Portforio

Sangyun Park

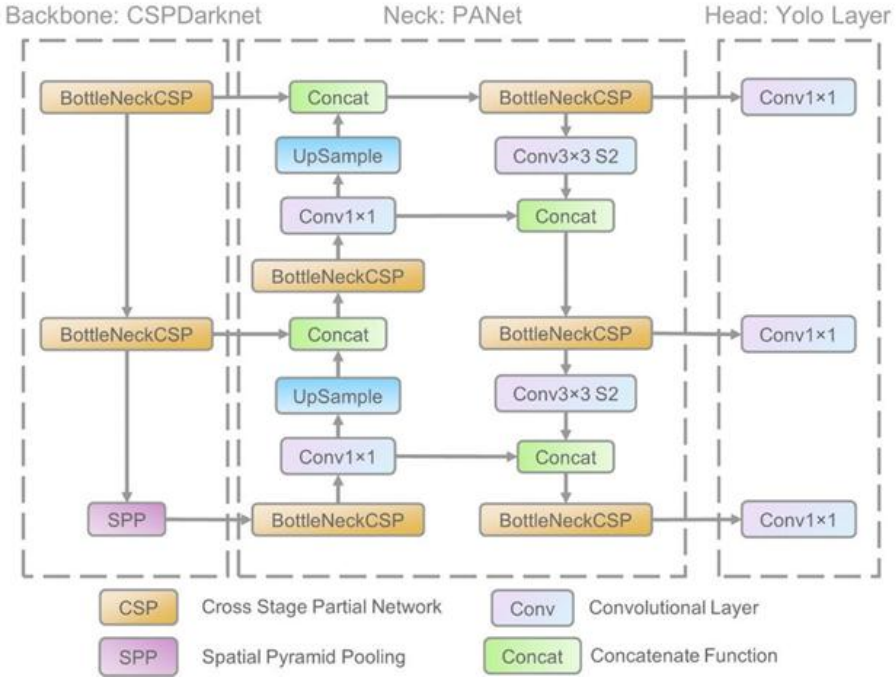
Robot tool detection

Data analysis

INPUT

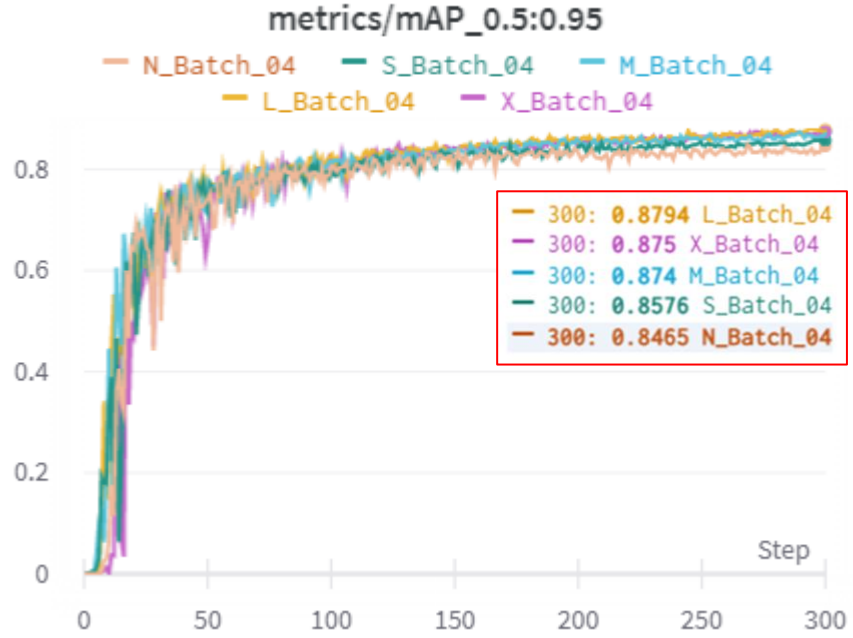
OUTPUT

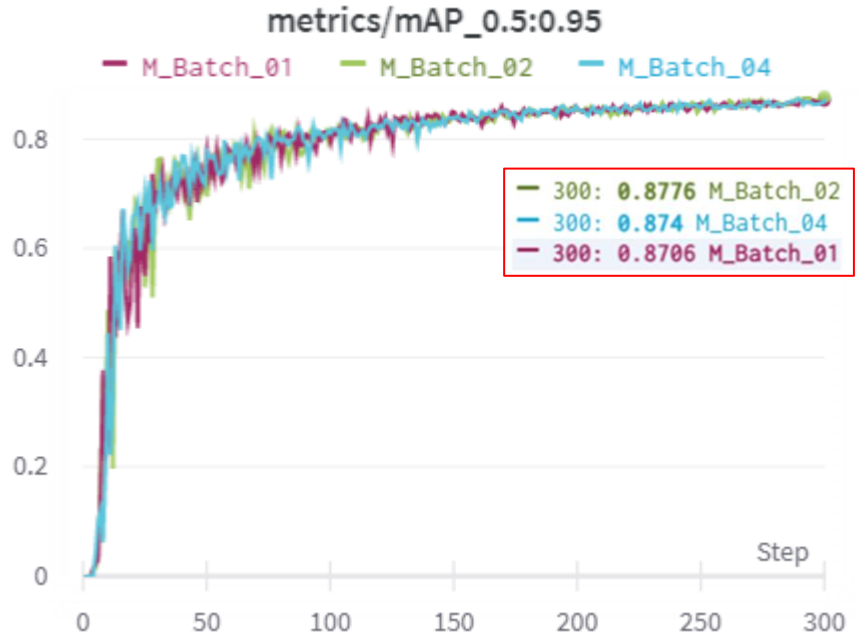
Model Architecture



Yolov5(2020)

Performance comparison





Demo

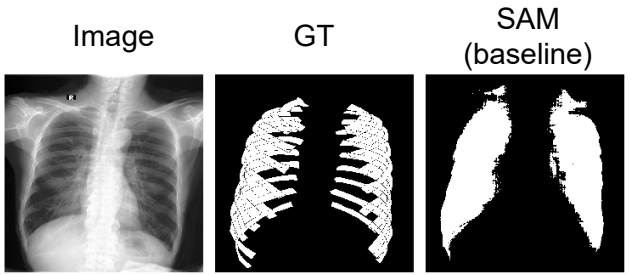
