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AI Based Student Guidance Chatbot

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ABSTRACT

The "AI-BASED STUDENT GUIDANCE CHATBOT" project taken from the Smart India Hackathon website under the domain Smart Education aims to build a Chatbot that democratize access to career guidance for secondary-level students by creating an interactive AI model. This model will empower students to make informed career choices by assessing their aptitudes and interests i.e. they can access various aptitude tests, offering personalized career recommendations, and providing detailed career paths. The project's core objective is to bridge the gap between students' aspirations and the available opportunities, ensuring that every child has access to tailored counselling regardless of their background or location. By leveraging the capabilities of Artificial Intelligence, which uses Natural Language Processing (NLP) and Machine Learning. This initiative seeks to equip students with the knowledge and confidence needed to embark on fulfilling career journeys, ultimately contributing to their personal growth and the socio-economic development of their committee.

1. INTRODUCTION

The aim is to contribute to developing a more secure digital environment by offering an advanced approach to phishing site detection. By In today's fast-paced educational landscape, students encounter a multitude of challenges that demand personalized guidance. Enter the AI-based Student Guidance Chatbot, a revolutionary tool designed to seamlessly integrate technology with mentorship. This cutting-edge solution harnesses the power of artificial intelligence to provide students with tailored assistance in their academic journey.

With the ability to understand and respond to individual needs, this Chatbot serves as a virtual companion, offering insights on course selection, study strategies, and career planning. It leverages machine learning algorithms to adapt and evolve, continuously improving its capacity to offer relevant advice. The Chatbot isn't just a repository of information; it engages students in dynamic conversations, fostering a supportive environment for their academic endeavors.

This innovative tool also excels in streamlining administrative tasks, aiding students in navigating enrollment procedures, scheduling, and accessing essential resources. The AI-based Chatbot is accessible 24/7, ensuring that students can seek guidance whenever they need it, promoting a more efficient and responsive educational experience.

In summary, the AI-based Student Guidance Chatbot stands at the forefront of educational support systems, ushering in a new era of personalized, accessible, and intelligent assistance for students navigating the complexities of their academic journey

2. LITERATURE SURVEY

Georgescu, "Chatbots for Education-Trends Benefits and Challenges, 2018".

This paper explores the latest trends in using chatbots within educational settings. It discusses the benefits, such as improved student engagement and personalized learning experiences, as well as challenges like technical limitations and resistance to adoption.

Fleming et al., "Streamlining student course requests using chatbots, 2018".

This study focuses on the use of chatbots to facilitate the process of student course requests. It highlights how chatbots can simplify administrative tasks, reduce the workload on staff, and provide timely information to students.

Fernoaga et al., "Intelligent Education Assistant Powered by Chatbots, 2018".

This paper presents the development and implementation of an intelligent educational assistant powered by chatbot technology. It emphasizes the assistant's capabilities in providing academic support, answering frequently asked questions, and enhancing the overall educational experience.

Shevat, Designing bots,Creating conversational experiences, O'Reilly Media, Inc., 2017.

This book by Amir Shevat provides a comprehensive guide on designing and creating conversational bots. It covers the principles of bot design, user interaction, and best practices for developing engaging and effective chatbot experiences.

Molnár and Szüts, "The Role of Chatbots in Formal Education", 2018.

This article investigates the role of chatbots in formal education systems. It examines their impact on teaching and learning processes, the potential for improving educational outcomes, and the integration of chatbots into existing educational frameworks.

Siswadi and Tarigan, "UGLEO: A Web Based Intelligence Chatbot for Student Admission Portal using MEGAHAL Style", J. Ilm. Inform. Komput., Jan. 2018.

This research introduces UGLEO, a web-based intelligent chatbot designed for student admission portals using the MEGAHAL style. It describes the chatbot's architecture, functionalities, and effectiveness in assisting prospective students with admission-related inquiries.

