
where the user wants to find a business location, or the amount of a bill payment. The name of an entity is always prefixed with the @ character.

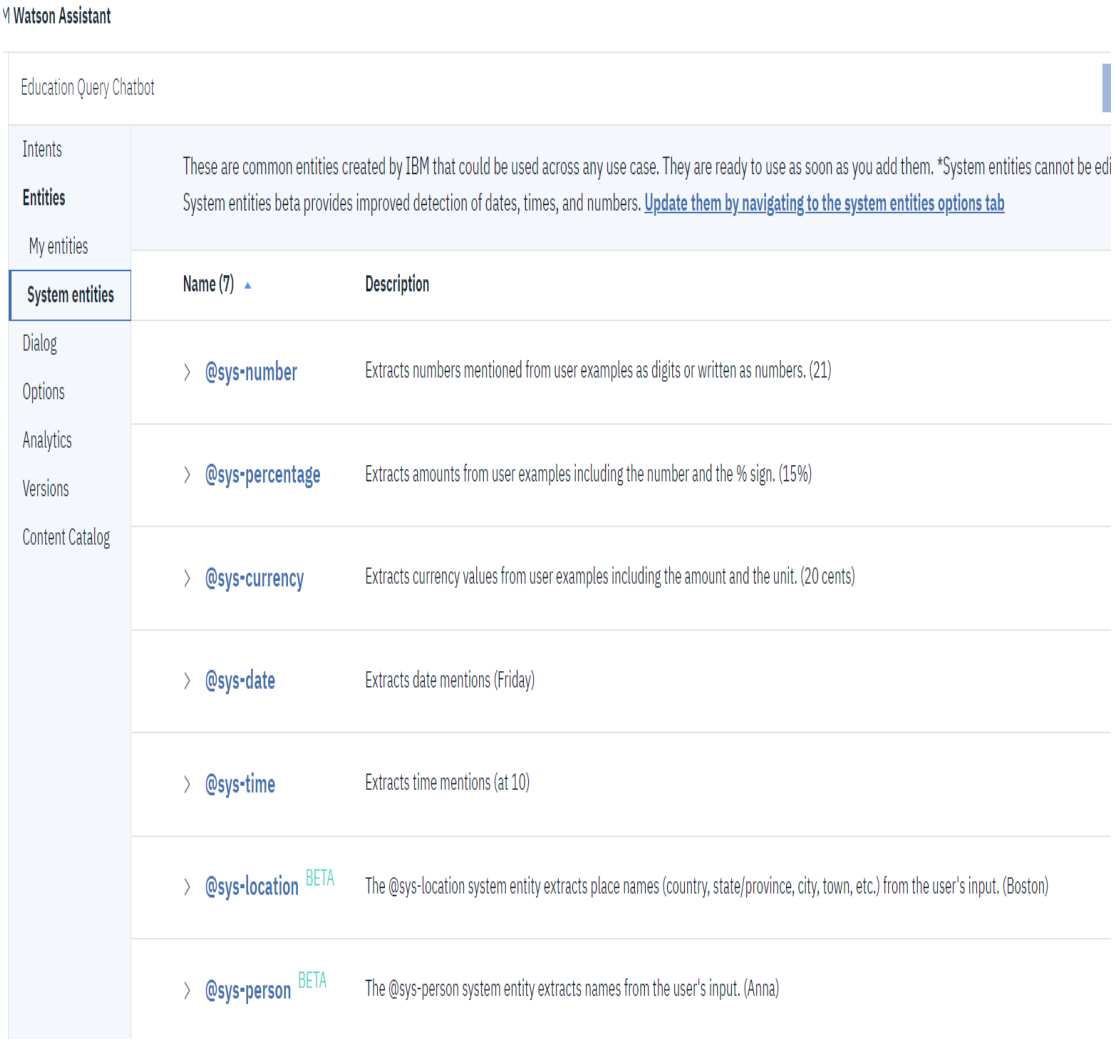
You can train the skill to recognize your entities by providing entity term values and synonyms, entity patterns, or by identifying the context in which an entity is typically used in a sentence. To fine tune your dialog, go back and add nodes that check for entity mentions in user input in addition to intents.

As you add information, the skill uses this unique data to build a machine learning model that can recognize these and similar user inputs. Each time you add or change the training data, the training process is triggered to ensure that the underlying model stays up-to-date as your customer needs and the topics they want to discuss change.

Natson Assistant

Cookie Preferences





Search skill:

When Watson Assistant doesn't have an explicit solution to a problem, it routes the user question to a search skill to find an answer from across your disparate sources of self-service content. The search skill interacts with the IBM Watson™ Discovery service to extract this information from a configured data collection.

If you already use the Discovery service, you can mine your existing data collections for source material that you can share with customers to address their questions.

However, you do not need to have a Discovery service instance. If you choose to create a search skill, a free instance of Discovery is provisioned for you. You can then create a collection from a data source and configure your search skill to search this collection to find answers to customer queries.

SOFTWARE DESIGN

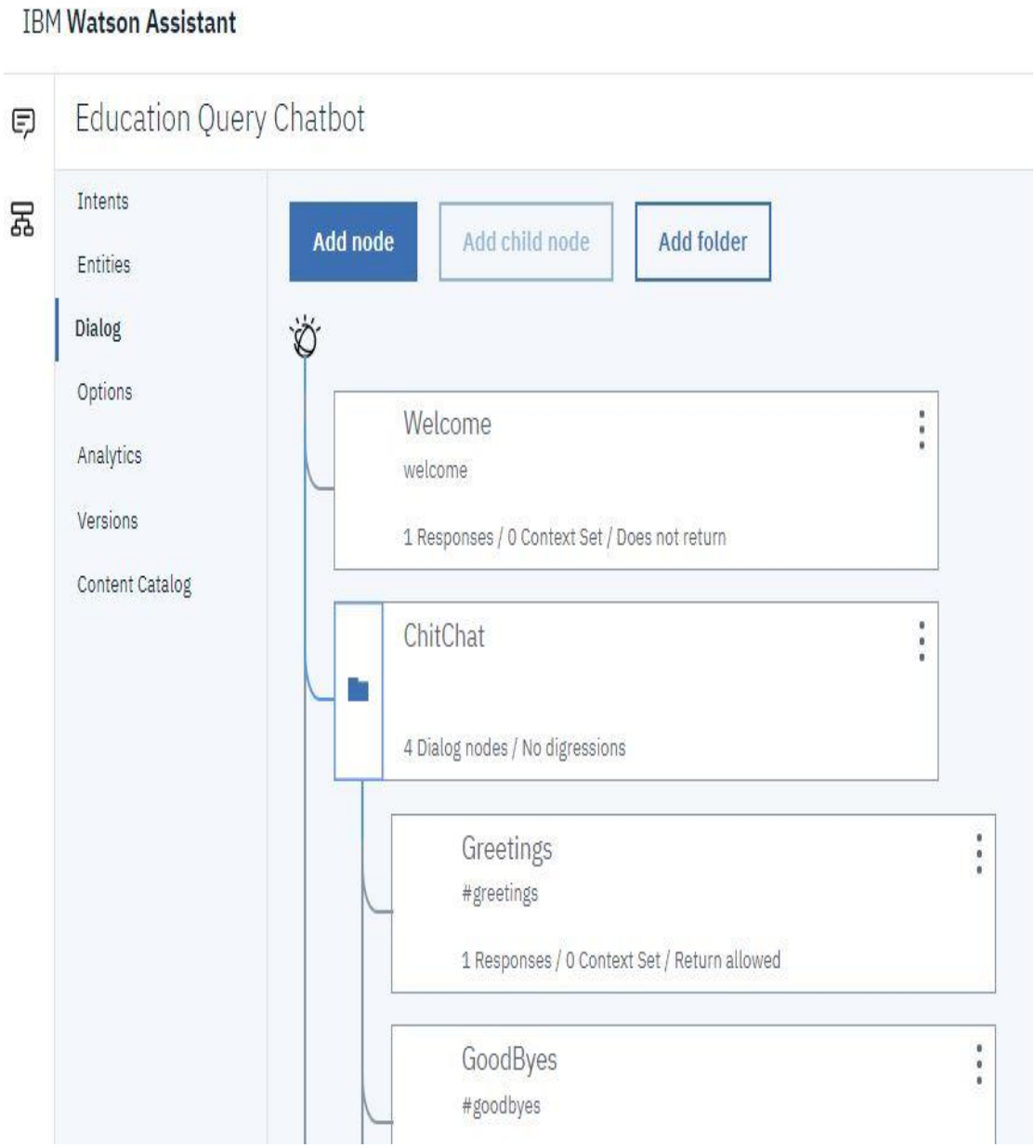
Data Flow Diagram:

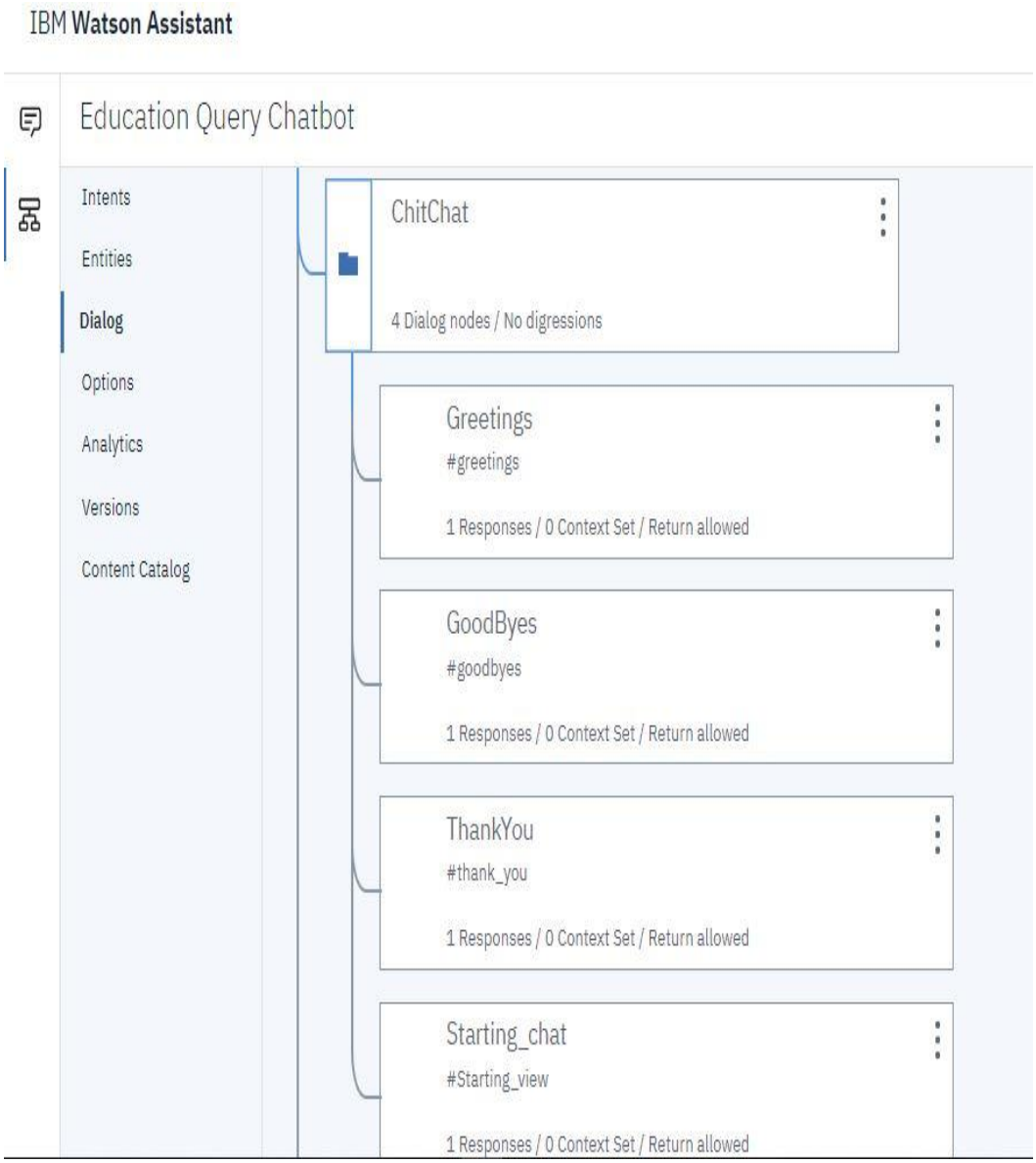
In the below images the flow of data have been described in the sequence of the images attached to it.

The program try to match it's the content in which it has to reply by checking the every node of the dialogs.

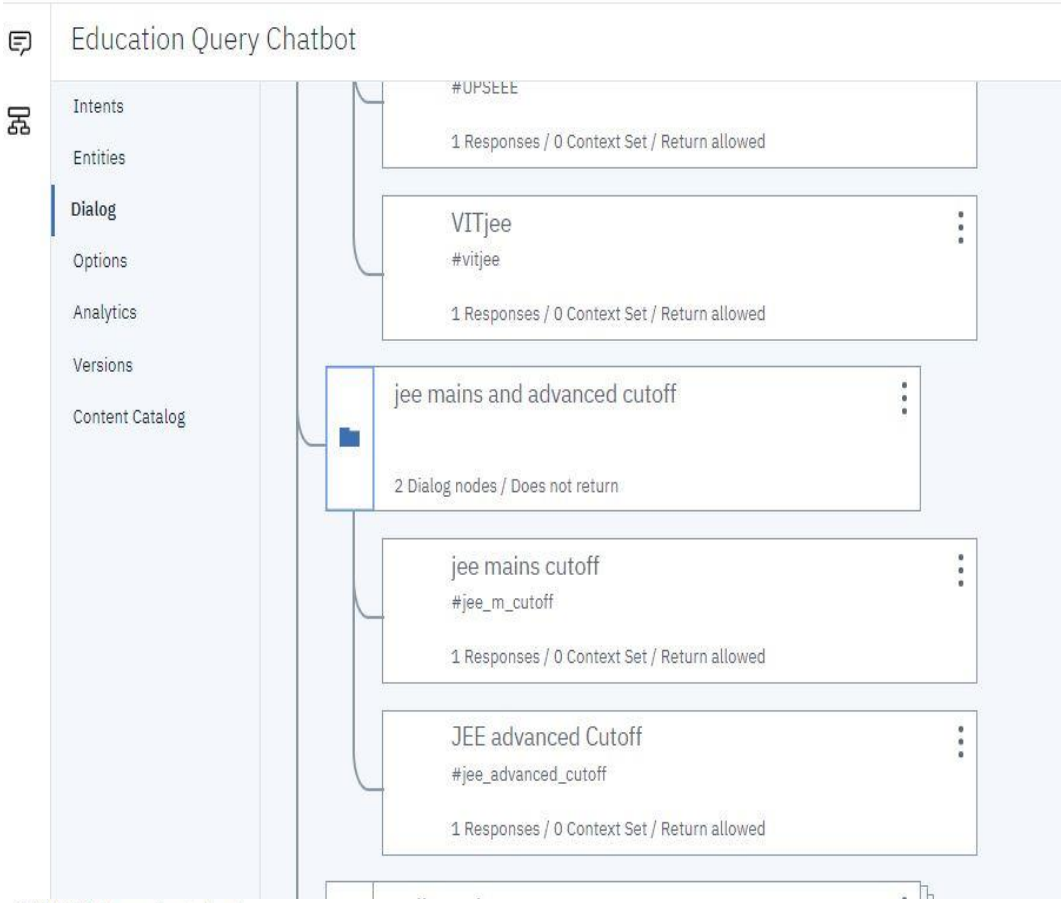
The flow is like**:**

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.

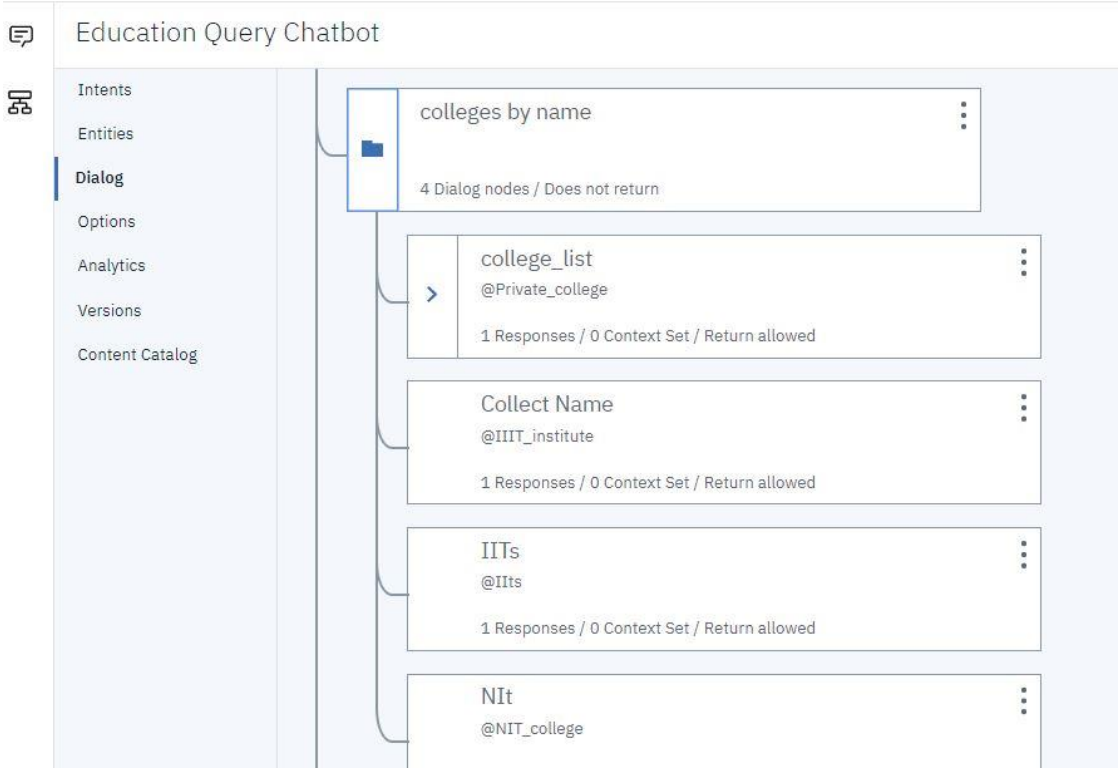

IBM Watson Assistant
Education Query Chatbot
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
Add node
Add child node
Add folder
Welcome
welcome
1 Responses / 0 Context Set / Does not return
ChitChat
4 Dialog nodes / No digressions
Greetings
#greetings
1 Responses / 0 Context Set / Return allowed
GoodByes
#goodbyes