Medical image segmentation

Background & Motivation

- Foundation models (SAM) show promise in medical imaging

- Challenge
  - Domain specialization needed for specific tasks

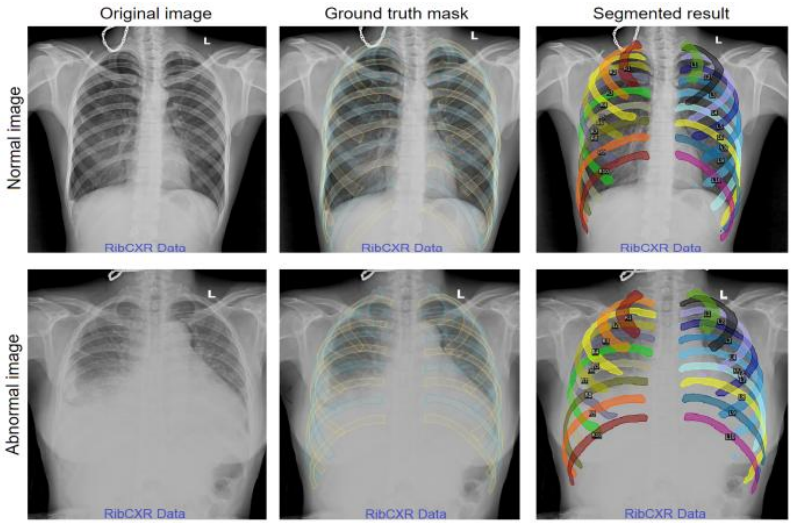
- Current gap
  - Optimal adaptation strategy unclear



