Reliability and safety of artificial intelligence applications

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Abstract

We developed a Vision-Language Model (VLM) for automatic document analysis within JAXA, focusing on creating a local model capable of interactive dialogue, especially with diagrams. In our experiments, we explored new instruction learning methods for diagram recognition and submitted the initial results to the AI Society Conference and MIRU.

Reasons and benefits of using JAXA Supercomputer System

The VLLM training requires a large VRAM. JSS is capable of mult node processing for the training utilizeing its V100 GPUs

Achievements of the Year

This year, we utilized the JAXA supercomputer (JSS) for training and learning local LLMs. Specifically, we focused on leveraging existing libraries and verifying the implementation for multi-node learning. The LLM experiments were conducted using numerical representations in Bfloat16 format, supported by GPUs with Nvidia Ampere architecture and later models. However, for some tasks, learning was also possible with Float16 on V100 GPUs. That said, overflow issues were frequent, and there were high expectations for the next-generation supercomputers.

Publications

N/A

Usage of JSS

Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	OpenMP
Number of Processes	1 - 32
Elapsed Time per Case	8 Hour(s)

JSS3 Resources Used

Fraction of Usage in Total Resources[*1](%): 0.01

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	0.00	0.00
TOKI-ST	1.04	0.00
TOKI-GP	5,568.27	0.09
TOKI-XM	0.00	0.00
TOKI-LM	0.00	0.00
TOKI-TST	1.40	0.00
TOKI-TGP	12,568.75	86.52
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[*2] (%)
/home	245.00	0.17
/data and /data2	15,310.00	0.07
/ssd	2,510.00	0.13

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2] (%)
J-SPACE	0.00	0.00

[*1]: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

[*2]: Fraction of Usage：Percentage of usage relative to each resource used in one year.

- **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage[*2] (%)
ISV Software Licenses (Total)	0.00	0.00

[*2]: Fraction of Usage：Percentage of usage relative to each resource used in one year.