IBM Watson Assistant
Education Query Chatbot
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
ChitChat
4 Dialog nodes / No digressions
Greetings
#greetings
1 Responses / 0 Context Set / Return allowed
GoodByes
#goodbyes
1 Responses / 0 Context Set / Return allowed
ThankYou
#thank_you
1 Responses / 0 Context Set / Return allowed
Starting_chat
#Starting_view
1 Responses / 0 Context Set / Return allowed

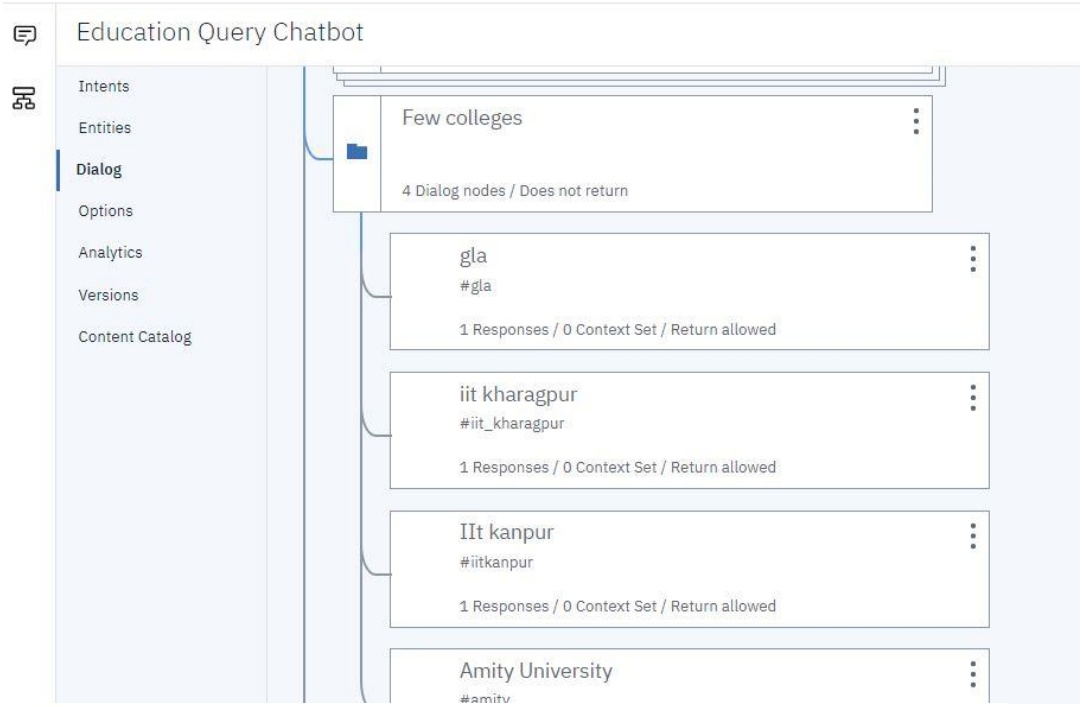
IBM **Watson Assistant**



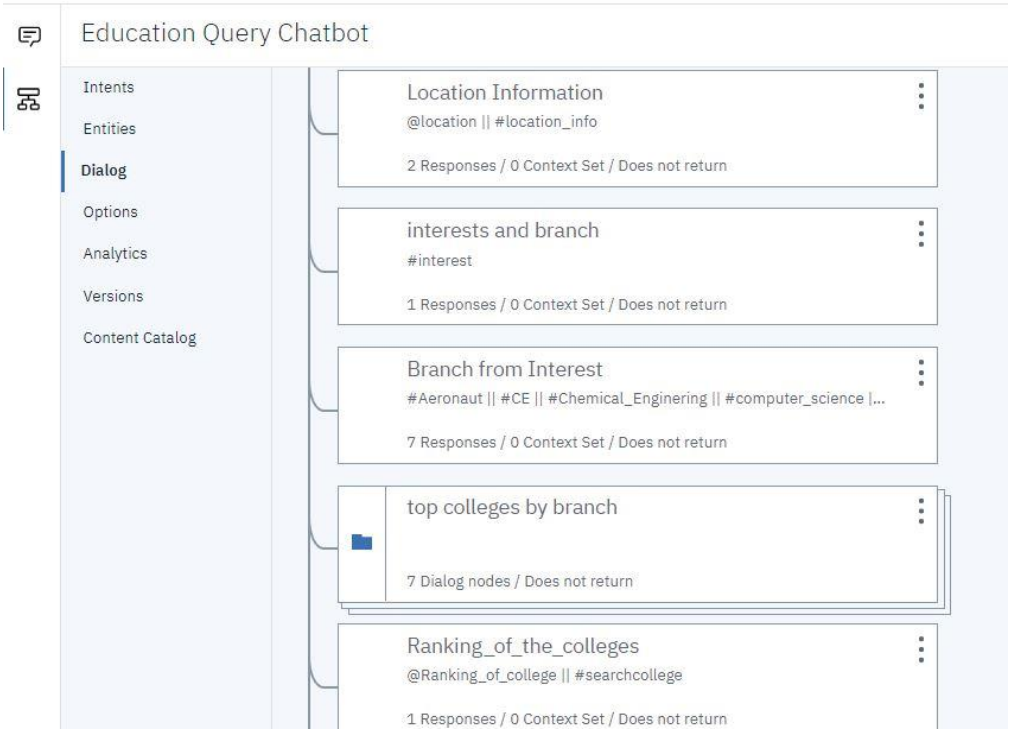
IBM **Watson Assistant**



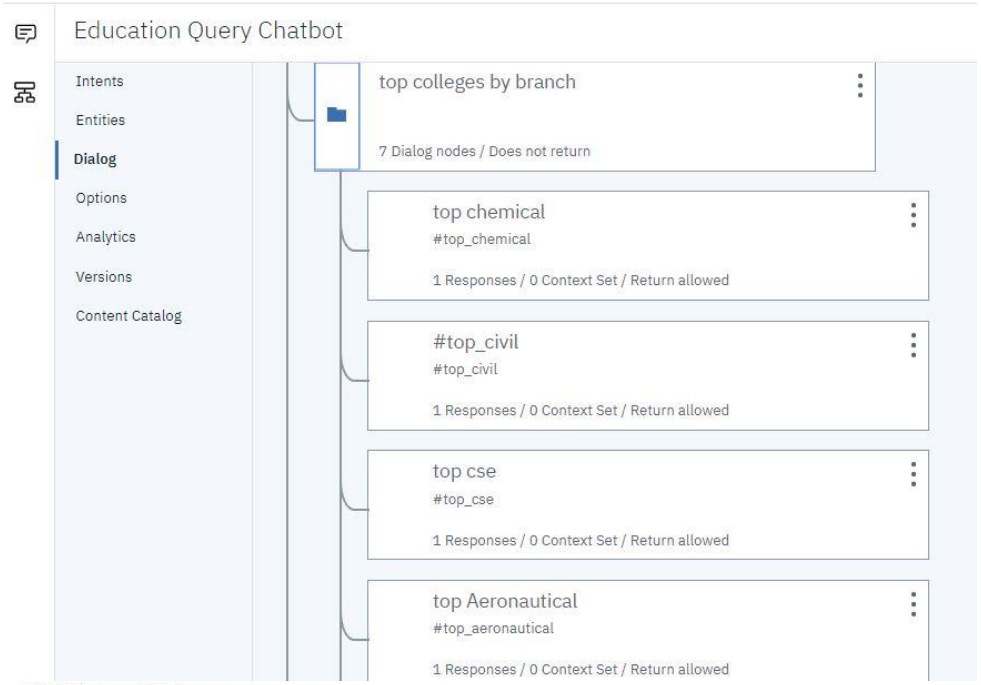
IBM **Watson Assistant**



IBM **Watson Assistant**



IBM **Watson Assistant**



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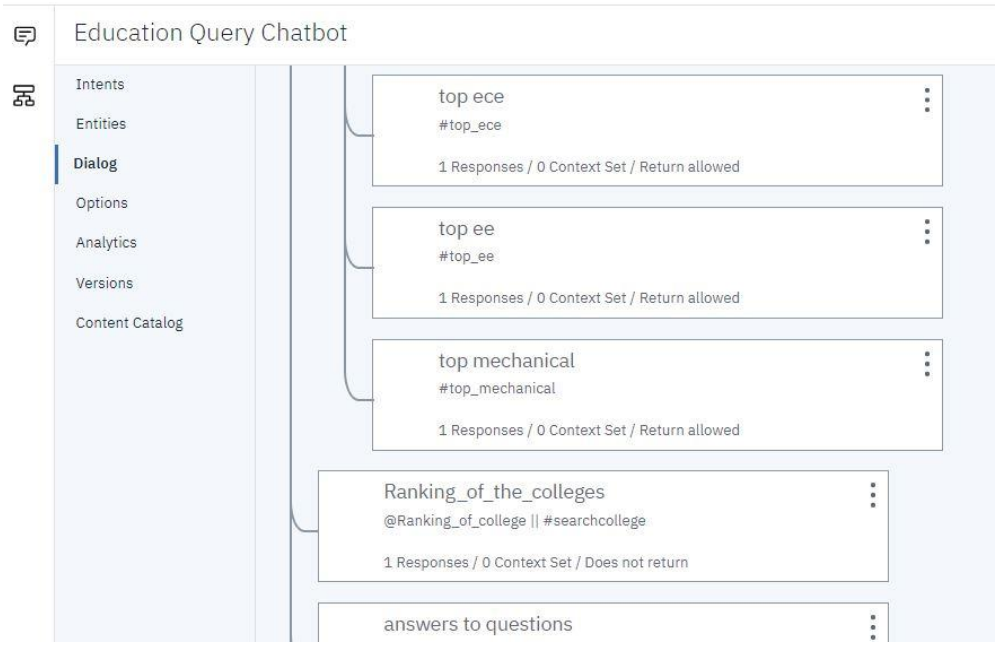

