

AI Assisted Coding (III Year) Assignment

NAME: A. sathwik

HT NO :2303A51178

BATCH :29

LAB ASSIGNMENT – 4.2

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.

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*
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- *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*
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- *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.