3. IMPLEMENTATION

training.py

```
import nltk
from nltk.stem import WordNetLemmatizer
lemmatizer = WordNetLemmatizer()
import json
import pickle


import numpy as np
from keras.models import Sequential
from keras.layers import Dense, Activation, Dropout
from tensorflow.keras.optimizers import SGD
import random
words=[]
classes = []
documents = []
ignore_words = ['?', '!']
data_file = open('data.json').read()
intents = json.loads(data_file)
for intent in intents['intents']:
    for pattern in intent['patterns']:
        w = nltk.word_tokenize(pattern)
        words.extend(w)
       documents.append((w, intent['tag']))
        if intent['tag'] not in classes:
            classes.append(intent['tag'])
words = [lemmatizer.lemmatize(w.lower()) for w in words if w not in ignore_words]
words = sorted(list(set(words)))
```

```
classes = sorted(list(set(classes)))
print (len(documents), "documents")
print (len(classes), "classes", classes)
                    print (len(words), "unique lemmatized words", words)
pickle.dump(words,open('texts.pkl','wb'))
pickle.dump(classes,open('labels.pkl','wb'))
training = []
output_empty = [0] * len(classes)
for doc in documents:
   bag = []
   pattern_words = doc[0]
   pattern_words = [lemmatizer.lemmatize(word.lower())
for w in words:
      bag.append(1) if w in pattern_words else bag.append(0)
   output_row = list(output_empty)
   output_row[classes.index(doc[1])] = 1
     training.append([bag, output_row])
random.shuffle(training)
Data_type = object
training = np.array(training,dtype=Data_type)
train_x = list(training[:,0])
train_y = list(training[:,1]
print("Training data created")
     model = Sequential()
model.add(Dense(128, input_shape=(len(train_x[0]),), activation='relu'))
model.add(Dropout(0.5))
model.add(Dense(64, activation='relu'))
model.add(Dropout(0.5))
model.add(Dense(len(train_y[0]), activation='softmax'))
sgd=SGD(learning_rate=0.01,momentum=0.9,decay=(0.01/25),nesterov=False)

model.compile(loss='categorical_crossentropy', optimizer=sgd, metrics=['accuracy'])
hist = model.fit(np.array(train_x), np.array(train_y), epochs=200, batch_size=5, verbose=1)
model.save('model.h5', hist)
print("model created")
```

app.py

```
import nltk
nltk.download('popular')
```

```
from nltk.stem import WordNetLemmatizer
lemmatizer = WordNetLemmatizer()
import pickle
import numpy as np
from keras.models import load_model
model = load_model('model.h5')
import json
import random
intents = json.loads(open('data.json').read())
words = pickle.load(open('texts.pkl','rb'))
classes = pickle.load(open('labels.pkl','rb'))
def clean_up_sentence(sentence):
    sentence_words = nltk.word_tokenize(sentence)
    sentence_words = [lemmatizer.lemmatize(word.lower()) for word in sentence_words]
    return sentence_words
def bow(sentence, words, show_details=True):
    sentence_words = clean_up_sentence(sentence)
    bag = [0]*len(words)
    for s in sentence_words:
        for i,w in enumerate(words):
            if w == s:
                bag[i] = 1
                if show_details:
                    print ("found in bag: %s" % w)
    return(np.array(bag))
def predict_class(sentence, model):
    p = bow(sentence, words,show_details=False)
    res = model.predict(np.array([p]))[0]
    ERROR_THRESHOLD = 0.25
    results = [[i,r] for i,r in enumerate(res) if r>ERROR_THRESHOLD]
    results.sort(key=lambda x: x[1], reverse=True)
    return_list = []
    for r in results:
        return_list.append({"intent": classes[r[0]], "probability": str(r[1])})
    return return_list
def getResponse(ints, intents_json):
    tag = ints[0]['intent']
    list_of_intents = intents_json['intents']
    for i in list_of_intents:
```

```
        if(i['tag']== tag):
            result = random.choice(i['responses'])
            break
    return result

def chatbot_response(msg):
    ints = predict_class(msg, model)
    res = getResponse(ints, intents)
    return res
from flask import Flask, render_template, request
app = Flask(__name__)
app.static_folder = 'static'

@app.route("/")
def home():
    return render_template("index.html")

@app.route("/get")
def get_bot_response():
    userText = request.args.get('msg')
    return chatbot_response(userText)

if __name__ == "__main__":
    app.run()
```