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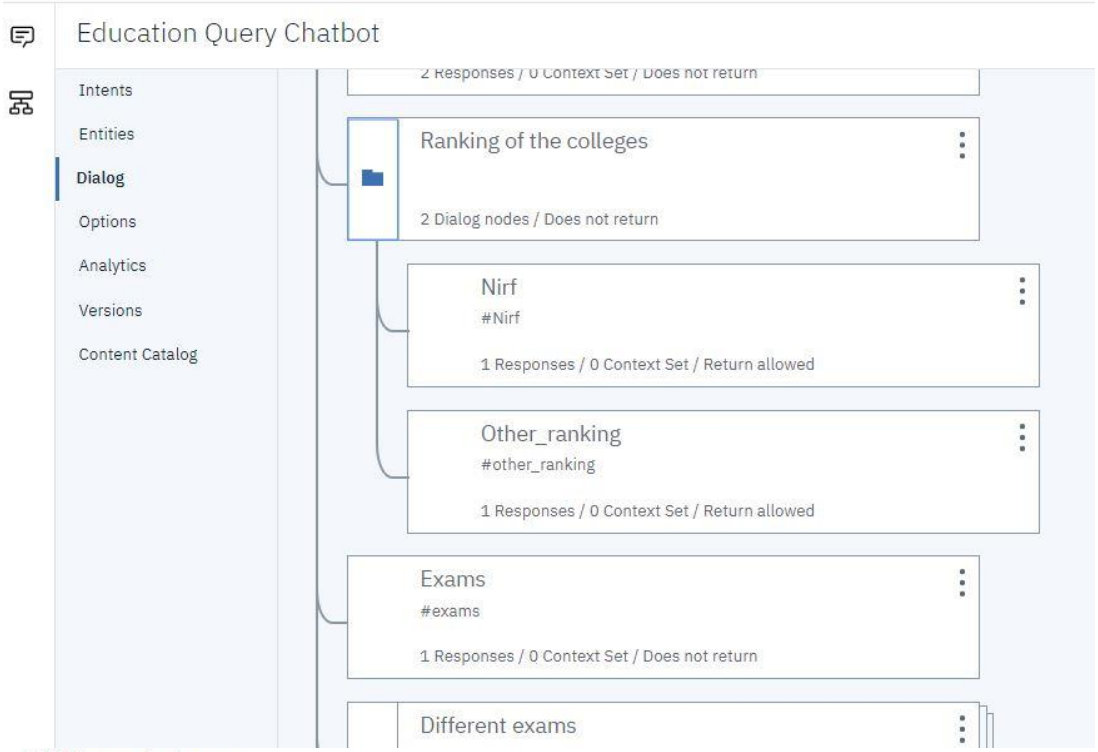

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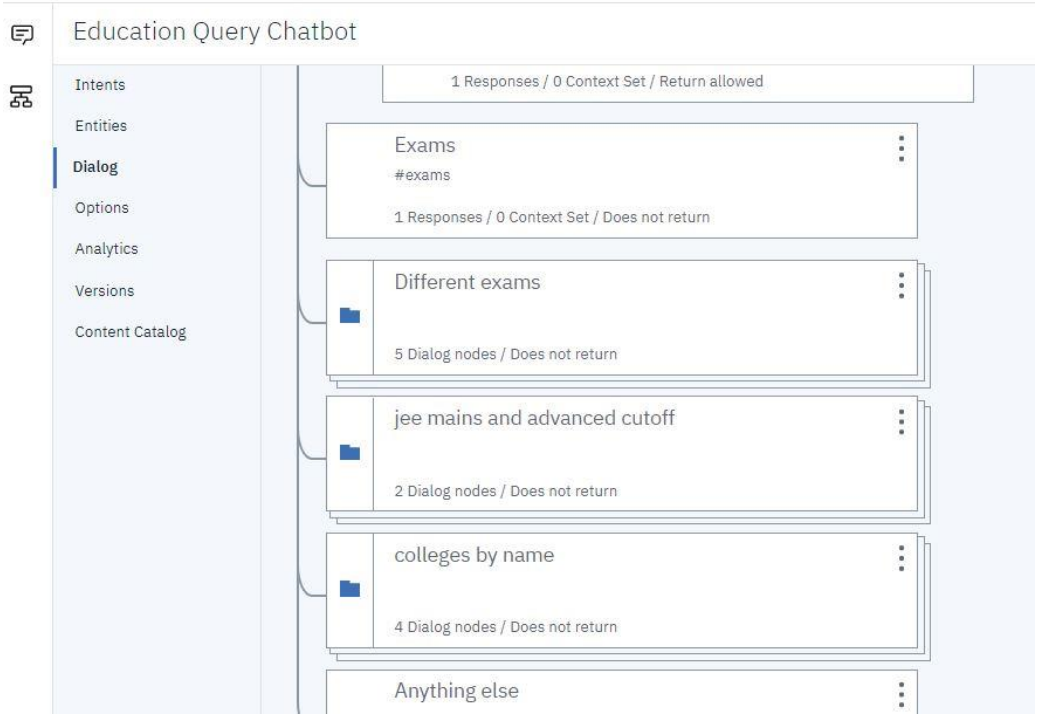
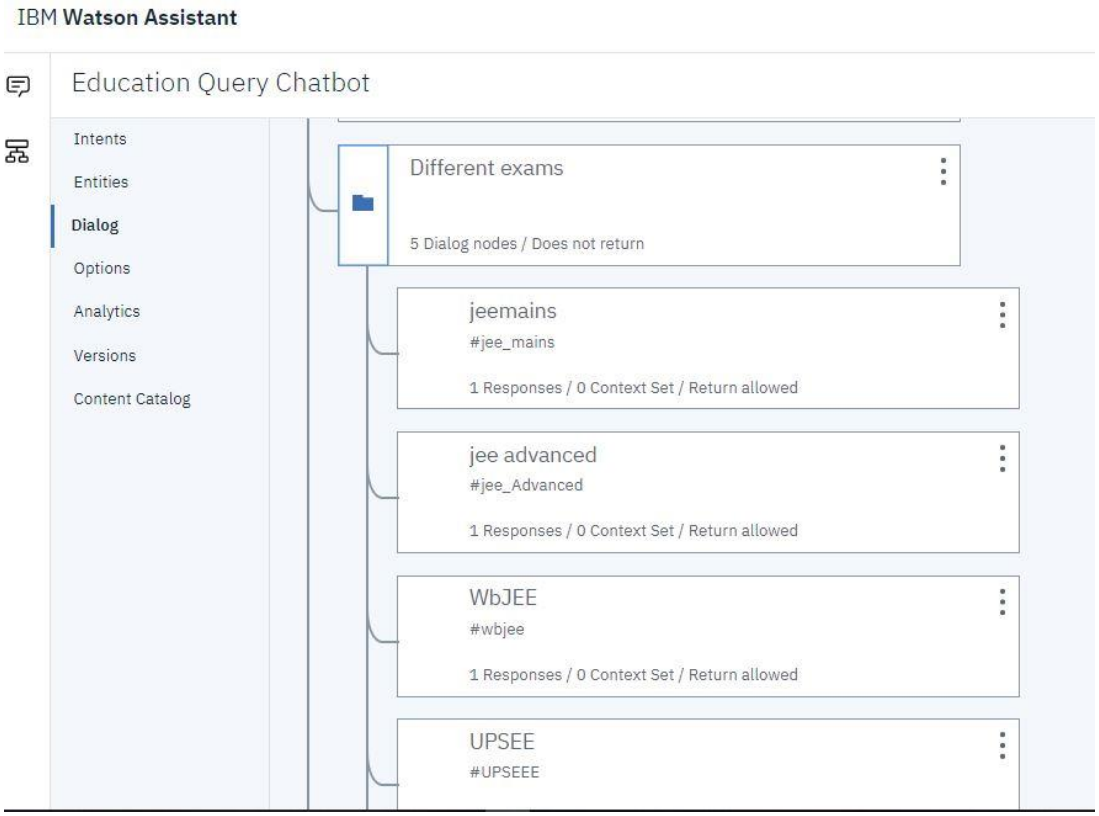
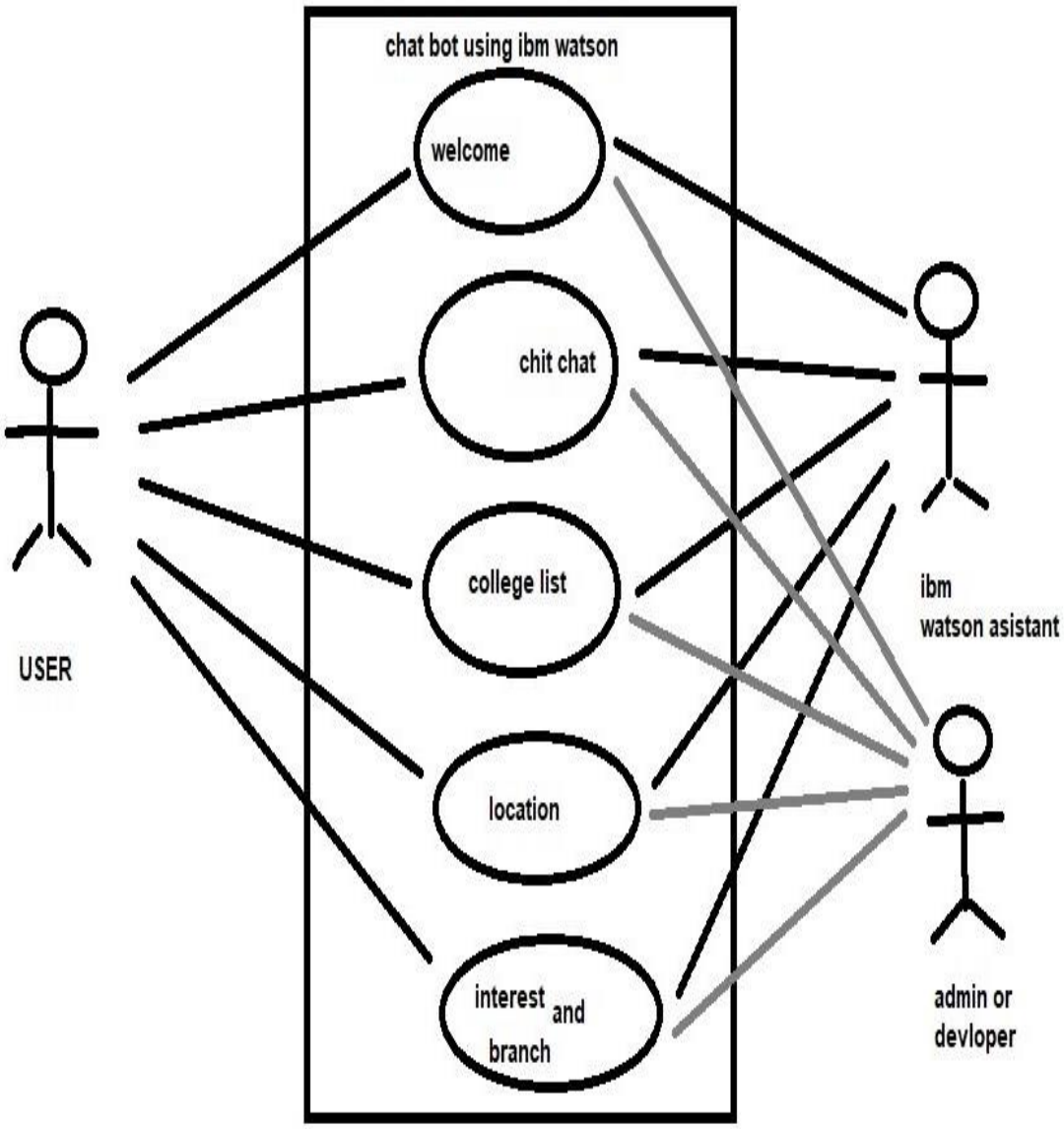



