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Batch:26

SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		**DEPARTMENT OF COMPUTER SCIENCE ENGINEERING**	
Program Name: B. Tech	**Assignment Type: Lab**	**Academic Year:**2025-2026	
Course Coordinator Name	Dr. Rishabh Mittal		
Instructor(s) Name	Mr. S Naresh Kumar Ms. B. Swathi Dr. Sasanko Shekhar Gantayat Mr. Md Sallauddin Dr. Mathivanan Mr. Y Srikanth Ms. N Shilpa Dr. Rishabh Mittal (Coordinator) Dr. R. Prashant Kumar Mr. Ankushavali MD Mr. B Viswanath Ms. Sujitha Reddy Ms. A. Anitha Ms. M.Madhuri Ms. Katherashala Swetha Ms. Velpula sumalatha Mr. Bingi Raju		
CourseCode	23CS002PC304	**Course Title**	AI Assisted Coding
Year/Sem	III/II	**Regulation**	R23
Date and Day of Assignment	**Week3 –**	**Time(s)**	23CSBTB01 To 23CSBTB52
Duration	2 Hours	**Applicable to Batches**	All batches
Assignment Number: 5.4(Present assignment number)/**24**(Total number of assignments)			

Q.No.	**Question**	***Expected Time to complete***
1	Lab 5: Ethical Foundations – Responsible AI Coding Practices	Week3 -

Lab Objectives:

- To explore the ethical risks associated with AI-generated code.
- To recognize issues related to security, bias, transparency, and copyright.
- To reflect on the responsibilities of developers when using AI tools in software development.
- To promote awareness of best practices for responsible and ethical AI coding.

Lab Outcomes (LOs):

After completing this lab, students will be able to:

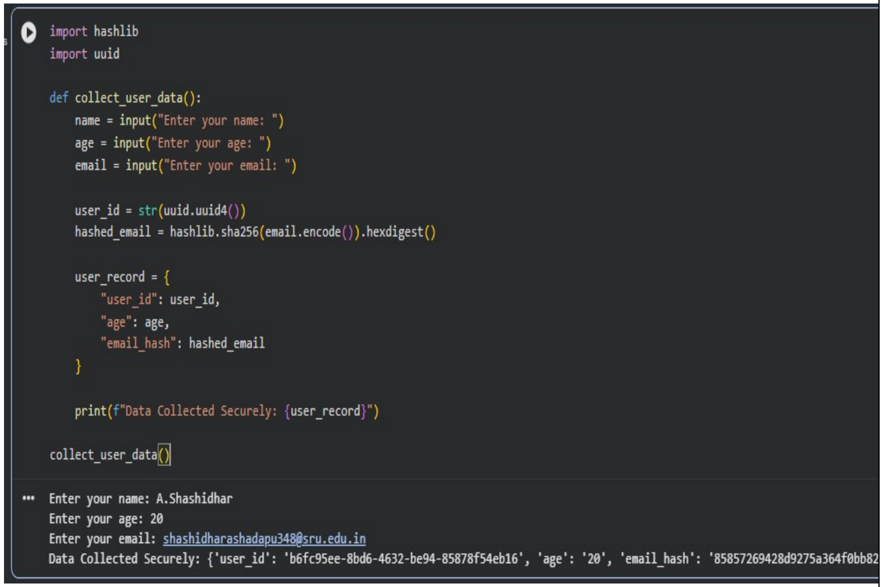
- Identify and avoid insecure coding patterns generated by AI tools.
- Detect and analyze potential bias or discriminatory logic in AI-generated outputs.
- Evaluate originality and licensing concerns in reused AI-generated code.
- Understand the importance of explainability and transparency in AI-assisted programming.
- Reflect on accountability and the human role in ethical AI coding practices.

Task Description #1:

• Prompt GitHub Copilot to generate a Python script that collects user data (e.g., name, age, email). Then, ask Copilot to add comments on how to anonymize or protect this data.