SAM's baseline performance in medical image segmentation needs improvement

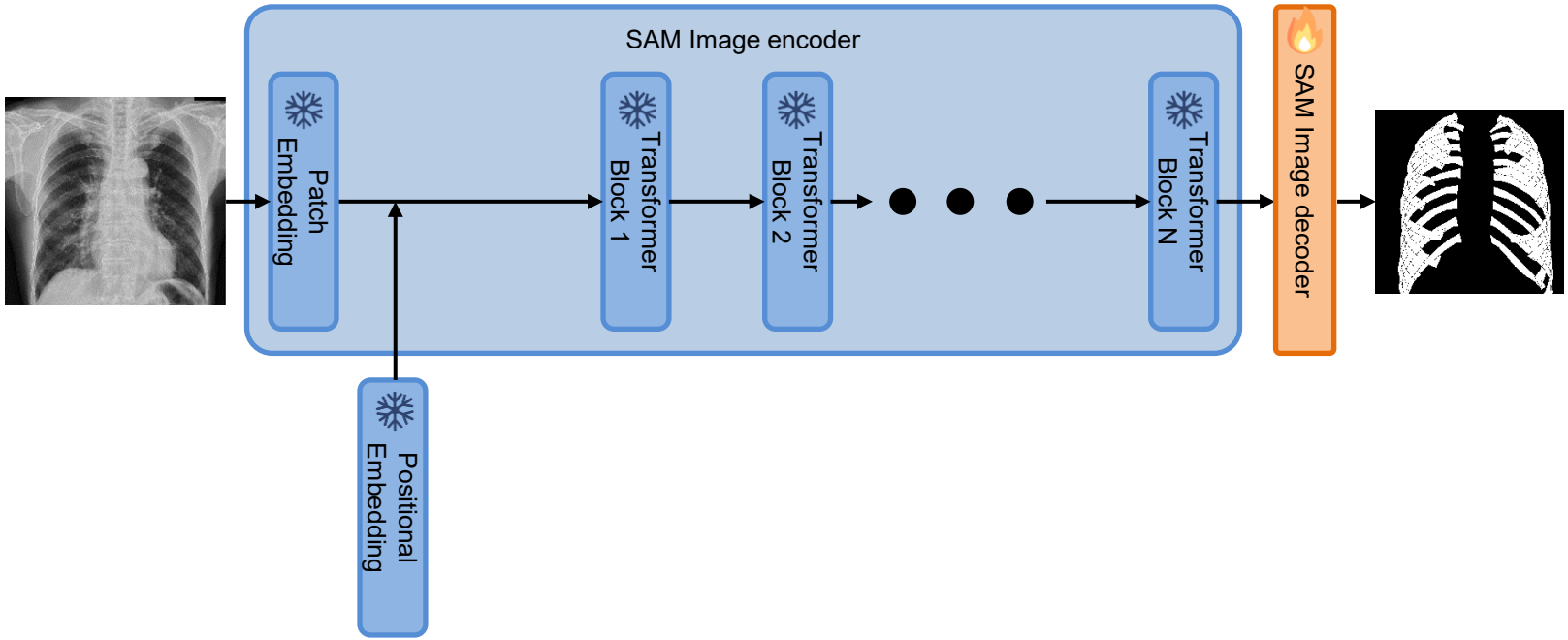
Dataset

- VinDr-RibCXR
- 245 Chest X-ray images
  - Training: 196 images
  - Validation: 49 images



