SUPERIOR UNIVERSITY

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Class:

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Section:

4B

Subject:

Programming for Artificial Intelligence

Submitted to:

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Task 12

Restaurant Information using similarity search

Introduction

This project presents an AI chatbot designed for a restaurant named **Foodie's Paradise**. The chatbot simulates natural conversation with users and provides quick responses to queries regarding the menu, drinks, desserts, and table bookings using a semantic similarity approach.

Objective

- Build an interactive AI chatbot that understands user queries.
- Provide accurate and fun responses about food items and services.
- Improve customer experience using NLP and transformer models.

Working

Step 1: Define Question-Answer Pool

Predefined questions and fun answers were created for topics like:

- Menu overview
- Burgers, pizzas, pasta, biryani
- BBQ, desserts, drinks
- Booking a table

Step 2: Load Semantic Model

The chatbot uses the `sentence-transformers` library with the `all-MiniLM-L6-v2` model to convert user inputs and predefined questions into embeddings.

Step 3: Calculate Similarity

The chatbot calculates the cosine similarity between user input and each question. If the best match exceeds a defined threshold (e.g., 0.4), the corresponding answer is returned.

Step 4: User Interaction Loop

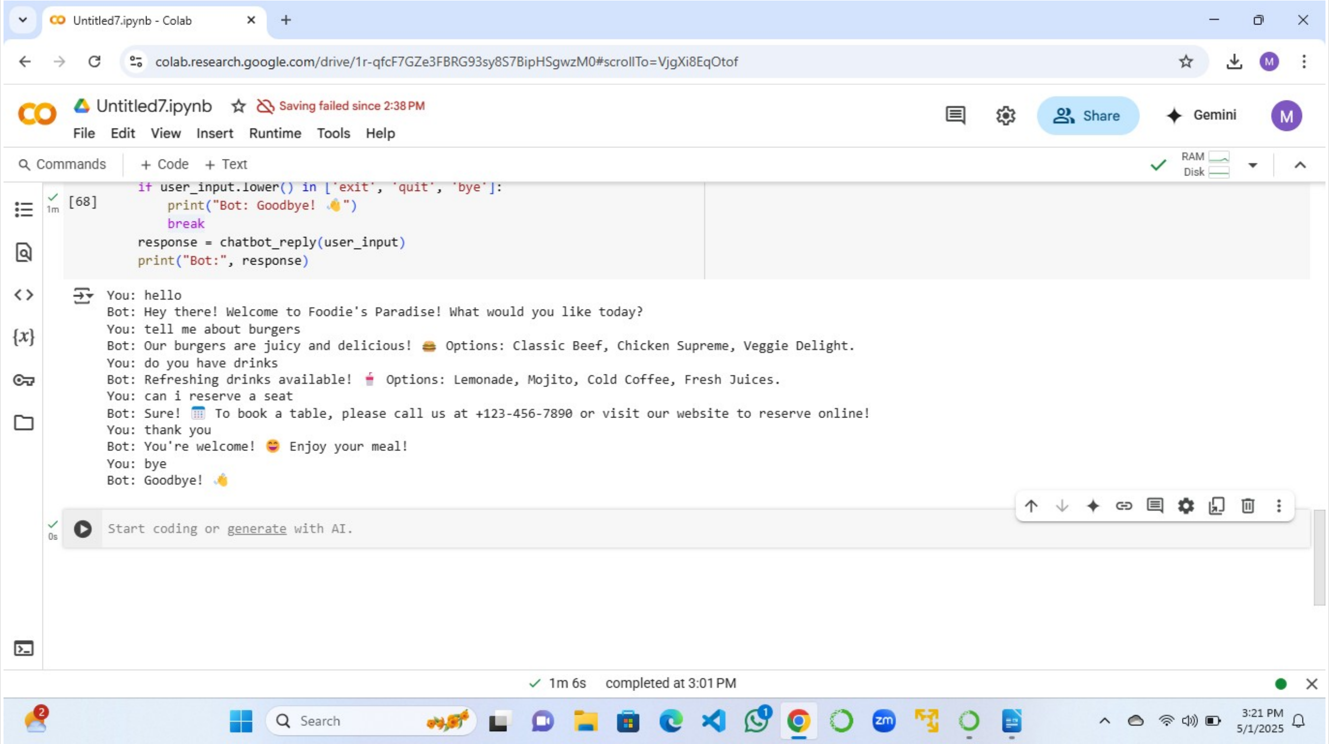
The chatbot continuously takes input until the user types 'bye', 'exit', or 'quit'.

