

Release 1 Documentation

Project Name: Cloud Diagram Translation & Reverse Engineering

Team Members & Responsibilities:

- **Shambhavi Singh** - Research and implementation of prompt engineering techniques.
 - **Akshita Arora** - Networking diagram analysis and structured prompt development.
 - **Aamish Samotra** - Dataset creation and testing methodologies.
 - **Lida Wei** - Small-scale fine-tuning experiments and comparative analysis.
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1. Objectives

The primary goal of Release 1 is to establish a foundation for translating natural language descriptions into cloud networking diagrams. This includes:

- Developing structured **prompt engineering** strategies.
 - Identifying critical **cloud networking elements**.
 - Creating a sample dataset for **model training and evaluation**.
 - Conducting a **preliminary fine-tuning feasibility study**.
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2. Deliverables

2.1 Core Functionalities

- **Structured Prompt Engineering:** Develop a set of structured prompts to generate accurate cloud diagrams.
 - **Sample Dataset Development:** Curate a dataset of cloud network descriptions mapped to corresponding visual representations.
 - **Initial Diagram Generation:** Generate diagrams using **Mermaid.js** and **Graphviz** based on prompt responses.
 - **Reverse Translation Assessment:** Outline the methodology to convert diagrams back into textual descriptions.
 - **Fine-Tuning Feasibility Study:** Conduct a small-scale test to compare the effectiveness of fine-tuning vs. prompt engineering.
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3. Task Breakdown

3.1 Tasks Assigned to Team Members

Task	Description	Assigned To	Expected Outcome
Research Prompt Engineering	Study best practices for structured prompt creation.	Team Member 1	Documented prompt templates.
Identify Key Networking Elements	Define essential cloud networking components (subnets, IPs, ports, etc.).	Team Member 2	List of core networking concepts.
Create Sample Dataset	Develop a dataset of cloud network descriptions and corresponding diagrams.	Team Member 3	Sample dataset for testing.
Fine-Tuning Feasibility Study	Conduct a test to compare prompting vs. fine-tuning.	Team Member 4	Report on fine-tuning effectiveness.
Diagram Rendering via Mermaid.js	Implement code to generate diagrams using prompts.	Team Member 1 & 2	Working model for diagram rendering.
Reverse Translation Framework	Define an approach for converting diagrams back to text.	Team Member 3 & 4	Draft methodology for reverse translation.

4. Testing & Validation

- **Prompt Validation:** Run test cases to assess prompt accuracy in generating diagrams.
- **Dataset Evaluation:** Ensure the sample dataset covers diverse networking scenarios.
- **Reverse Translation Check:** Evaluate how accurately diagrams can be converted back to textual descriptions.
- **Fine-Tuning Impact:** Compare model performance before and after fine-tuning.

5. Risks & Mitigation Strategies

Risk	Impact	Mitigation Strategy
Inaccurate diagram generation	High	Refine prompt structures and iterate on test cases.
Lack of sufficient training data	Medium	Expand dataset by incorporating real-world network topologies.
Fine-tuning computational cost	High	Conduct feasibility tests before full-scale fine-tuning.
Reverse translation inconsistency	Medium	Implement rule-based validation for text outputs.

6. Next Steps

- **Refine Prompt Engineering** based on test results.
 - **Expand Dataset** with additional cloud network cases.
 - **Prototype Reverse Translation** using structured input-output pairs.
 - **Evaluate Fine-Tuning Impact** to determine long-term feasibility.
 - **Client Feedback Integration** for iterative improvements.
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7. Conclusion

Release 1 establishes the foundational framework for cloud diagram translation. The primary focus is on **prompt engineering, dataset creation, and feasibility analysis for fine-tuning**. Based on the outcomes of this release, the team will refine strategies for the subsequent development phases.