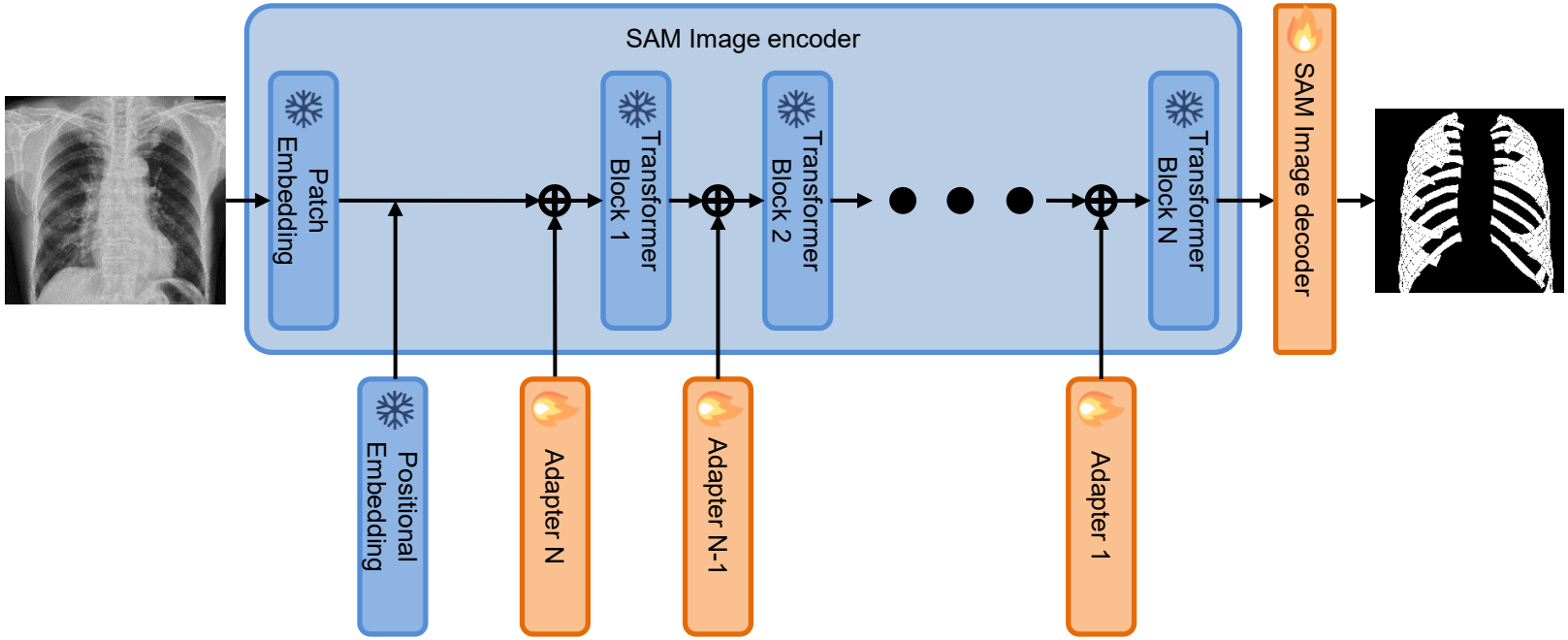
VinDr-RibCXR Dataset: 245 chest X-rays for rib segmentation

Model Architecture



Segment Anything Model (SAM)