Code:

```
from sentence_transformers import SentenceTransformer,util
model = SentenceTransformer("sentence-transformers/all-MiniLM-L6-v2")
question_pool = [
    "Hi",
    "What's on the menu?",
    "Do you have burgers?",
    "Tell me about pizzas",
    "What types of pasta do you serve?",
    "Do you offer biryani?",
    "Do you have BBQ items?",
    "Can I get a dessert?",
    "What drinks do you serve?",
    "Can I book a table?",
    "Thanks!",
    "Bye"
]

answer_pool = [
    "Hey there! Welcome to Foodie's Paradise! What would you like today?",
    "Our menu is packed with love! 🍕 🍔 🍝 We have pizzas, burgers, pasta, biryani, BBQ, desserts,
and much more!",
    "Our burgers are juicy and delicious! 🍔 Options: Classic Beef, Chicken Supreme, Veggie
Delight.",
    "Hot and cheesy pizzas await you! 🍕 Options: Margherita, Pepperoni, BBQ Chicken, Veggie
Special.",
    "We serve creamy Alfredo, spicy Arrabiata, and classic Bolognese pasta! 🍝 ",
    "Aromatic biryani for you! Options: Chicken Biryani, Mutton Biryani, and Veg Biryani. 🍛 ",
    "Smoky and tender BBQ dishes! Options: BBQ Wings, Ribs, and BBQ Platters. 🔥 ",
    "Dessert time! 🍰 Options: Chocolate Lava Cake, Cheesecake, Ice Cream Sundae.",
    "Refreshing drinks available! 🥤 Options: Lemonade, Mojito, Cold Coffee, Fresh Juices.",
    "Sure! 📅 To book a table, please call us at +123-456-7890 or visit our website to reserve online!",
    "You're welcome! 😄 Enjoy your meal!",
    "Goodbye foodie! 👋 Come back hungry!"
]


question_embeddings = model.encode(question_pool,
convert_to_tensor=True)
```

```python
import numpy as np
question_embeddings = np.array(question_embeddings).astype('float32')
np.save('restaurant_embeddings.npy',question_embeddings)
question_embeddings = np.load('restaurant_embeddings.npy')
import faiss
dimension = question_embeddings.shape[1]
index = faiss.IndexFlatL2(dimension)
index.add(question_embeddings)


SIMILARITY_THRESHOLD = 0.4
def chatbot_reply(user_input):
    user_embedding = model.encode(user_input, convert_to_tensor=True)
    cosine_scores = util.pytorch_cos_sim(user_embedding, question_embeddings)

    best_score = cosine_scores.max().item()
    best_index = cosine_scores.argmax().item()

    if best_score >= SIMILARITY_THRESHOLD:
        return answer_pool[best_index]
    else:
        return "I'm not sure about that. Try asking about food, drinks, or bookings!"

while True:
    user_input = input("You: ")
    if user_input.lower() in ['exit', 'quit', 'bye']:
        print("Bot: Goodbye! 👋")
        break
    response = chatbot_reply(user_input)
    print("Bot:", response)
```

Output:


Untitled7.ipynb - Colab
colab.research.google.com/drive/1r-qfcF7GZe3FBRG93sy8S7BipHSgwzM0#scrollTo=VjgXi8EqOtof
Untitled7.ipynb
Saving failed since 2:38 PM
File Edit View Insert Runtime Tools Help
Share
Gemini
Commands
+ Code
+ Text
RAM
Disk
[68]
1m
0s
Start coding or generate with AI.
✓ 1m 6s completed at 3:01 PM
Search
3:21 PM
5/1/2025

```
    if user_input.lower() in ['exit', 'quit', 'bye']:
        print("Bot: Goodbye! 👋")
        break
    response = chatbot_reply(user_input)
    print("Bot:", response)
```

```
You: hello
Bot: Hey there! Welcome to Foodie's Paradise! What would you like today?
You: tell me about burgers
Bot: Our burgers are juicy and delicious! 🍔 Options: Classic Beef, Chicken Supreme, Veggie Delight.
You: do you have drinks
Bot: Refreshing drinks available! 🥤 Options: Lemonade, Mojito, Cold Coffee, Fresh Juices.
You: can i reserve a seat
Bot: Sure! 📅 To book a table, please call us at +123-456-7890 or visit our website to reserve online!
You: thank you
Bot: You're welcome! 😄 Enjoy your meal!
You: bye
Bot: Goodbye! 👋
```