Expected Output #1:

• A script with inline Copilot-suggested code and comments explaining how to safeguard or anonymize user information (e.g., hashing emails, not storing data unencrypted).



```
import hashlib
import uuid

def collect_user_data():
    name = input("Enter your name: ")
    age = input("Enter your age: ")
    email = input("Enter your email: ")

    user_id = str(uuid.uuid4())
    hashed_email = hashlib.sha256(email.encode()).hexdigest()

    user_record = {
        "user_id": user_id,
        "age": age,
        "email_hash": hashed_email
    }

    print(f"Data Collected Securely: {user_record}")

collect_user_data()
```

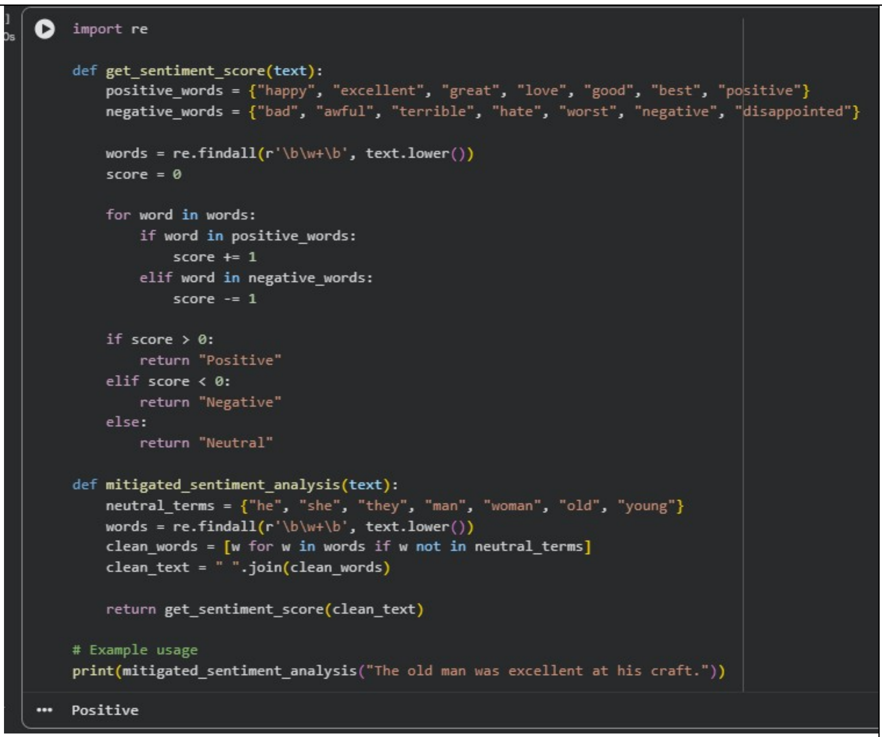
```
Enter your name: A.Shashidhar
Enter your age: 20
Enter your email: shashidharashadapu348@sru.edu.in
Data Collected Securely: {'user_id': 'b6fc95ee-8bd6-4632-be94-85878f54eb16', 'age': '20', 'email_hash': '85857269428d9275a364f0bb82
```

Task Description #2:

• Ask Copilot to generate a Python function for sentiment analysis. Then prompt Copilot to identify and handle potential biases in the data.

Expected Output #2:

• Copilot-generated code with additions or comments addressing bias mitigation strategies (e.g., balancing dataset, removing offensive terms).



```python
import re

def get_sentiment_score(text):
    positive_words = {"happy", "excellent", "great", "love", "good", "best", "positive"}
    negative_words = {"bad", "awful", "terrible", "hate", "worst", "negative", "disappointed"}

    words = re.findall(r'\b\w+\b', text.lower())
    score = 0

    for word in words:
        if word in positive_words:
            score += 1
        elif word in negative_words:
            score -= 1

    if score > 0:
        return "Positive"
    elif score < 0:
        return "Negative"
    else:
        return "Neutral"

def mitigated_sentiment_analysis(text):
    neutral_terms = {"he", "she", "they", "man", "woman", "old", "young"}
    words = re.findall(r'\b\w+\b', text.lower())
    clean_words = [w for w in words if w not in neutral_terms]
    clean_text = " ".join(clean_words)

    return get_sentiment_score(clean_text)

# Example usage
print(mitigated_sentiment_analysis("The old man was excellent at his craft."))
```