IBM Watson Assistant
Education Query Chatbot
Intents
Entities
Dialog
Options
Analytics
Versions
Content Catalog
Different exams
5 Dialog nodes / Does not return
jeemains
#jee_mains
1 Responses / 0 Context Set / Return allowed
jee advanced
#jee_Advanced
1 Responses / 0 Context Set / Return allowed
WbJEE
#wbjee
1 Responses / 0 Context Set / Return allowed
UPSEE
#UPSEEE

Used Case Diagram:



TESTING

Testing is a process of executing a program with the aim of finding error. To make our software perform well it should be error free.If testing is done successfully it will remove all the errors from the software.

Principles of Testing:-

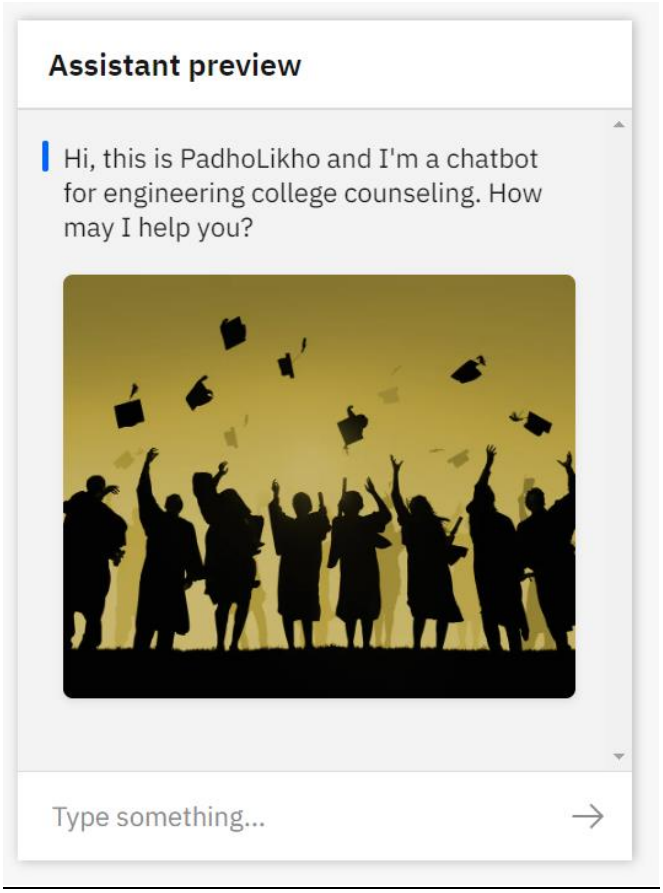
(i) All the test should meet the customer requirements
(ii) To make our software testing should be performed by third party
(iii) Exhaustive testing is not possible.As we need the optimal amount of testing based on the risk assessment of the application.
(iv) All the test to be conducted should be planned before implementing it
(v) It follows pareto rule(80/20 rule) which states that 80% of errors comes from 20% of program components.
(vi) Start testing with small parts and extend it to large parts.

