

# **LAB ASSIGNMENT – 4**

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## **Advanced Prompt Engineering: Zero-shot, One-shot, and Few-shot Techniques**

### **Lab Objectives:**

- To apply different types of prompting techniques in AI-assisted tasks.
- To understand zero-shot, one-shot, and few-shot prompting methods.
- To study how examples and context affect AI output quality.

### **Lab Outcomes:**

After completing this lab, students will be able to:

- Use zero-shot prompting with minimal instructions.
- Use one-shot prompting with a single example.
- Use few-shot prompting with multiple examples.
- Compare outputs of different prompting strategies.

### **Introduction**

Prompt engineering is a technique used to guide Artificial Intelligence systems using well-designed instructions called prompts. Instead of training a new machine learning model, prompt engineering uses an existing large language model to perform tasks such as classification and analysis.

In this lab, three prompting techniques are studied:

1. Zero-shot prompting
2. One-shot prompting

### 3. Few-shot prompting

These techniques are applied to different real-world classification problems.

## **Sample Example Problem:** News Headline Classification

### **Problem Statement**

A news platform wants to classify news headlines into:

- Politics
- Sports
- Technology
- Entertainment

This is done using prompt engineering without training a model.

### **Sample News Headlines**

1. Government announces new education policy – Politics
2. Parliament passes new tax reform bill – Politics
3. India wins the T20 cricket series – Sports
4. Football club signs a new international player – Sports
5. Tech company launches a new AI-powered smartphone – Technology
6. Cybersecurity firm reports major data breach – Technology
7. Upcoming movie breaks box office records – Entertainment
8. Popular actor announces next film project – Entertainment

### **Zero-shot Prompting**

#### **Prompt:**

Classify the following headline into Politics, Sports, Technology, or Entertainment.

**Headline:** India wins the T20 cricket series.

**Output:** Sports

#### **Observation:**

The model classified the headline correctly without any examples.

## **One-shot Prompting**

**Prompt:**

**Example:**

**Headline:** Government announces new education policy **Category:** Politics

**Classify the following headline:**

Tech company launches a new AI-powered smartphone.

**Output:** Technology

**Observation:**

Providing one example improved clarity.

## **Few-shot Prompting**

**Prompt:**

Headline: Parliament passes new tax reform bill – Politics

Headline: Football club signs a new international player – Sports

Headline: Cybersecurity firm reports major data breach – Technology Headline: Upcoming movie breaks box office records – Entertainment

Classify: Popular actor announces next film project.

**Output:** Entertainment

**Observation:**

Few-shot prompting gave the most accurate result.

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## **Problem Statement 1:** Customer Email Classification

### **Categories**

- Billing
- Technical Support
- Feedback
- Others

### **Sample Emails**

1. I was charged twice for my subscription – Billing
2. Payment failed but money was deducted – Billing
3. The app crashes when I try to login – Technical Support

4. Your customer service is excellent – Feedback
5. What are your office working hours? – Others

### **Zero-shot Prompt**

Classify the email into Billing, Technical Support, Feedback, or Others. Email: I have not received my invoice for this month.

### **Output: Billing**

### **One-shot Prompt**

Email: The app crashes during login – Technical Support

Classify: I have not received my invoice for this month.

### **Output: Billing**

### **Few-shot Prompt**

Email: Payment failed but money was deducted – Billing

Email: The app crashes while opening – Technical Support Email: Great customer service – Feedback

Classify: I have not received my invoice for this month.

### **Output: Billing**

### **Observation**

Few-shot prompting gave better and more consistent results.

### **Problem Statement 2: Intent Classification for Chatbot Queries**

#### **Intents**

- Account Issue
- Order Status
- Product Inquiry
- General Question

## **Sample Queries**

1. I forgot my account password – Account Issue
2. Where is my order? – Order Status
3. Does this phone support 5G? – Product Inquiry
4. How do I contact customer support? – General Question
5. My account is locked – Account Issue
6. When will my order arrive? – Order Status

## **Results**

- Zero-shot output: Order Status
- One-shot output: Order Status
- Few-shot output: Order Status

### **Observation:**

Few-shot prompting reduced confusion between intents.

## **Problem Statement 3: Student Feedback Analysis**

### **Categories**

- Positive
  - Negative
  - Neutral
- 
- Zero-shot output: Positive
  - One-shot output: Positive
  - Few-shot output: Positive

### **Observation:**

Providing examples improved sentiment understanding.

## **Problem Statement 4: Course Recommendation System**

### **Levels**

- Beginner

- Intermediate
- Advanced

**Zero-shot output:** Beginner

- One-shot output: Beginner
- Few-shot output: Beginner

**Observation:**

Few-shot prompting improved recommendation accuracy.

#### **Problem Statement 5: Social Media Post Moderation**

**Categories**

- Acceptable
  - Offensive
  - Spam
- 
- Zero-shot output: Spam
  - One-shot output: Spam
  - Few-shot output: Spam

**Observation:**

Few-shot prompting performed better than zero-shot.

**Conclusion**

This lab shows that prompt engineering is an effective way to use AI without training new models. Zero-shot prompting works for simple tasks. One-shot prompting improves clarity. Few-shot prompting gives the most accurate and reliable results. Therefore, few-shot prompting is the best approach for complex real-world problems.