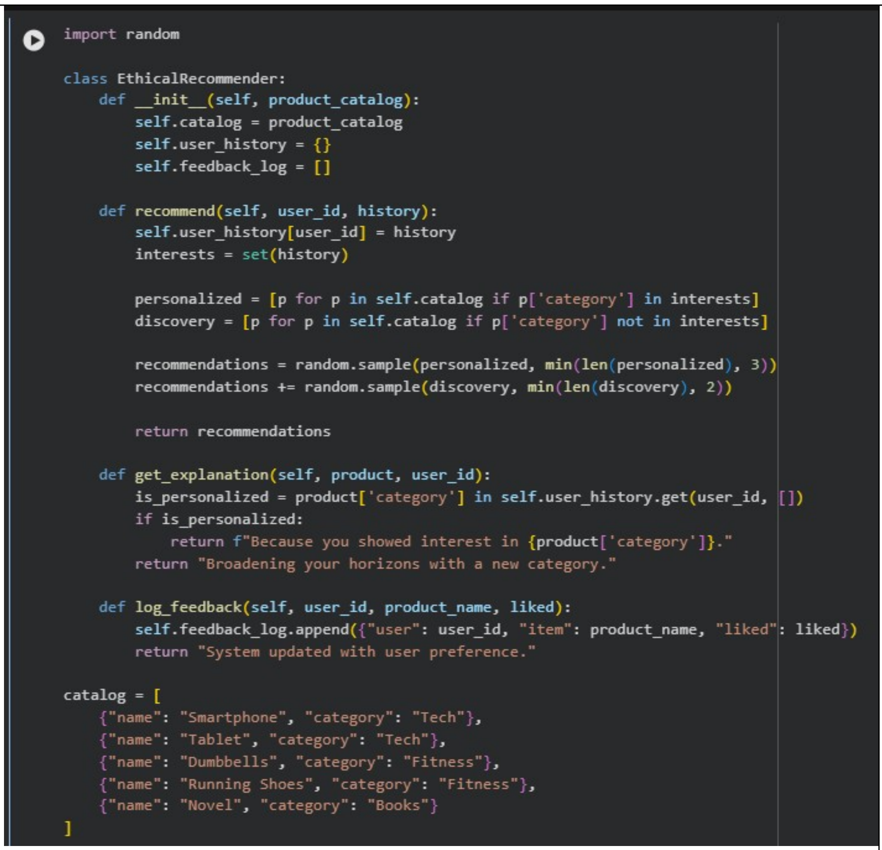
```
Positive
```

Task Description #3:

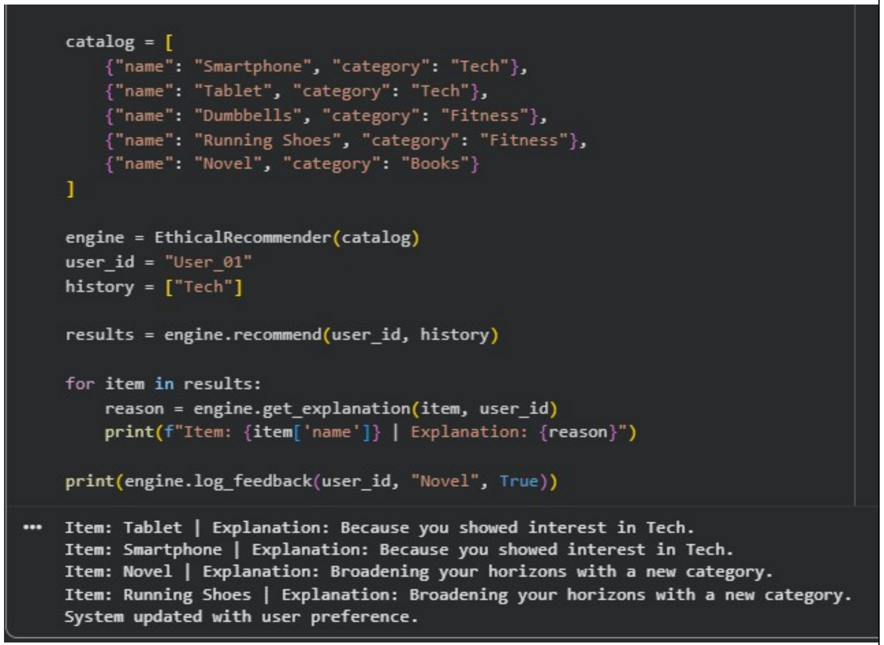
• Use Copilot to write a Python program that recommends products based on user history. Ask it to follow ethical guidelines like transparency and fairness.

Expected Output #3:

• Copilot suggestions that include explanations, fairness checks (e.g., avoiding favoritism), and user feedback options in the code.



```python
import random

class EthicalRecommender:
    def __init__(self, product_catalog):
        self.catalog = product_catalog
        self.user_history = {}
        self.feedback_log = []

    def recommend(self, user_id, history):
        self.user_history[user_id] = history
        interests = set(history)

        personalized = [p for p in self.catalog if p['category'] in interests]
        discovery = [p for p in self.catalog if p['category'] not in interests]

        recommendations = random.sample(personalized, min(len(personalized), 3))
        recommendations += random.sample(discovery, min(len(discovery), 2))

        return recommendations

    def get_explanation(self, product, user_id):
        is_personalized = product['category'] in self.user_history.get(user_id, [])
        if is_personalized:
            return f"Because you showed interest in {product['category']}."
        return "Broadening your horizons with a new category."

    def log_feedback(self, user_id, product_name, liked):
        self.feedback_log.append({"user": user_id, "item": product_name, "liked": liked})
        return "System updated with user preference."

catalog = [
    {"name": "Smartphone", "category": "Tech"},
    {"name": "Tablet", "category": "Tech"},
    {"name": "Dumbbells", "category": "Fitness"},
    {"name": "Running Shoes", "category": "Fitness"},
    {"name": "Novel", "category": "Books"}
]
```



```python
catalog = [
    {"name": "Smartphone", "category": "Tech"},
    {"name": "Tablet", "category": "Tech"},
    {"name": "Dumbbells", "category": "Fitness"},
    {"name": "Running Shoes", "category": "Fitness"},
    {"name": "Novel", "category": "Books"}
]

engine = EthicalRecommender(catalog)
user_id = "User_01"
history = ["Tech"]

results = engine.recommend(user_id, history)

for item in results:
    reason = engine.get_explanation(item, user_id)
    print(f"Item: {item['name']} | Explanation: {reason}")

print(engine.log_feedback(user_id, "Novel", True))
```

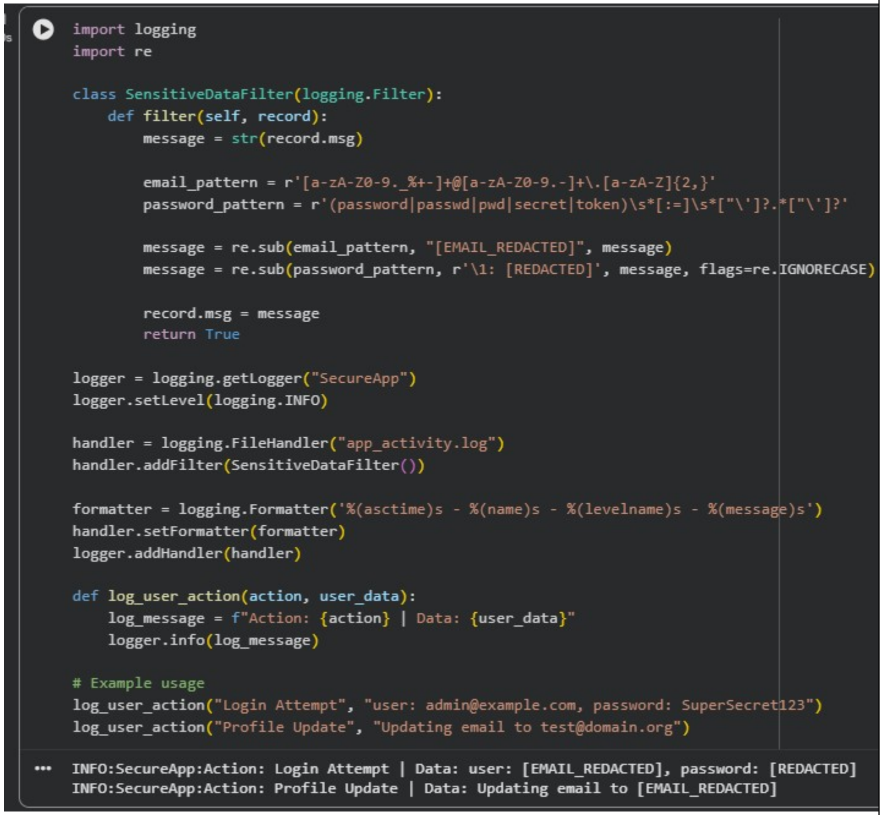
```
Item: Tablet | Explanation: Because you showed interest in Tech.
Item: Smartphone | Explanation: Because you showed interest in Tech.
Item: Novel | Explanation: Broadening your horizons with a new category.
Item: Running Shoes | Explanation: Broadening your horizons with a new category.
System updated with user preference.
```

Task Description #4:

• Prompt Copilot to generate logging functionality in a Python web application. Then, ask it to ensure the logs do not record sensitive information.

