(a) General-purpose vs. Scenario-specialized RS-MLLMs



Harbor RS image

Generate a structured harbor observation report.

FBA Training

A coastal area with several ships and buildings.

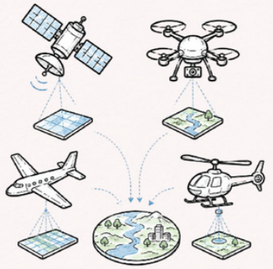
This is a compact industrial harbor with berth, docking, storage, and service functions. The large vessel is berthed at the central quay, while small vessels are moored near the eastern pier...

(b) Key Challenges for Vertical RS-MLLMs

#Challenge 1 Scarce High-quality Scenario Data



Scene Observation



Sensor Acquisition



Expert Semantics

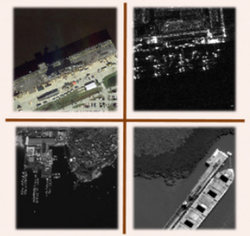
#Challenge 2 Difficult Capability Coverage

1 Alignment Gap



Natural/RS

2 Modality Gap



RGB/SAR/NIR/PAN

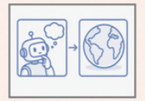
3 Task Gap



Perception



Grounding



Reasoning



Generation

(c) Our Paradigm: Filling Before Advancing