Model Architecture

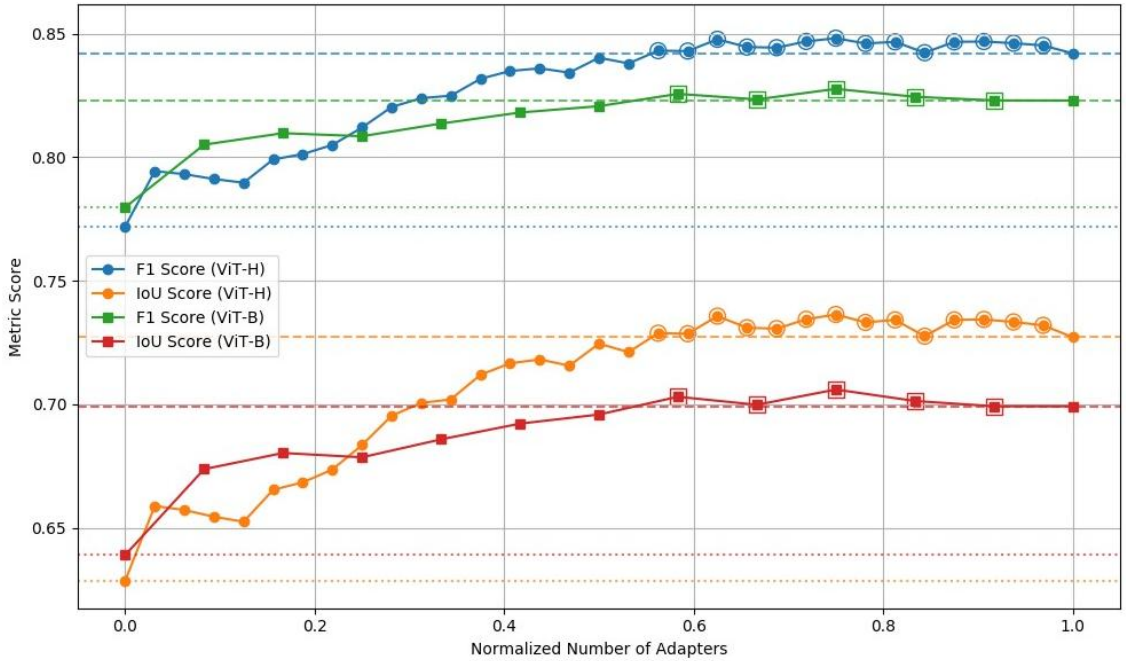


SAM-Adapter: Integrating domain-specific adapters into foundation model

Implementation

- Model Architectures
  - ViT-B: 12 transformer blocks
  - ViT-H: 32 transformer blocks
- Training Parameters
  - 50 epochs
  - Batch size: 2
  - Optimizer: AdamW
  - Loss: IoU

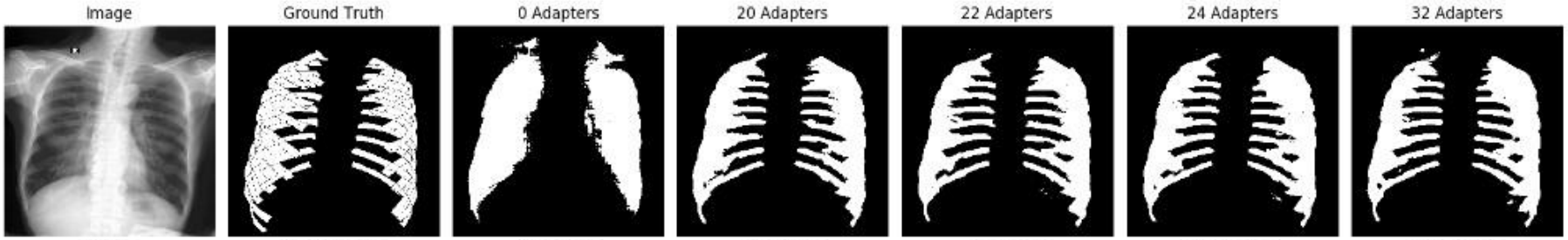
Performance comparison: Across different adapter configurations



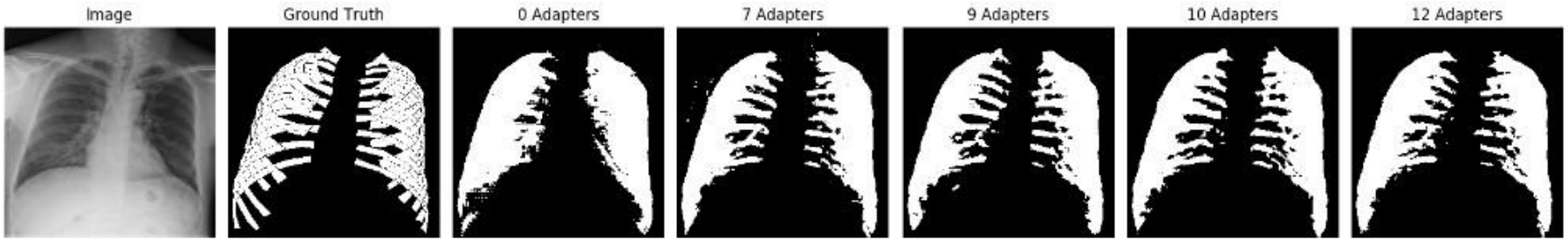
Performance comparison: Quantitative results