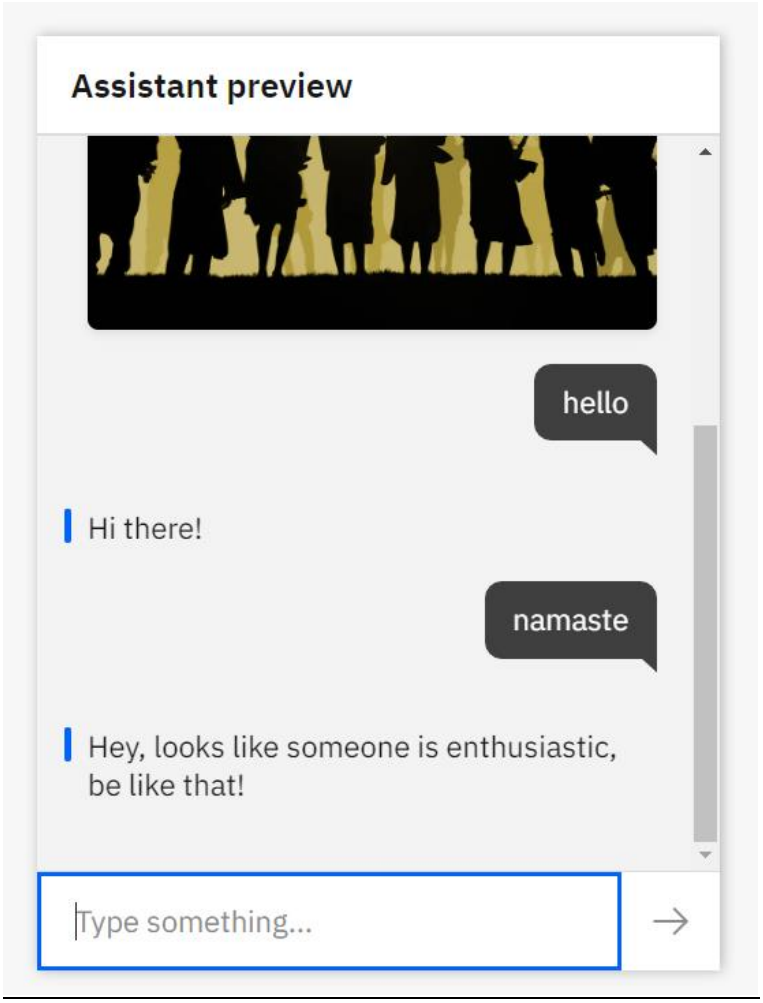
White Box Testing

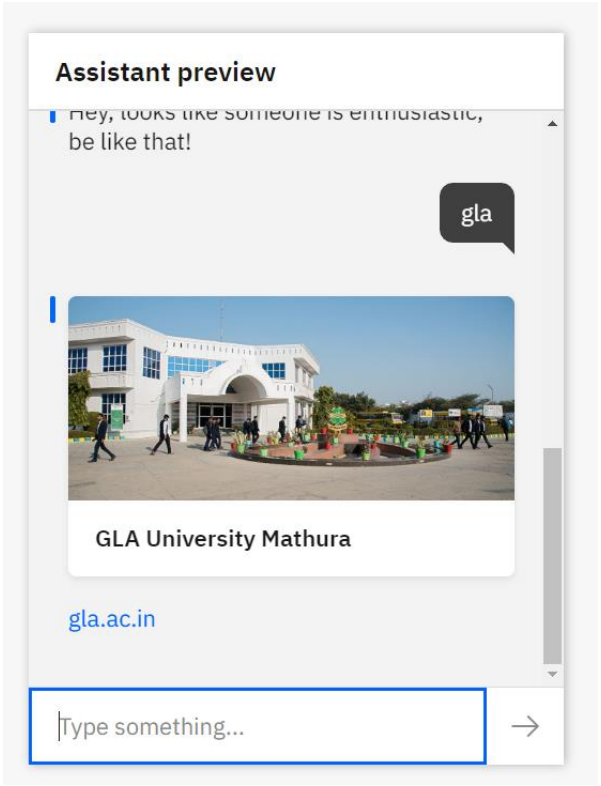
It is defined as the testing of a software solution's internal structure, design, and coding. In this type of testing, the code is visible to the tester. It focuses primarily on verifying the flow of inputs and outputs through the application, improving design and usability, strengthening security.

Black Box Testing

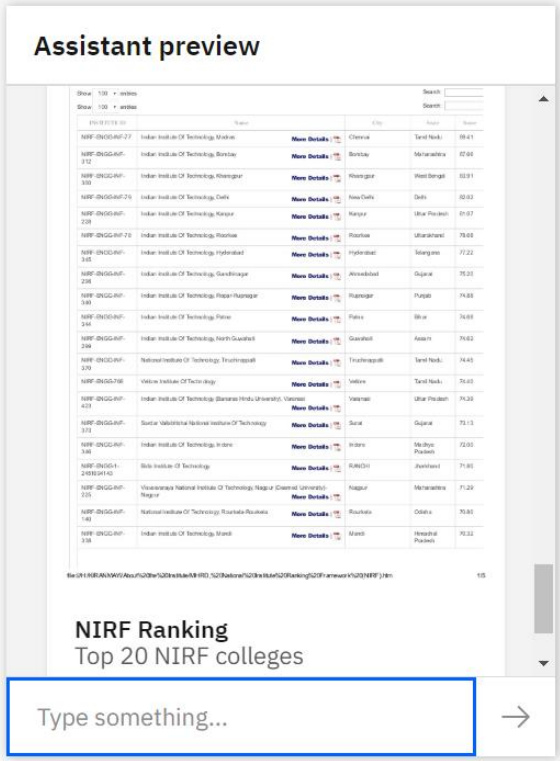
Black box testing is a type of software testing in which the functionality of the software is not known. The testing is done without the internal knowledge of the products.

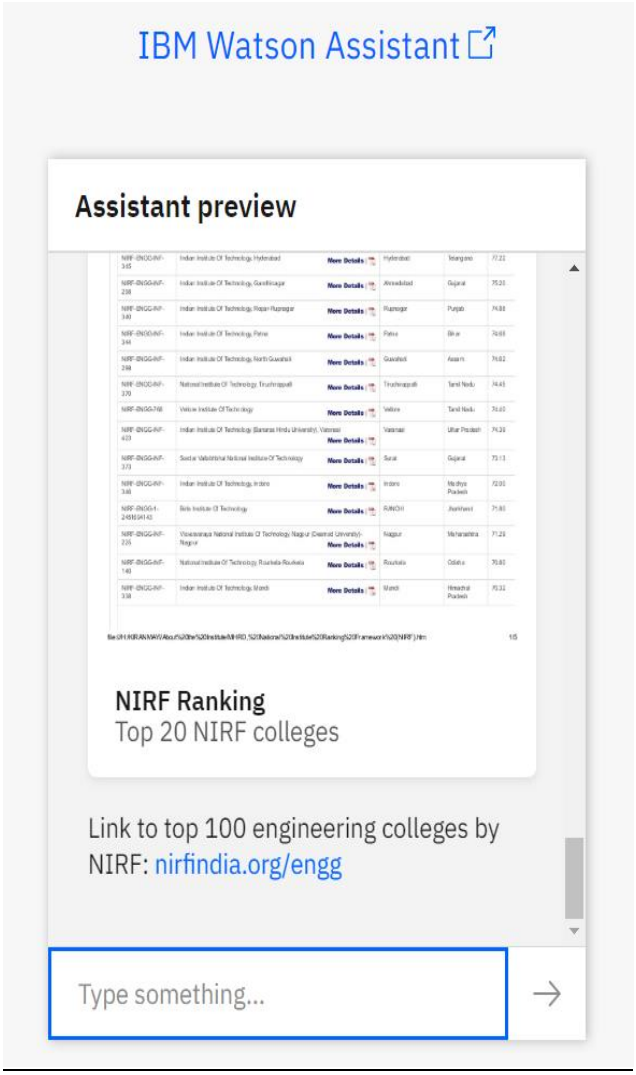

Assistant preview
Hi, this is PadhoLikho and I'm a chatbot for engineering college counseling. How may I help you?
Type something...


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...

IBM Watson Assistant




IBM Watson Assistant
Assistant preview
NIRF Ranking
Top 20 NIRF colleges
Link to top 100 engineering colleges by NIRF: nirfindia.org/engg
Type something...

IMPLEMENTATION AND USER INTERFACE

Facebook Developer

The Facebook Platform is the set of services, tools, and products provided by the social networking service Facebook for third-party developers to create their own applications and services that access data in Facebook.

IBM allows free of cost integration of the Watson chatbot to Facebook messenger. At first the API is linked with facebook messenger account of an admin of a page. The API is tested before and if works properly, the chatbot goes live but before that Terms of Usage and Privacy Policy are needed.

Graph API

The Graph API is the core of Facebook Platform, enabling developers to read from and write data into Facebook. The Graph API presents a simple, consistent view of the Facebook social graph, uniformly representing objects in the graph (e.g., people, photos, events, and pages) and the connections between them (e.g., friend relationships, shared content, and photo tags).

Authentication

Facebook authentication enables developers' applications to interact with the Graph API on behalf of Facebook users, and it provides a single-sign on mechanism across web, mobile, and desktop apps.

