

SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		DEPARTMENT OF COMPUTER SCIENCE ENGINEERING	
Program Name: B. Tech		Assignment Type: Lab	AcademicYear:2025-2026
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Question			

Lab 4: Advanced Prompt Engineering: Zero-shot, one-shot, and few-shot techniques

Objective: To explore and compare Zero-shot, One-shot, and Few-shot prompting techniques for classifying emails into predefined categories using a large language model (LLM).

Suppose that you work for a company that receives hundreds of customer emails daily. Management wants to automatically classify emails into categories like "Billing", "Technical Support", "Feedback", and "Others" before assigning them to appropriate departments. Instead of training a new model, your task is to use prompt engineering techniques with an existing LLM to handle the classification.

Tasks to be completed are as below

1. Prepare Sample Data:

- Create or collect 10 short email samples, each belonging to one of the 4 categories.

PROMPT : Create or collect 10 short email samples, each belonging to one of the 4 categories. Take input from user

```
emails = []
categories = ['Category A', 'Category B', 'Category C', 'Category D']

for i in range(10):
    print(f"Enter email sample {i+1}:")
    email_content = input()
    print("Select a category:")
    for j, cat in enumerate(categories):
        print(f"{j+1}. {cat}")
    while True:
        try:
            category_choice = int(input())
            if 1 <= category_choice <= len(categories):
                selected_category = categories[category_choice - 1]
                emails.append({'email': email_content, 'category': selected_category})
                break
            else:
                print("Invalid category choice. Please enter a number between 1 and 4.")
        except ValueError:
            print("Invalid input. Please enter a number.")

print("\nCollected Emails:")
for email_data in emails:
    print(f"Category: {email_data['category']}")
    print(f"Email: {email_data['email']}\n")

*** Enter email sample 1:
2483a51067@srw.edu.in
Select a category:
1. Category A
2. Category B
3. Category C
4. Category D
Category A
Invalid input. Please enter a number.
2
Enter email sample 2:
2483a51075@srw.edu.in
Select a category:
1. Category A
2. Category B
3. Category C
4. Category D
Category B
Invalid input. Please enter a number.
3
Enter email sample 3:
2483a51083@srw.edu.in
Select a category:
1. Category A
2. Category B
3. Category C
4. Category D
```

2. Zero-shot Prompting:

- Design a prompt that asks the LLM to classify a single email without providing any examples.
- Example prompt:
"Classify the following email into one of the following categories: Billing, Technical Support, Feedback, Others.
Email: 'I have not received my invoice for last month.'"

```

# Step 2: Get user input and categorize emails

email_list = []
print("\nEnter email samples one by one. Type 'done' on a new line to finish.")

while True:
    line = input()
    if line.lower() == 'done':
        break
    email_list.append(line)

print(f"\nReceived {len(email_list)} email samples.")

# Step 3 & 4: Categorize and display results for each email
def categorize_email(email_text, categories):
    email_text_lower = email_text.lower()

    if any(keyword in email_text_lower for keyword in ["bill", "invoice", "payment", "charge", "subscription"]):
        return "Billing"
    elif any(keyword in email_text_lower for keyword in ["support", "technical", "error", "bug", "trouble", "fix"]):
        return "Technical Support"
    elif any(keyword in email_text_lower for keyword in ["feedback", "suggestion", "comment", "improve", "review"]):
        return "Feedback"
    else:
        return "Others"

print("\nCategorization Results:")
for i, email in enumerate(email_list):
    predicted_category = categorize_email(email, new_email_categories)
    print(f"Email {i+1}:")
    print(f"Text: {email}")
    print(f"Category: {predicted_category}")
    print("-" * 30) # Separator

```

```

Enter email samples one by one. Type 'done' on a new line to finish.
2403a51083@sru.edu.in
haririshika31@gmail.com
2403a51075@sru.edu.in
done

```

Received 3 email samples.

Categorization Results:

```

Email 1:
Text: 2403a51083@sru.edu.in
Category: Others

