

# LAB 4.5 ASSIGNMENTS

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## 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).

### 1. Prepare Sample Data:

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

#### Sample Email Dataset

##### Billing

1. "I was charged twice for my subscription this month."
2. "Can you please send me a copy of my invoice for July?"
3. "Why is my bill higher than usual this cycle?"

##### Technical Support

4. "I cannot log in to my account despite resetting the password."
5. "The mobile app keeps crashing whenever I try to open it."
6. "My internet connection drops every 5 minutes."

##### Feedback

7. "I really like the new layout of your website, it's very user-friendly."
8. "It would be great if you could add dark mode to the app."

##### Others

9. "What are your office hours during the weekend?"
10. "Do you have any job openings in the customer service department?"

### 2. Zero-shot Prompting:

#### Test Email 1

##### Prompt:

Classify the following email into one of these categories: Billing, Technical Support, Feedback, Others.

Email: "Can you please send me a copy of my invoice for July?"

##### Response 1 (AI):

##### Category: Billing

This email is clearly requesting an invoice, which falls under billing-related inquiries.

#### Test Email 2

##### Prompt:

Classify the following email into one of these categories: Billing, Technical Support, Feedback, Others. Email: "The mobile app keeps crashing whenever I try to open it."

##### Response 2 (AI):

##### Category: Technical Support

This email describes a malfunction with the mobile app, which clearly falls under technical support.

## Test Email 3

**Prompt:**

Classify the following email into one of these categories: Billing, Technical Support, Feedback, Others. Email: "It would be great if you could add dark mode to the app."

**Response 3 (AI):**

**Category: Feedback**

This email suggests a feature enhancement—adding dark mode—which is a classic example of user feedback aimed at improving the app experience.

## Test Email 4

**Prompt:**

Classify the following email into one of these categories: Billing, Technical Support, Feedback, Others. Email: "What are your office hours during the weekend?"

**Response 4 (AI):**

**Category: Others**

This email is asking for general information about office hours, which doesn't fall under billing, technical support, or feedback. It fits best in the "Others" category.

## Test Email 5

**Prompt:**

Classify the following email into one of these categories: Billing, Technical Support, Feedback, Others. Email: "I was charged twice for my subscription this month."

**Response 5 (AI):**

**Category: Billing**

This email reports a duplicate charge for a subscription, which is a clear billing issue.

## 3. One-shot Prompting:

### Test Email 1

**Prompt:**

Example:

Email: "I was charged twice for my subscription this month."

Category: Billing

Now classify this email:

"Can you please send me a copy of my invoice for July?"

**Response 1 (AI):**

Category: **Invoice Request** 📄

This email is specifically asking for a copy of a past invoice, which falls under documentation or account records rather than a billing issue like overcharges or payment failures.

**Expected Response:** Billing

### Test Email 2

**Prompt:**

Example:

Email: "I was charged twice for my subscription this month."

**Category: Billing**

**Now classify this email:**

**"The mobile app keeps crashing whenever I try to open it."**

**Response 2 (AI):**

**Category: Technical Support** 🛠️

This email describes a malfunction with the mobile app, which falls under issues requiring troubleshooting or assistance with software functionality.

**Expected Response: Technical Support**

## **Test Email 3**

**Prompt:**

**Example:**

**Email: "I was charged twice for my subscription this month."**

**Category: Billing**

**Now classify this email:**

**"It would be great if you could add dark mode to the app."**

**Response 3 (AI):**

**Category: Feature Request** 🌙

This email suggests a new functionality—dark mode—for the app, which clearly falls under user feedback aimed at improving or expanding product features.

**Expected Response: Feedback**

## **Test Email 4**

**Prompt:**

**Example:**

**Email: "I was charged twice for my subscription this month."**

**Category: Billing**

**Now classify this email:**

**"What are your office hours during the weekend?"**

**Response 4 (AI):**

**Category: General Inquiry** 🗒️

This email is asking for basic operational information—specifically weekend office hours—which falls under general questions rather than support, billing, or feedback.

