CoGrammar

DS PORTFOLIO SESSION 12

SKILLS FOR LIFE
SKILLS BOOTCAMPS

Department for Education

Data Science Session Housekeeping

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(FBV: Mutual Respect.)**
- No question is daft or silly - **ask them!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. Moderators are going to be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Open Classes. You can submit these questions here: **Open Class Questions**

Data Science Session Housekeeping cont.

- For all **non-academic questions**, please submit a query: **www.hyperiondev.com/support**
- Report a **safeguarding** incident: **www.hyperiondev.com/safeguardreporting**
- We would love your **feedback** on lectures: **Feedback on Lectures**

Progression Criteria

✅ Criterion 1: Initial Requirements

- Complete 15 hours of Guided Learning Hours and the first four tasks within two weeks.

✅ Criterion 2: Mid-Course Progress

- Software Engineering: Finish 14 tasks by week 8.
- Data Science: Finish 13 tasks by week 8.

✅ Criterion 3: Post-Course Progress

- Complete all mandatory tasks by 24th March 2024.
- Record an Invitation to Interview within 4 weeks of course completion, or by 30th March 2024.
- Achieve 112 GLH by 24th March 2024.

✅ Criterion 4: Employability

- Record a Final Job Outcome within 12 weeks of graduation, or by 23rd September 2024.

Recap of Week 11, 12: Machine Learning

Machine Learning Application/System

- Uses ML algorithms in order to analyse sensor data and predict machine failure.

Supervised Machine Learning

- A category of ML where the model is trained on a labeled dataset, ultimately learning the relationship between input and corresponding target labels.

Feature Selection

- Picking relevant features from the sensor data is crucial for accurate predictions.

Evaluation Metrics

- Factors such as accuracy, precision, recall, and the confusion matrix.

A Chatbot Revolution (TechBot)

- **Background:** In the bustling world of e-commerce, "TechTrendz" stands as a leading online tech store. With a vast product range and a growing customer base, their customer support team is inundated with frequently asked questions. The CEO, Mr. Alan Turing, believes in leveraging technology to enhance customer experience. He envisions a chatbot that can handle common queries, freeing up the human support team for more complex issues.

- **Challenge:** Mr. Turing presents a challenge to the you: Develop "TechBot", a chatbot that understands and responds to varied user inputs. This chatbot should be able to answer questions about product specifications, return policies, shipping details, and more. You will use advanced NLP techniques to ensure the chatbot can understand different phrasings of the same question and provide accurate answers.

A Chatbot Revolution (TechBot)

By comparing "TechBot" to the rudimentary chatbot you've designed in the first week, you will see firsthand the advancements made in your understanding and application of NLP.

What is the primary goal of developing TechBot for TechTrendz?

A. Enhancing graphics for the online tech store.
B. Streamlining product delivery.
C. Improving customer support by developing a chatbot.
D. Implementing augmented reality features.

Demo: Need for TechBot

```
# Simple example to demonstrate the need for TechBot
user_input = input("Ask TechBot about product specifications, return
policies, or shipping details: ")

# Process user input using advanced NLP techniques
# (Demonstration may include additional features not covered in the example)

# Provide relevant response based on NLP analysis
print("TechBot: [Response based on NLP analysis]")
```

Demo: TechBot Development

```
# Load a pre-trained NLP model

nlp = spacy.load("en_core_web_sm")
def process_user_input(user_input):
  # Use advanced NLP techniques to extract key information from user input
  doc = nlp(user_input)
  # Analyse the intent and entities in the user input
  intent = "product_query" # Placeholder, actual intent analysis needed
  entities = ["product_specifications", "return_policy", "shipping_details"]
   # Placeholder, actual entity analysis needed

  return intent, entities
```

```
def generate_techbot_response(intent, entities):
  # Based on the intent and entities, generate a relevant response
  if intent == "product_query":
    if "product_specifications" in entities:
      return "TechBot: Here are the specifications for the requested
product."
    elif "return_policy" in entities:
      return "TechBot: Our return policy allows returns within 30 days of
purchase."
    elif "shipping_details" in entities:
      return "TechBot: We offer standard and express shipping options.
Delivery usually takes 3-5 business days."

  return "TechBot: I'm sorry, I couldn't understand your request. Please try
again."
```

```
# Demonstrate TechBot response generation
user_input = input("Ask TechBot about product specifications, return
policies, or shipping details: ")
intent, entities = process_user_input(user_input)
response = generate_techbot_response(intent, entities)
print(response)
```

Techbot

Develop "TechBot", a chatbot that understands and responds to varied user inputs. This chatbot should be able to answer questions about product specifications, return policies, shipping details, and more.

spacy(for NLP)
Linear Regression

Important Concepts:

1. **NLP:** Unlike ByteMatch (which focuses on pattern matching), TechBot employs NLP to understand and respond to user queries expressed in natural language.

2. **Linear Regression:** Linear regression may help to identify patterns in user satisfaction scores based on various features, ultimately enhancing the bots conversational abilities.

Advanced Challenge:

- Integrate a mechanism for users to provide feedback on the chatbot responses.
- Implement a linear regression model that analyses user feedback, considering features such as response time, accuracy and user sentiment

In the development of TechBot, what is the primary role of advanced NLP techniques?

A. Enhancing graphics for the online tech store.
B. Streamlining product delivery.
C. Improving customer support by accurately understanding and responding to varied user inputs.
D. Implementing augmented reality features.

Why is TechBot important for TechTrendz?

A. To provide real-time updates on scientific research.
B. To streamline product returns.
C. To enhance customer support by handling common queries and freeing up the human support team.
D. To implement augmented reality features in product listings.

Summary

Linear Regression

★ Linear regression can be used in the context of TechBot for analysing user feedback and improving the bots performance.

Natural Language Processing (NLP)

★ Understanding the NLP capabilities of TechBot is crucial for users seeking conversational and context-aware interactions with the chatbot.

Questions and Answers

Questions around the Case Study