```

```

-----
Email 2:
Text: haririshika31@gmail.com
Category: Others

```

```

-----
Email 3:
Text: 2403a51075@sru.edu.in
Category: Others

```

3. One-shot Prompting:

- Add one labeled example before asking the model to classify a new email.

```

email_list = []
print("\nEnter email samples one by one. Type 'done' on a new line to finish.")

while True:
    line = input()
    if line.lower() == 'done':
        break
    email_list.append(line)

print(f"\nReceived {len(email_list)} email samples.")

def categorize_email(email_text, categories):
    email_text_lower = email_text.lower()

    if any(keyword in email_text_lower for keyword in ["bill", "invoice", "payment", "charge", "subscription"]):
        return "Billing"
    elif any(keyword in email_text_lower for keyword in ["support", "technical", "error", "bug", "trouble", "fix"]):
        return "Technical Support"
    elif any(keyword in email_text_lower for keyword in ["feedback", "suggestion", "comment", "improve", "review"]):
        return "Feedback"
    else:
        return "Others"

print("\nCategorization Results:")
for i, email in enumerate(email_list):
    predicted_category = categorize_email(email, new_email_categories)
    print(f"Email {i+1}:")
    print(f"Text: {email}")
    print(f"Category: {predicted_category}")
print("-" * 30)

```

```

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Enter email samples one by one. Type 'done' on a new line to finish.
Subject: Feedback on the New Interface Design Hi Team, I wanted to share my thoughts on the new interface design. Overall, it's very user-friendly, but I think the color contrast could be improved for better readability. Thanks!
done

Received 1 email samples.

Categorization Results:
Email 1:
Text: Subject: Feedback on the New Interface Design Hi Team, I wanted to share my thoughts on the new interface design. Overall, it's very user-friendly, but I think the color contrast could be improved for better readability. Thanks!
Category: Feedback
.....

```

4. Few-shot Prompting:

- Use 3–5 labeled examples in your prompt before asking the model to classify a new email.

```

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Enter email samples one by one. Type 'done' on a new line to finish.
Subject: Request for Internship Body: Hi, I'm a computer science student and would love to intern with your company. Are there any open positions? Regards, Daniel
Subject: Error While Submitting Assignment Body: Dear Support, I'm getting a "Submission failed" error when trying to upload my assignment. Kindly assist. Best, Carlos
Subject: Suggestion for UI Improvement Body: Hi Team, I think the dashboard could be more user-friendly if you reorganize the navigation menu. Just a suggestion. Thanks, Emma
Subject: Payment Not Going Through Body: Dear Team, I've been trying to pay for my subscription, but the payment keeps failing. Can you assist? Best, Anika
done

Received 4 email samples.

Categorization Results:
Email 1:
Text: Subject: Request for Internship Body: Hi, I'm a computer science student and would love to intern with your company. Are there any open positions? Regards, Daniel
Category: Others
.....
Email 2:
Text: Subject: Error While Submitting Assignment Body: Dear Support, I'm getting a "Submission failed" error when trying to upload my assignment. Kindly assist. Best, Carlos
Category: Technical Support
.....
Email 3:
Text: Subject: Suggestion for UI Improvement Body: Hi Team, I think the dashboard could be more user-friendly if you reorganize the navigation menu. Just a suggestion. Thanks, Emma
Category: Feedback
.....
Email 4:
Text: Subject: Payment Not Going Through Body: Dear Team, I've been trying to pay for my subscription, but the payment keeps failing. Can you assist? Best, Anika
Category: Billing
.....

```

5. Evaluation:

- Run all three techniques on the same set of 5 test emails.
- Compare and document the accuracy and clarity of responses.

5 TEST EMAILS ON BILLING:

Enter email samples one by one. Type 'done' on a new line to finish.

Subject: Overbilling Concern Body: I noticed a higher charge than usual on my bill this month. Could you explain the difference?
Subject: Payment Failed Body: Hi, I tried paying for a new course but the transaction keeps failing. Can you check?
Subject: Subscription Cancellation Body: Dear team, I want to cancel my subscription effective immediately. Please confirm.
Subject: Need Invoice Copy Body: Hello, I need a copy of the invoice for my last payment for reimbursement purposes.
Subject: Incorrect Charge on My Account Body: Hi, I was charged twice for the same course this month. Please assist with the refund.
done

Received 5 email samples.

Categorization Results:

Email 1:

Text: Subject: Overbilling Concern Body: I noticed a higher charge than usual on my bill this month. Could you explain the difference?
Category: Billing

Email 2:

Text: Subject: Payment Failed Body: Hi, I tried paying for a new course but the transaction keeps failing. Can you check?
Category: Billing

Email 3:

Text: Subject: Subscription Cancellation Body: Dear team, I want to cancel my subscription effective immediately. Please confirm.
Category: Billing

Email 4:

Text: Subject: Need Invoice Copy Body: Hello, I need a copy of the invoice for my last payment for reimbursement purposes.
Category: Billing

Email 5:

Text: Subject: Incorrect Charge on My Account Body: Hi, I was charged twice for the same course this month. Please assist with the refund.
Category: Billing

5 TEST EMAILS ON FEEDBACK:

Enter email samples one by one. Type 'done' on a new line to finish.