Expected Output #4:

• Logging code that avoids saving personal identifiers (e.g., passwords, emails), and includes comments about ethical logging practices.



```python
import logging
import re

class SensitiveDataFilter(logging.Filter):
    def filter(self, record):
        message = str(record.msg)

        email_pattern = r'[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\.[a-zA-Z]{2,}'
        password_pattern = r'(password|passwd|pwd|secret|token)\s*[:=]\s*["\']?.*["\']?'

        message = re.sub(email_pattern, "[EMAIL_REDACTED]", message)
        message = re.sub(password_pattern, r'\1: [REDACTED]', message, flags=re.IGNORECASE)

        record.msg = message
        return True

logger = logging.getLogger("SecureApp")
logger.setLevel(logging.INFO)

handler = logging.FileHandler("app_activity.log")
handler.addFilter(SensitiveDataFilter())

formatter = logging.Formatter('%(asctime)s - %(name)s - %(levelname)s - %(message)s')
handler.setFormatter(formatter)
logger.addHandler(handler)

def log_user_action(action, user_data):
    log_message = f"Action: {action} | Data: {user_data}"
    logger.info(log_message)

# Example usage
log_user_action("Login Attempt", "user: admin@example.com, password: SuperSecret123")
log_user_action("Profile Update", "Updating email to test@domain.org")
```

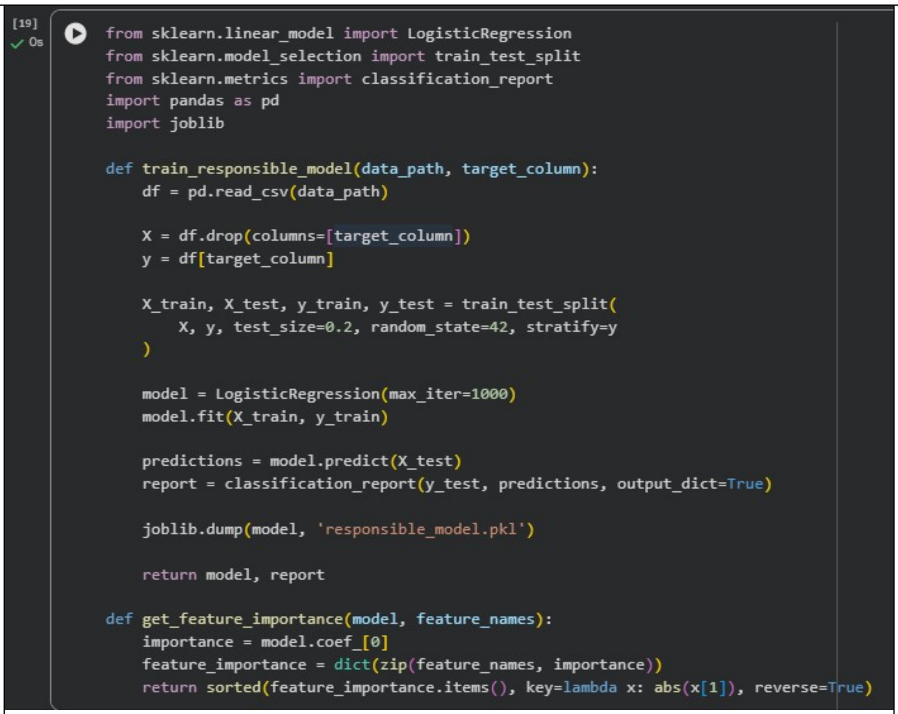
```
INFO:SecureApp:Action: Login Attempt | Data: user: [EMAIL_REDACTED], password: [REDACTED]
INFO:SecureApp:Action: Profile Update | Data: Updating email to [EMAIL_REDACTED]
```

Task Description #5:

• Ask Copilot to generate a machine learning model. Then, prompt it to add documentation on how to use the model responsibly (e.g., explainability, accuracy limits).

Expected Output #5:

• Copilot-generated model code with a README or inline documentation suggesting responsible usage, limitations, and fairness considerations.



```
[19]
✓ 0s
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report
import pandas as pd
import joblib

def train_responsible_model(data_path, target_column):
    df = pd.read_csv(data_path)

    X = df.drop(columns=[target_column])
    y = df[target_column]

    X_train, X_test, y_train, y_test = train_test_split(
        X, y, test_size=0.2, random_state=42, stratify=y
    )

    model = LogisticRegression(max_iter=1000)
    model.fit(X_train, y_train)

    predictions = model.predict(X_test)
    report = classification_report(y_test, predictions, output_dict=True)

    joblib.dump(model, 'responsible_model.pkl')

    return model, report

def get_feature_importance(model, feature_names):
    importance = model.coef_[0]
    feature_importance = dict(zip(feature_names, importance))
    return sorted(feature_importance.items(), key=lambda x: abs(x[1]), reverse=True)
```

Note: Report should be submitted a word document for all tasks in a single document with prompts, comments & code explanation, and output and if required, screenshots