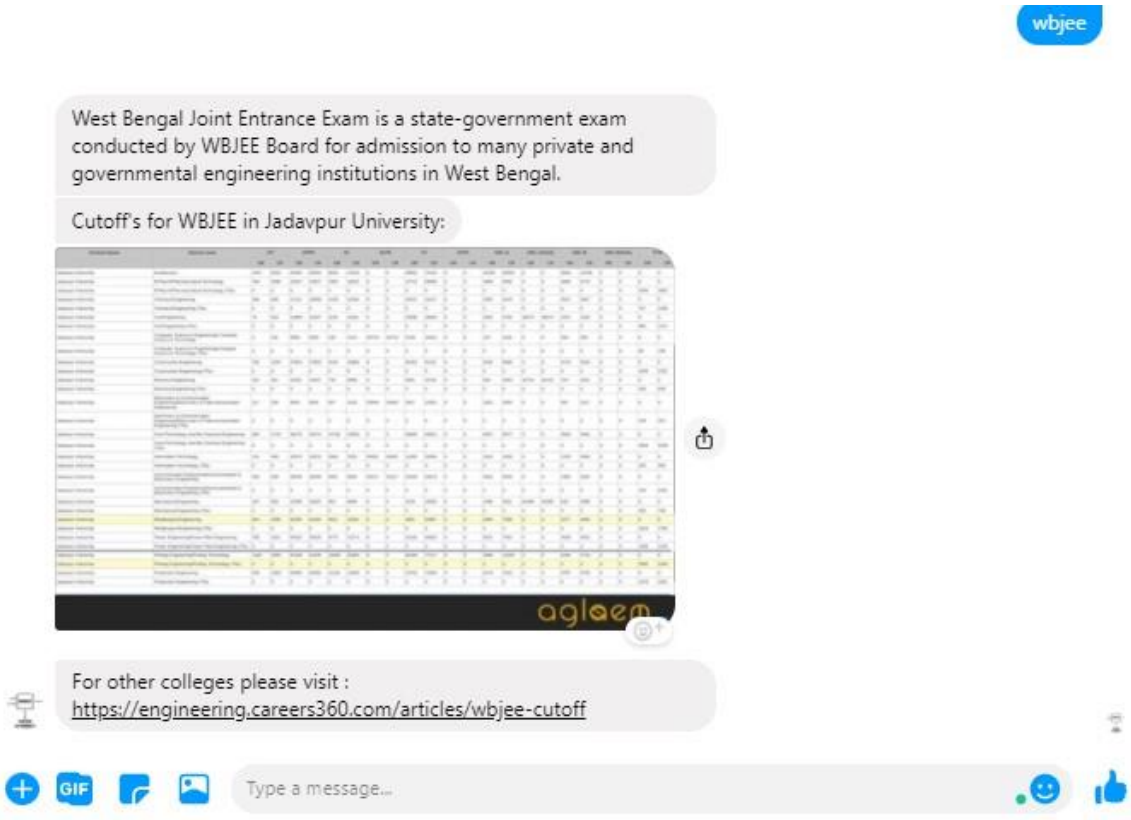
Social plugins

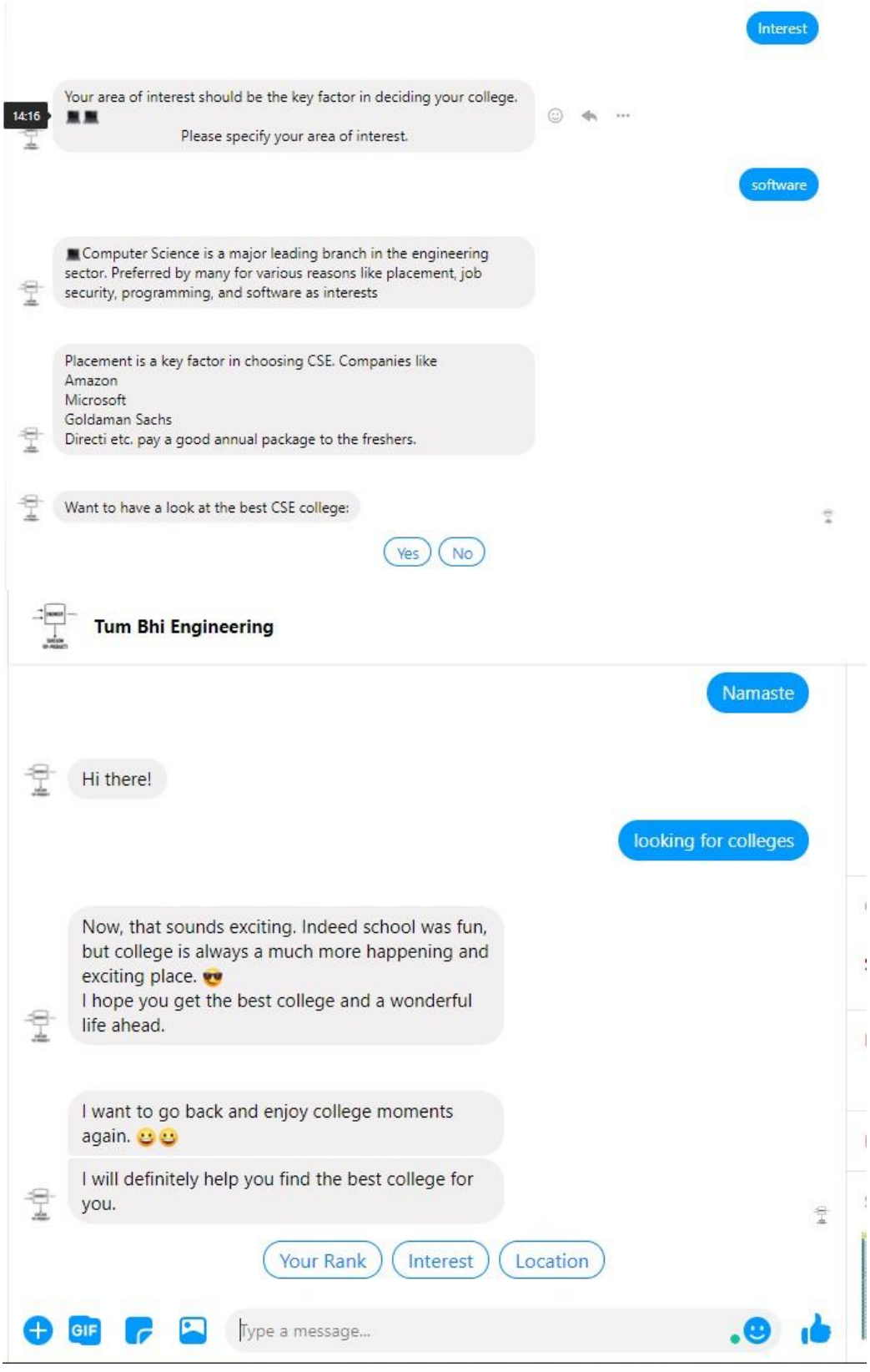
Social plugins – including the Like Button, Recommendations, and Activity Feed – enable developers to provide social experiences to their users with just a few lines of

HTML. All social plugins are extensions of Facebook and are designed so that no user data is shared with the sites on which they appear. On the other hand, the social plugins let Facebook track its users' browsing habits through any sites that feature the plugins. And the data collected from the browsing habits of the users helps marketers and advertisers on Facebook to target their audience.

In this section we have discussed about the different User Screens on which we have worked:

Front end:




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...

The methodology draws from the overall recommendations broad understanding arrived at by a Core Committee set up by MHRD, to identify the broad parameters for ranking various universities and institutions. The parameters broadly cover "Teaching, Learning and Resources," "Research and Professional Practices," "Graduation Outcomes," "Outreach and Inclusivity," and "Perception".

Link to top 100 engineering colleges by NIRF:
https://www.nirfindia.org/engg

Type a message...

ranking of colleges

Colleges are ranked on various parameters such as infrastructure, facilities, placement, research areas, etc. A top-ranked college always has some upper hand over a college with fewer ratings.

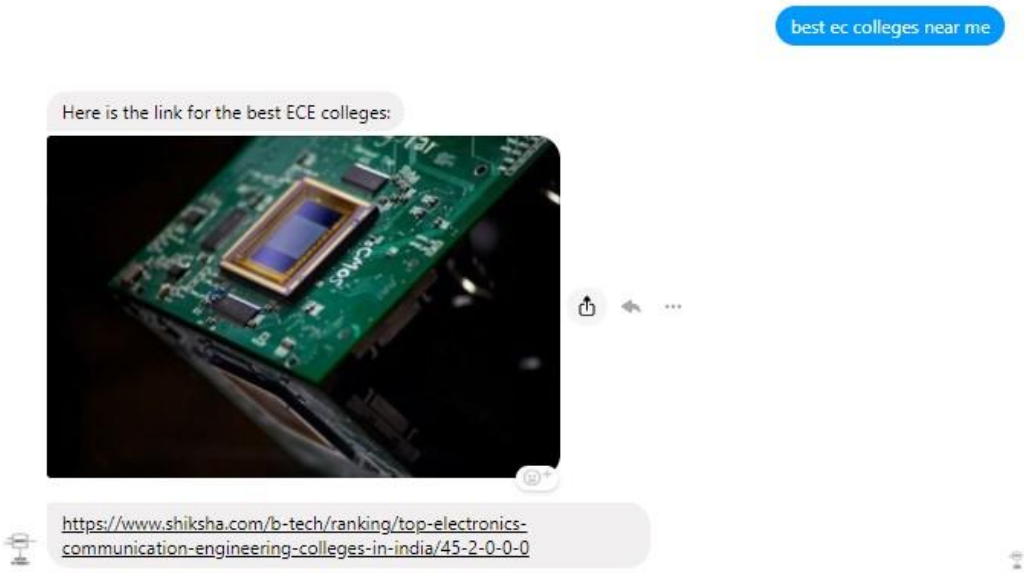
14:26 There's many organization's that rank colleges. The National Institutional Ranking Framework (NIRF) has been accepted by the MHRD

