AMD AI PREMIER LEAGUE - TRACK 1

AMD AI Reinforcement Learning Hackathon

Qwen2.5-14B Powered Question-Answer Generation Pipeline with Optimized LoRA

Team
Team34 (Greedy Agent)

Model
Qwen2.5-14B-Instruct

AGENDA

Presentation Overview

01 **Project Overview**
Dual-agent architecture and problem statement

02 **Technical Architecture**
Complete stack and data flow

03 **Training Methodology**
Best practices and pipeline

04 **Q-Agent Implementation**
Question generation engine details

05 **A-Agent Implementation**
Answer generation engine details

06 **Performance Optimization**
Unsloth acceleration and results

07 **Results & Innovations**
Metrics and key achievements

PROJECT OVERVIEW

Dual-Agent Question-Answer System

Core Concept

A sophisticated dual-agent architecture leveraging Qwen2.5-14B as the foundation model. The system consists of two specialized agents working collaboratively: Q-Agent for intelligent question generation and A-Agent for precise answer generation, enabling high-quality QA pair creation with domain-specific knowledge.

Agent Architecture

Q-Agent

Generates contextually relevant, diverse questions from input context using fine-tuned generation capabilities

A-Agent

Produces accurate, comprehensive answers by understanding question intent and retrieving relevant information

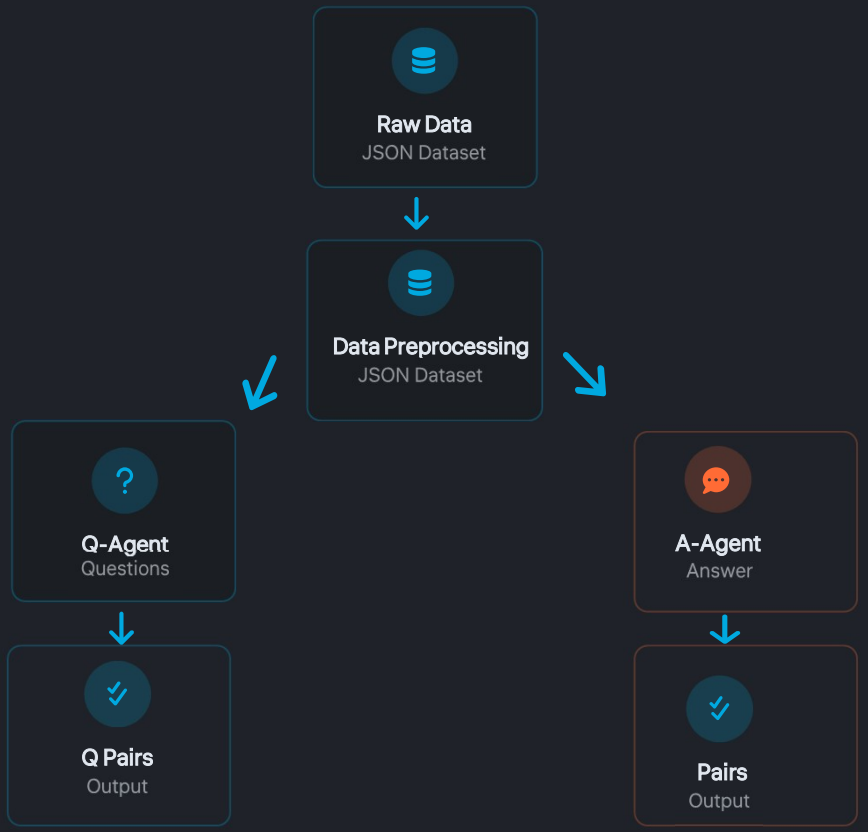
Topics

- Syllogism
- Seating Arrangements
- Blood Relations
- Mixed Series

TECHNICAL ARCHITECTURE

Complete Technology Stack

Data Flow Architecture



Base Model

Model	Qwen2.5-14B
Parameters	14 Billion
Type	Instruct
Context	32K-128K

Fine-Tuning

Method	LoRA
Rank	64
Alpha	128
Quantization	4-bit

Q-A Agent

Q/A Model Training

LoRA Configuration

Rank (r)	64
Alpha	128
Dropout	0.05
Target Modules	8

Training Configuration

Learning Rate	1.5e-4
Epochs	3
LR Scheduler	Cosine
Warmup Ratio	10%
Optimizer	AdamW 8-bit
Weight Decay	0.01

Batch Configuration

Batch Size Per device	4
Gradient Accumulation Effective batch = 32	8 steps
Sequence Length Max tokens	2048

Overfitting Prevention Strategies

Early Stopping
Patience=5, threshold=0.001

Validation Split
15% held-out for monitoring

Weight Decay
L2 regularization at 0.01

LoRA Dropout
5% dropout for regularization

Gradient Clipping
Max norm = 1.0

Limited Epochs
3 epochs maximum

TRAINING RESULTS

Performance Metrics & Analysis

Q-Agent Matrix

Q-AGENT TRAINING SUMMARY

Dataset Statistics:
- Training examples: 5,224
- Validation examples: 923
- Total epochs: 3

Training Results:
- Final training loss: 0.2389
- Best validation loss: 0.2054
- Total training steps: 450
- Training loss improvement: 90.5%

Model Outputs:
- LoRA adapters: models/question_agent_lora_optimizedv2
- Merged model: models/question_agent_merged_optimizedv2
- Training logs: outputs/question_agent_optimizedv2
- Configuration: outputs/question_agent_optimizedv2/training_config.json

Model Details:
- Base model: Qwen2.5-14B-Instruct
- Agent type: Q-Agent (Question Generation)
- LoRA rank: 64
- LoRA alpha: 128
- Learning rate: 1.50e-04
- Scheduler: cosine

A-Agent Matrix

TRAINING SUMMARY

Dataset Statistics:
- Training examples: 5,224
- Validation examples: 923
- Total epochs: 3

Training Results:
- Final training loss: 0.1865
- Best validation loss: 0.1128
- Total training steps: 450
- Training loss improvement: 99.2%

Model Outputs:
- LoRA adapters: models/answer_agent_lora_optimizedv2
- Merged model: models/answer_agent_merged_optimizedv2
- Training logs: outputs/answer_agent_optimizedv2
- Configuration: outputs/answer_agent_optimizedv2/training_config.json

Model Details:
- Base model: Qwen2.5-14B-Instruct
- LoRA rank: 64
- LoRA alpha: 128
- Learning rate: 1.50e-04
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Thank You

Dual-Agent Fine-Tuning System with Qwen2.5-14B

Team34
Greedy Agent

Qwen2.5-14B
Foundation Model

2-5x Speedup
Unsloth Optimized

Production-Ready Pipeline

Dual-Agent Architecture

Optimized LoRA