index.html

```
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="UTF-8">
  <title>Chatbot</title>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <meta http-equiv="X-UA-Compatible" content="ie=edge">
  <link rel="stylesheet" href="{{ url_for('static', filename='styles/style.css') }}">
  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.2.1/jquery.min.js"></script>
</head>
```

```
<body>
 <!-- partial:index.partial.html -->
 <section class="msger">
  <header class="msger-header">
   <div class="msger-header-title">
    <i class="fa-regular fa-building-columns"></i> Student Guidance Chatbot <i class="fa-regular fa-building-columns"></i>
   </div>
  </header>

  <main class="msger-chat">
   <div class="msg left-msg">
    <div class="msg-img" style="background-image: url('bot3.svg')"></div>

    <div class="msg-bubble">
     <div class="msg-info">
      <div class="msg-info-name">Chatbot</div>
      <div class="msg-info-time">12:45</div>
     </div>

     <div class="msg-text">
      Hi, Welcome to Student Guidance Automated Chatbot! Go ahead and send me a message.

     </div>
    </div>
   </div>
</main>

  <form class="msger-inputarea">
   <input type="text" class="msger-input" id="textInput" placeholder="Enter your message...">
   <button type="submit" class="msger-send-btn">Send</button>
  </form>
 </section>
 <!-- partial -->
 <script src='https://use.fontawesome.com/releases/v5.0.13/js/all.js'></script>
 <script>

  const msgerForm = get(".msger-inputarea");
  const msgerInput = get(".msger-input");
  const msgerChat = get(".msger-chat");
```

```
    const BOT_IMG = "bot3.svg";
    const PERSON_IMG = "https://image.flaticon.com/icons/svg/145/145867.svg";
    const BOT_NAME = "ChatBot";
    const PERSON_NAME = "You";

    msgerForm.addEventListener("submit", event => {
      event.preventDefault();

      const msgText = msgerInput.value;
      if (!msgText) return;

      appendMessage(PERSON_NAME, PERSON_IMG, "right", msgText);
      msgerInput.value = "";
      botResponse(msgText);
    });

    function appendMessage(name, img, side, text) {
      //   Simple solution for small apps
      const msgHTML = `
<div class="msg ${side}-msg">
  <div class="msg-img" style="background-image: url('bot3.svg')"></div>

  <div class="msg-bubble">
    <div class="msg-info">
      <div class="msg-info-name">${name}</div>
      <div class="msg-info-time">${formatDate(new Date())}</div>
    </div>

    <div class="msg-text">${text}</div>
  </div>
</div>
      msgerChat.insertAdjacentHTML("beforeend", msgHTML);

      msgerChat.scrollTop += 500;
    }
    function botResponse(rawText) {

      // Bot Response
      $.get("/get", { msg: rawText }).done(function (data)
```

```
 {console.log(rawText);
        console.log(data);
        const msgText = data;
        appendMessage(BOT_NAME, BOT_IMG, "left", msgText);
      });
    }
    function get(selector, root = document) {
      return root.querySelector(selector);
    }
    function formatDate(date)
{
      const h = "0" + date.getHours();
      const m = "0" + date.getMinutes();
      return `${h.slice(-2)}:${m.slice(-2)}`;
    }

  </script>
</body>
</html>
```