Subject: Love the New Interface! Body: Hey, I really like the updated design of the dashboard. It's much more user-friendly.
Subject: Course Could Use More Examples Body: Hi, I think the JavaScript course could be improved by adding more real-world examples.
Subject: App Feedback Body: Hi there, the mobile app is generally great, but it crashes occasionally. Just wanted to share.
Subject: Suggestion for Quiz Format Body: I'd recommend allowing partial credit for multiple-choice questions. It would be more fair.
Subject: Course Rating Body: Just finished the Machine Learning course – excellent content and delivery. 5 stars!
done

Received 5 email samples.

Categorization Results:

Email 1:

Text: Subject: Love the New Interface! Body: Hey, I really like the updated design of the dashboard. It's much more user-friendly.
Category: Others

Email 2:

Text: Subject: Course Could Use More Examples Body: Hi, I think the JavaScript course could be improved by adding more real-world examples.
Category: Feedback

Email 3:

Text: Subject: App Feedback Body: Hi there, the mobile app is generally great, but it crashes occasionally. Just wanted to share.
Category: Feedback

Email 4:

Text: Subject: Suggestion for Quiz Format Body: I'd recommend allowing partial credit for multiple-choice questions. It would be more fair.
Category: Feedback

Email 5:

Text: Subject: Course Rating Body: Just finished the Machine Learning course – excellent content and delivery. 5 stars!
Category: Others

5 TEST EMAILS ON TECHNICAL SUPPORT :

Enter email samples one by one. Type 'done' on a new line to finish.
Subject: Error Submitting Assignment Body: Hello, I'm getting an error every time I try to submit my assignment. Please help.
Subject: Can't Access My Dashboard Body: Hi, I keep getting a "404 Not Found" error when I log in. Can you fix this?
Subject: Video Not Loading Body: Hi Support, the video for Lesson 3 won't play. It's just showing a black screen
Subject: Mobile App Not Syncing Body: Hey, the progress on the mobile app isn't syncing with my web account. Please investigate.
Subject: System Slow Body: Hello, the LMS is extremely slow today. Is there any maintenance going on?
done

Received 5 email samples.

Categorization Results:

Email 1:
Text: Subject: Error Submitting Assignment Body: Hello, I'm getting an error every time I try to submit my assignment. Please help.
Category: Technical Support

Email 2:
Text: Subject: Can't Access My Dashboard Body: Hi, I keep getting a "404 Not Found" error when I log in. Can you fix this?
Category: Technical Support

Email 3:
Text: Subject: Video Not Loading Body: Hi Support, the video for Lesson 3 won't play. It's just showing a black screen
Category: Technical Support

Email 4:
Text: Subject: Mobile App Not Syncing Body: Hey, the progress on the mobile app isn't syncing with my web account. Please investigate.
Category: Others

Email 5:
Text: Subject: System Slow Body: Hello, the LMS is extremely slow today. Is there any maintenance going on?
Category: Others

5 TEST EMAILS ON OTHERS:

Enter email samples one by one. Type 'done' on a new line to finish.
Subject: Partnership Opportunity Body: Hi, I'm interested in partnering with your platform to offer a new training course.
Subject: Request for Certificate Reissue Body: Hello, I lost access to my certificate and would like it reissued. What's the process?
Subject: Career Advice Body: Hi there, I've completed several courses. Could you suggest a learning path to get into AI?
Subject: General Inquiry Body: I'm exploring online platforms and wanted to know more about your course structure.
Subject: Internship Request Body: Hi, I'm a final-year student looking for internship opportunities. Do you have any openings?
DONE

Received 5 email samples.

Categorization Results:

Email 1:
Text: Subject: Partnership Opportunity Body: Hi, I'm interested in partnering with your platform to offer a new training course.
Category: Others

Email 2:
Text: Subject: Request for Certificate Reissue Body: Hello, I lost access to my certificate and would like it reissued. What's the process?
Category: Others

Email 3:
Text: Subject: Career Advice Body: Hi there, I've completed several courses. Could you suggest a learning path to get into AI?
Category: Others

Email 4:
Text: Subject: General Inquiry Body: I'm exploring online platforms and wanted to know more about your course structure.
Category: Others

Email 5:
Text: Subject: Internship Request Body: Hi, I'm a final-year student looking for internship opportunities. Do you have any openings?
Category: Others

Requirements:

- VS Code with Github Copilot or Cursor IDE and/or Google Colab with Gemini.
-

Deliverables:

- A .txt or .md file showing prompts and model responses.
- A comparison table showing classification accuracy for each technique.
- A short reflection on which method was most effective and why

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