Stage 1: Supervised Fine-Tuning

Tool-Augmented Data w/ CoT → VLM

Stage 2: Reinforcement Learning

Finetuned VLM

GRPO
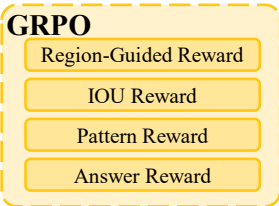- Region-Guided Reward
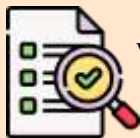- IOU Reward
- Pattern Reward
- Answer Reward

Two-Stage Training

`<think>` I need to ... {"bbox_2d": [...], "label": ...}

Based on ... `</think>` `<answer>` Yes `</answer>`

Qwen2.5-VL

Visual Encoder

Visual Encoder

Cropping & Zooming

Vision Token
Text Token

Evaluation & Downstream Uses

Evaluation

Whether to crop?
Where to crop?

LRS-GRO (Ours)
MME-Real-world
XLRS-Bench
GeoLLava-8K

Downstream Uses

Image Editing   Denoising

Cloud Removal   Segmentation

...   ...