style.css

```
:root
{
  --body-bg: linear-gradient(135deg, #f5f7fa 0%, #c3cfe2 100%);
  --msger-bg: #fff;
  --border: 2px solid #ddd;
  --left-msg-bg: #ececec;
  --right-msg-bg: #579ffb;
}

html
{
  box-sizing: border-box;
}

*,
*:before,
*:after
```

```
 {
  margin: 0;
  padding: 0;
  box-sizing: inherit;
}

body
{
  display: flex;
  justify-content: center;
  align-items: center;
  height: 100vh;
  background-image: var(--body-bg);
  font-family: Helvetica, sans-serif;
}

.msger {
  display: flex;
  flex-flow: column wrap;
  justify-content: space-between;
  width: 100%;
  max-width: 867px;
  margin: 25px 10px;
  height: calc(100% - 50px);
  border: var(--border);
  border-radius: 5px;
  background: var(--msger-bg);
  box-shadow: 0 15px 15px -5px rgba(0, 0, 0, 0.2);

}

.msger-header
 {
  /* display: flex; */
  font-size: medium;
  justify-content: space-between;
  padding: 10px;
  text-align: center;
  border-bottom: var(--border);
```

```
 background: #eee;
 color: #666;
}

.msger-chat
{
 flex: 1;
 overflow-y: auto;
 padding: 10px;}

.msger-chat::-webkit-scrollbar {
 width: 6px;}
.msger-chat::-webkit-scrollbar-track
{
 background: #ddd;}
.msger-chat::-webkit-scrollbar-thumb
{
 background: #bdbdbd;}

.msg{
 display: flex;
 align-items: flex-end;
 margin-bottom: 10px;}
.msg-img
{
 width: 50px;
 height: 50px;
 margin-right: 10px;
 background: #ddd;

 background-repeat: no-repeat;
 background-position: center;
 background-size: cover;
 border-radius: 50%;}
.msg-bubble
 {
 max-width: 450px;
 padding: 15px;
 border-radius: 15px;
```

```
  background: var(--left-msg-bg);}

.msg-info{
  display: flex;
  justify-content: space-between;
  align-items: center;
  margin-bottom: 10px
;}

.msg-info-name{
margin-right: 10px;
  font-weight: bold;
}
.msg-info-time {
font-size: 0.85em;}

.left-msg .msg-bubble{
border-bottom-left-radius: 0;}
.right-msg {
 flex-direction: row-reverse;
}
.right-msg .msg-bubble {
background: var(--right-msg-bg);

  color: #fff;
  border-bottom-right-radius: 0;
}

.right-msg .msg-img{
  margin: 0 0 0 10px;
}
.msger-inputarea {

  display: flex;
  padding: 10px;
  border-top: var(--border);
  background: #eee;
}
```

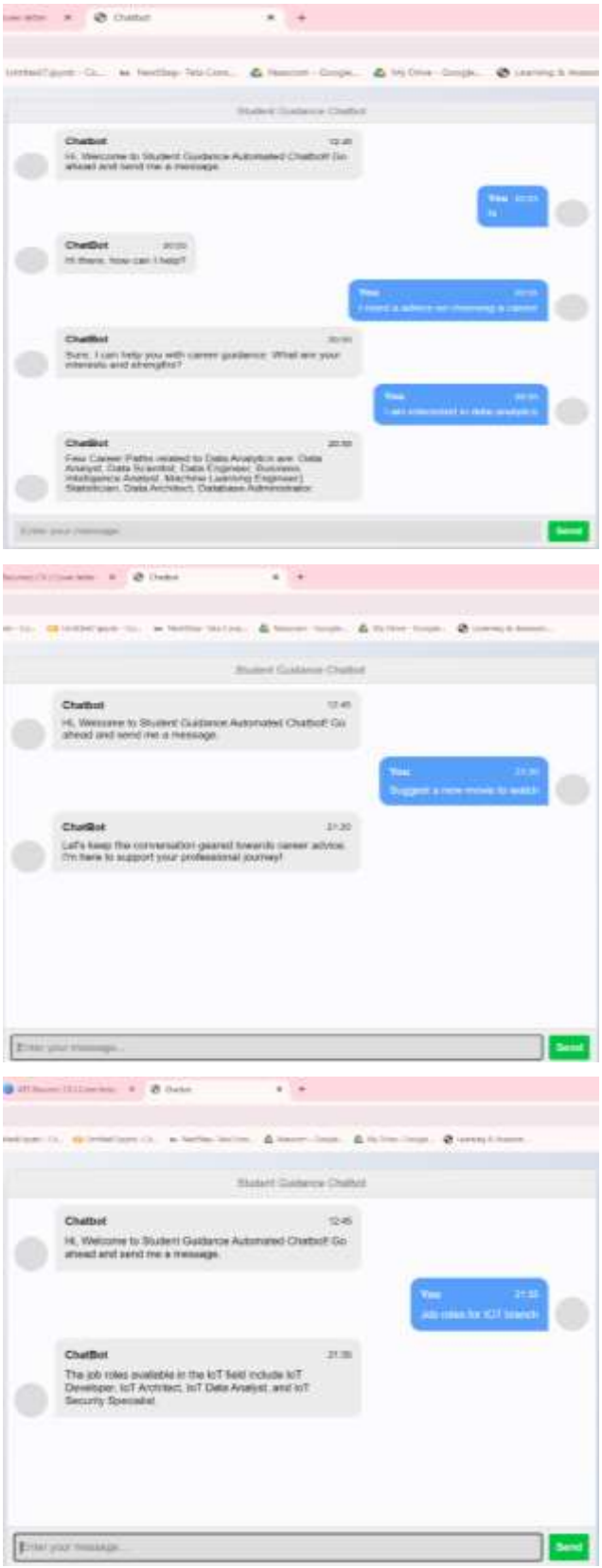
```
.msger-inputarea * {
  padding: 10px;
  border: none;
  border-radius: 3px;
  font-size: 1em;
}

.msger-input {
  flex: 1;
  background: #ddd;
}

.msger-send-btn {
  margin-left: 10px;
  background: rgb(0, 196, 65);
  color: #fff;
  font-weight: bold;
  cursor: pointer;
  transition: background 0.23s;
}

.msger-send-btn:hover{
  background: rgb(0, 180, 50);
}
.msger-chat {
  background-color: #fcfcfe;
  background-image: url("bot3.svg width='260' height='260'")}
```