	Number of Adapters	F1(dice) Metric			IoU Metric		
		Score	p-value (vs 0)	p-value (vs 32)	Score	p-value (vs 0)	p-value (vs 32)
ViT-H	0 (0%)	0.770	-	<0.001	0.627	-	<0.001
	20 (63%)	**0.847**	<0.001	0.001	**0.735**	<0.001	0.002
	22 (69%)	0.843	<0.001	0.268	0.730	<0.001	0.266
	24 (75%)	**0.847**	<0.001	<0.001	**0.735**	<0.001	<0.001
	32 (100%)	0.837	<0.001	-	0.720	<0.001	-
	Number of Adapters	F1 Metric			IoU Metric		
		Score	p-value (vs 0)	p-value (vs 12)	Score	p-value (vs 0)	p-value (vs 12)
ViT-B	0 (0%)	0.777	-	<0.001	0.637	-	<0.001
	7 (59%)	0.824	<0.001	0.031	0.702	<0.001	0.029
	9 (75%)	**0.826**	<0.001	0.001	**0.705**	<0.001	0.001
	10 (83%)	0.823	<0.001	0.535	0.700	<0.001	0.514
	12 (100%)	0.821	<0.001	-	0.700	<0.001	-

Qualitative comparison: Segmentation results



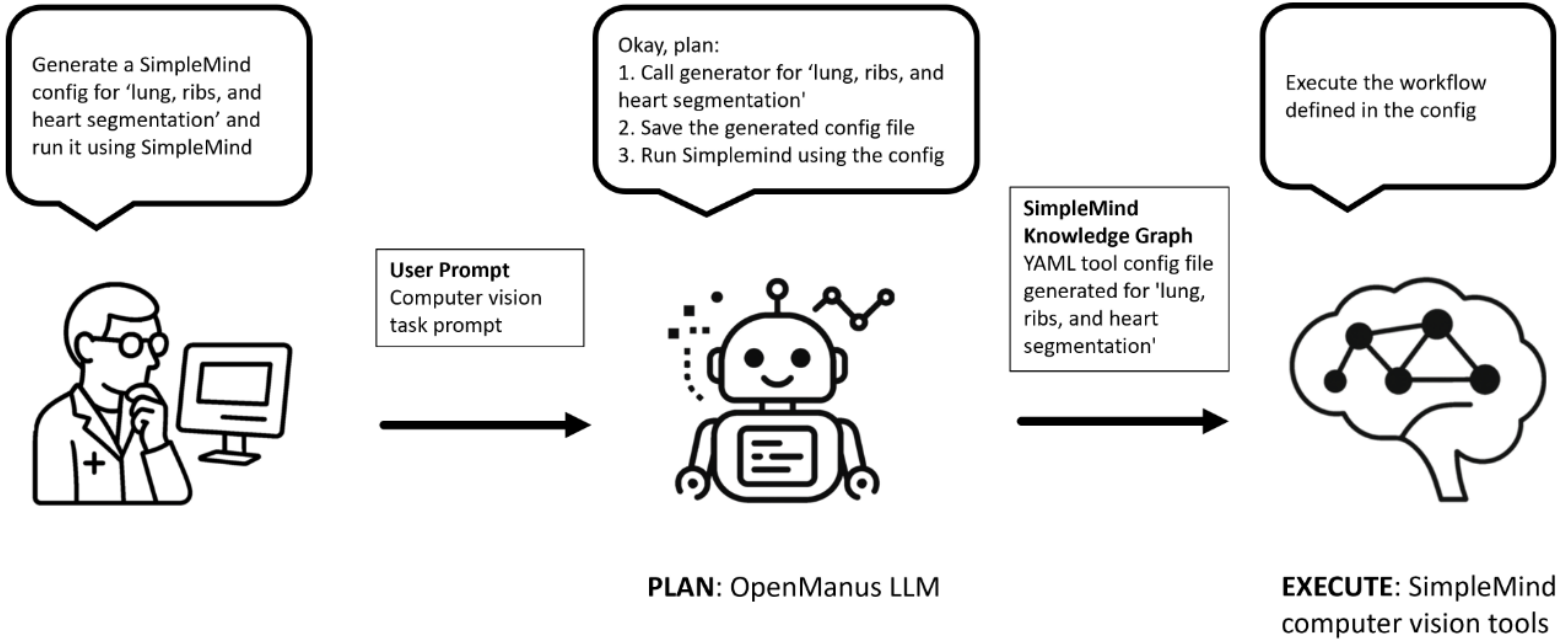
ViT-H



ViT-B

Agentic AI

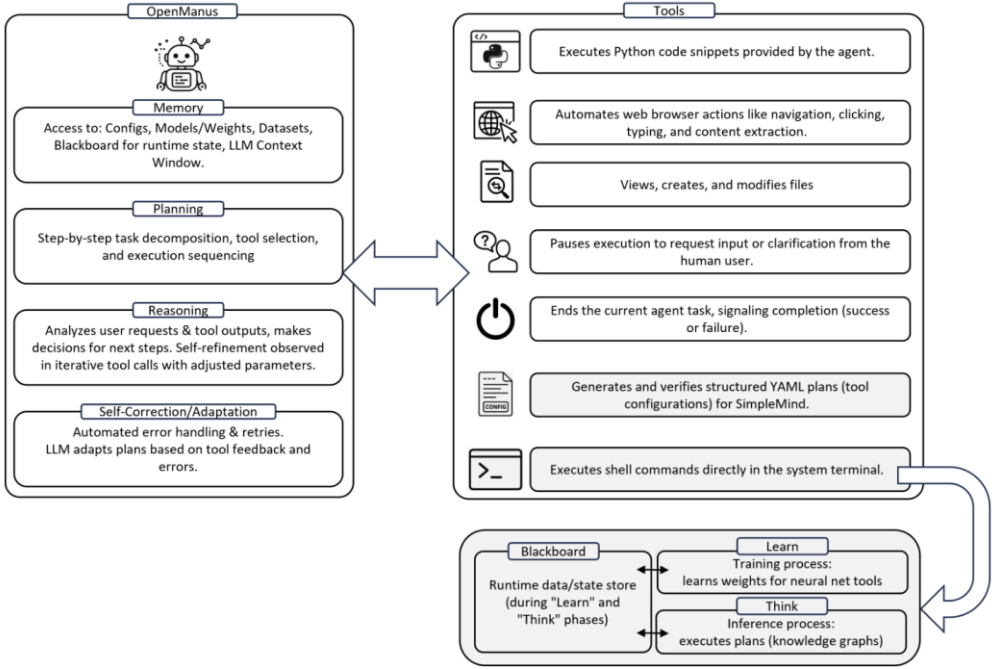
SimpleMind – Agentic ai



Key Technologites

- AI Agent Framework : OpenManus
- LLM: Qwen/QwQ-32B
- Medical Imaging AI Tool : SimpleMind
- Data Handling : DICOM 형식 처리 및 분석 결과물 처리
  (JSON, CSV, 이미지 파일)
- Prompt Engineering : LLM을 통한 의료 분석 및 이미지 분석을 위한 파라미터 생성

Detailed system architecture



The Agentic AI approach