Yes

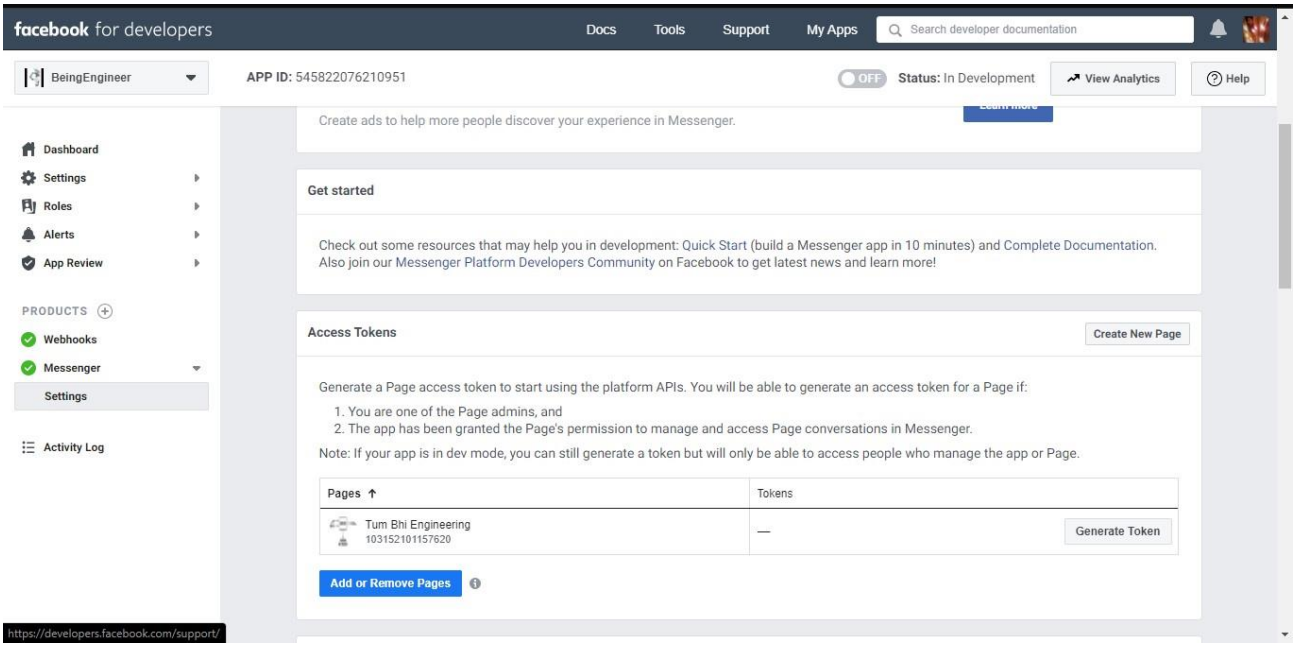
NATIONAL INSTITUTIONAL RANKING FRAMEWORK

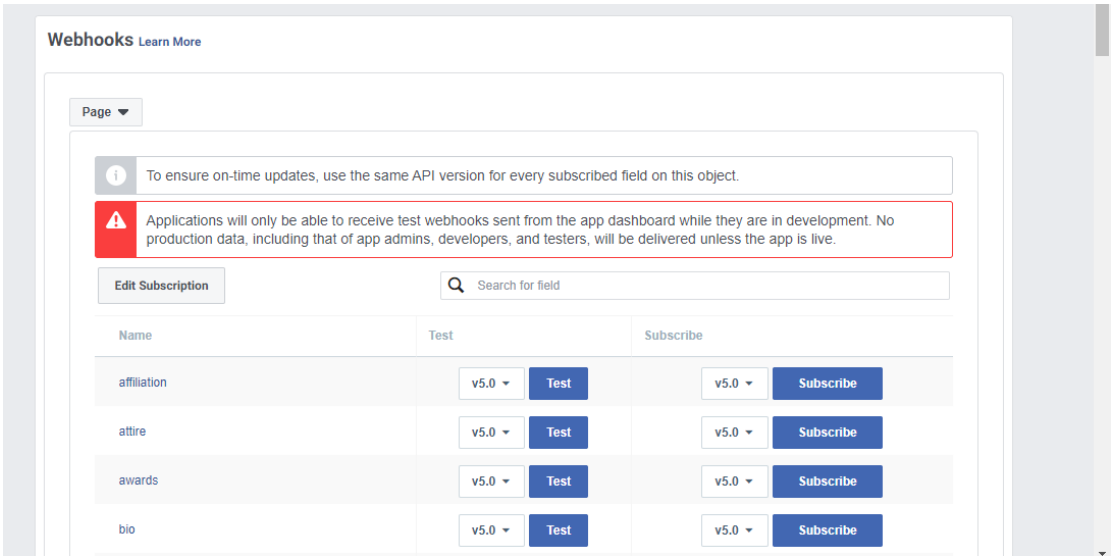
The methodology draws from the overall recommendations broad

Type a message...

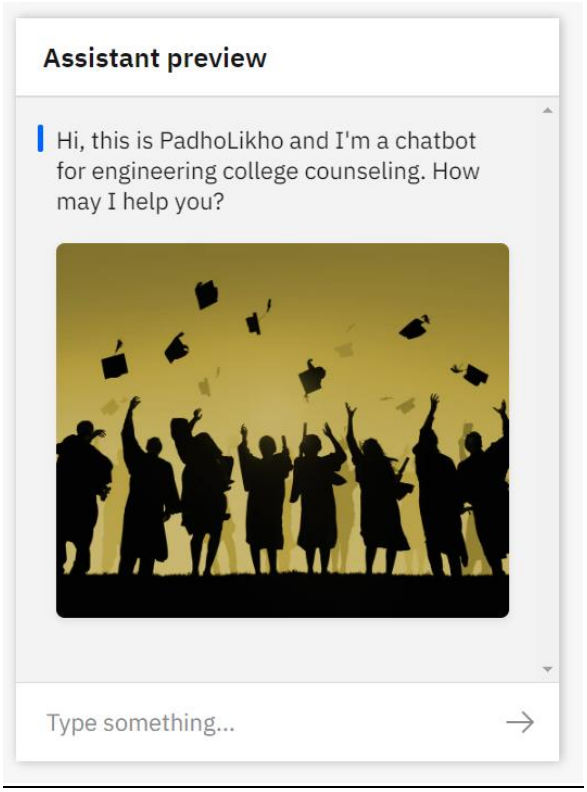

best ec colleges near me
Here is the link for the best ECE colleges:
https://www.shiksha.com/b-tech/ranking/top-electronics-communication-engineering-colleges-in-india/45-2-0-0-0

Back End:


facebook for developers
Docs
Tools
Support
My Apps
Search developer documentation
BeingEngineer
APP ID: 545822076210951
OFF
Status: In Development
View Analytics
Help
Create ads to help more people discover your experience in Messenger.
Dashboard
Settings
Roles
Alerts
App Review
PRODUCTS
Webhooks
Messenger
Settings
Activity Log
Get started
Check out some resources that may help you in development: Quick Start (build a Messenger app in 10 minutes) and Complete Documentation.
Also join our Messenger Platform Developers Community on Facebook to get latest news and learn more!
Access Tokens
Create New Page
Generate a Page access token to start using the platform APIs. You will be able to generate an access token for a Page if:
1. You are one of the Page admins, and
2. The app has been granted the Page's permission to manage and access Page conversations in Messenger.
Note: If your app is in dev mode, you can still generate a token but will only be able to access people who manage the app or Page.
Pages
Tokens
Tum Bhi Engineering
103152101157620
—
Generate Token
Add or Remove Pages
https://developers.facebook.com/support/



PREVIEW OF USER INTERFACE:



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(2) https://en.wikipedia.org/wiki/Watson_(computer)#Description
(3) www.geeksforgeeks.com
(4) www.developer.facebook.com
(5) www.google.com
(6) https://github.com/IBM/watson-banking-chat bot
(7) https://cloud.ibm.com/docs/services/assistant?topic=assistant-skills
(8) https://www.ibm.com/cloud/garage/tutorials/watson_conversation_support

APPENDICES

CODE:

Here, the code related with each dialog has been shown

- WELCOME node


```
{
  "output": {
    "generic": [
      {
        "values": [
          {
            "text": "Hello. My name is PadhoLikho and I'm a chatbot for engineering college counseling."
          },
          {
            "text": "Hi, this is PadhoLikho and I'm a chatbot for engineering college counseling.  How may I help you?"
          },
          {
            "text": "Thanks for reaching by, How can I help! PadhoLikho!"
          }
        ],
        "response_type": "text",
        "selection_policy": "random"
```

```
        },
        {
          "title": "",
          "source": "https://images.theconversation.com/files/206092/original/file-20180213-58339-n9h57g.jpg?ixlib=rb-1.1.0&q=45&auto=format&w=926&fit=clip",
          "description": "",
          "response_type": "image"
        }
      ]
    },
    "context": {}
  }
```


- CHIT CHAT


```
{
  "output": {
    "generic": [
      {
        "values": [
          {
            "text": "Hey!!"
          },
          {
```

```
          "text": "Hi there!"
        },
        {
          "text": "Hey, looks like someone is enthusiastic, be like that!"
        },
        {
          "text": "hello!"
        }
       ],
       "response_type": "text",
       "selection_policy": "random"
     }
   ]
  }
}
```


- TOP COLLEGES BY BRANCH


```
{
  "output": {
    "generic": [
     {
       "values": [
        {
```

```
        "text": "Best Computer Science Engineering Colleges in India:"
      },
      {
        "text": "Top cse colleges of India:"
      },
      {
        "text": "Some of the best computer science engineering colleges:"
      }
    ],
    "response_type": "text",
    "selection_policy": "random"
  },
  {
    "source": "https://uploads.sarvgyan.com/2014/06/cse-image.jpg",
    "response_type": "image"
  },
  {
    "values": [
      {
        "text": "https://www.shiksha.com/b-tech/ranking/top-computer-science-engineering-colleges-in-india/46-2-0-0-0"
      },
      {
```

```
            "text": "https://collegedunia.com/engineering/computer-science-colleges"
          },
          {
            "text": "https://engineering.careers360.com/colleges/list-of-computer-science-engineering-colleges-in-india"
          }
        ],
        "response_type": "text",
        "selection_policy": "sequential"
      }
    ]
  }
}
```