OUTPUT SCREENS



4. FUTURE SCOPE

Further enhancements for an AI-based Student Guidance Chatbot could include the following:

Enhanced Natural Language Understanding (NLU)

Improve the chatbot's NLU capabilities to better comprehend complex and nuanced student queries, including slang, regional language variations, and context-based questions.Implement sentiment analysis to gauge the emotional tone of students and adjust responses accordingly for more empathetic interactions.

Expanded Knowledge Base

Continuously update and expand the chatbot's knowledge base with the latest academic programs, courses, internships, scholarships, and career opportunities.

Integrate with reputable educational databases, industry reports, and job portals to provide comprehensive and up-to-date information to students.

Integration with Academic Institutions

Forge partnerships with educational institutions to integrate the chatbot with learning management systems (LMS) and student information systems (SIS).

Enable seamless access to academic records, course registrations, and academic support services through the chatbot interface.

Continuous Feedback and Improvement

Implement robust feedback mechanisms to gather insights from students, educators, and counselors about their experiences with the chatbot.

Personalization and User Profiling:

Develop advanced user profiling capabilities to personalize recommendations based on individual preferences, academic history, career aspirations, and extracurricular interests. Utilize machine learning algorithms to dynamically adjust the chatbot's responses to align with each student's unique profile.

Multi-modal Interface:

Extend the chatbot's capabilities beyond text-based interactions to support voice input/output, image recognition, and multimedia content. This enhancement can cater to diverse learning styles and accessibility needs, providing a more engaging and inclusive user experience.

5. CONCLUSION

The conclusion drawn from the review of various journals emphasizes the user-friendly nature of chatbots, which can be utilized by individuals familiar with basic mobile and desktop operations. Customized chatbot implementation relies heavily on sophisticated AI algorithms and comprehensive training data. Ultimately, the deployment of personalized chatbots proves instrumental in saving time and streamlining interactions among individuals.

The efficiency of chatbots can be significantly enhanced by integrating additional machine learning (ML) algorithms. This approach aims to optimize the chatbot's performance and responsiveness, ensuring a seamless user experience. The increasing demand for such systems in our country's IT industry underscores the necessity of developing innovative solutions to accommodate the growing population's needs.

A chatbot system's fundamental objective is to replicate human-like conversation. Its architecture involves the integration of a language model and computational algorithms designed to simulate natural language interactions between humans and computers. Leveraging AI-based Natural Language Toolkit (NLTK) is a strategic choice due to its effectiveness in chatbot development.

In summary, the conclusion from the journal review underscores the transformative potential of chatbots in facilitating seamless and efficient human-computer interactions. The integration of AI algorithms, particularly NLTK, enhances the chatbot's performance, paving the way for user-friendly and adaptable systems that cater to the evolving needs of our IT-driven society.

6. REFERENCES

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