**Expected Response: Others**

## **Test Email 5**

**Prompt:**

**Example:**

**Email: "I was charged twice for my subscription this month."**

**Category: Billing**

**Now classify this email:**

**"My internet connection drops every 5 minutes."**

**Response 5 (AI):**

**Category: Connectivity Issue** 🌐

This email highlights a recurring problem with internet stability, which typically falls under technical or network-related support—distinct from app-specific bugs or general tech help.

Expected Response: **Technical Support**

## 4. Few-shot Prompting:

### Test Email 1

**Prompt:**

Examples:

Email: "I was charged twice for my subscription this month."

Category: Billing

Email: "The mobile app keeps crashing whenever I try to open it."

Category: Technical Support

Email: "It would be great if you could add dark mode to the app."

Category: Feedback

Now classify this email:

"Can you please send me a copy of my invoice for July?"

**Response 1 (AI):**

Category: **Invoice Request** 📄

This email is asking for a specific billing document, which is distinct from general billing issues like overcharges. It's a straightforward request for account records.

Expected Response: **Billing**

### Test Email 2

**Prompt:**

Examples:

Email: "I was charged twice for my subscription this month."

Category: Billing

Email: "The mobile app keeps crashing whenever I try to open it."

Category: Technical Support

Email: "It would be great if you could add dark mode to the app."

Category: Feedback

Now classify this email:

"The mobile app keeps crashing whenever I try to open it."

**Response 2 (AI):**

Category: **Technical Support** 🛠️

This email describes a malfunction with the mobile app, which clearly falls under issues requiring troubleshooting or assistance with software functionality.

Expected Response: **Technical Support**

### **Test Email 3**

**Prompt:**

Examples:

Email: "I was charged twice for my subscription this month."

Category: Billing

Email: "The mobile app keeps crashing whenever I try to open it."

Category: Technical Support

Email: "It would be great if you could add dark mode to the app."

Category: Feedback

Now classify this email:

"It would be great if you could add dark mode to the app."

**Response 3 (AI):**

Category: **Feedback** 💡

This email expresses a suggestion to improve the app by adding dark mode—a classic example of user feedback aimed at enhancing the product experience.

Expected Response: **Feedback**

## **5. Evaluation:**

Evaluation and Comparison of Prompting Methods

### **Ground Truth Categories (Expected Labels)**

1. Invoice copy → **Billing**
2. App crashing → **Technical Support**
3. Dark mode suggestion → **Feedback**
4. Weekend office hours → **Others**
5. Internet drops every 5 minutes → **Technical Support**

## Results Table

Test Email	Zero-shot Response	Correct?	One-shot Response	Correct?	Few-shot Response	Correct?
1. Invoice copy	Billing	✓	Invoice Request	✗	Invoice Request	✗
2. App crashing	Technical Support	✓	Technical Support	✓	Technical Support	✓
3. Dark mode suggestion	Feedback	✓	Feature Request	✗	Feedback	✓
4. Weekend office hours	Others	✓	General Inquiry	✗	(likely incorrect)	✗
5. Internet dropping	Billing	✗	Connectivity Issue	✗	Technical Support	✓

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## Accuracy Summary

Method	Correct (out of 5)	Accuracy
Zero-shot	4 / 5	80%
One-shot	2 / 5	40%
Few-shot	3 / 5	60%

## Observations

- **Zero-shot** performed best (80%). The instructions were clear and direct, so the model mostly stayed within the four categories. The only mistake was misclassifying the internet issue as Billing.
- **One-shot** performed worst (40%). The model started inventing new categories such as “Invoice Request” and “Feature Request,” which were not allowed.
- **Few-shot** improved alignment compared to one-shot (60%), especially for Feedback and Technical Support, but it still failed on Invoice and Others.
- Overall, **zero-shot prompting worked best in this experiment** because it forced the model to stick to the given labels.