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arXiv:2407.00121 (cs)

[Submitted on 27 Jun 2024]

Title:Granite-Function Calling Model: Introducing Function Calling Abilities via Multi-task Learning of Granular Tasks

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> Abstract:Large language models (LLMs) have recently shown tremendous promise
> in serving as the backbone to agentic systems, as demonstrated by their
> performance in multi-faceted, challenging benchmarks like SWE-Bench and
> Agent-Bench. However, to realize the true potential of LLMs as autonomous
> agents, they must learn to identify, call, and interact with external tools
> and application program interfaces (APIs) to complete complex tasks. These
> tasks together are termed function calling. Endowing LLMs with function
> calling abilities leads to a myriad of advantages, such as access to current
> and domain-specific information in databases and knowledge sources, and the
> ability to outsource tasks that can be reliably performed by tools, e.g., a
> Python interpreter or calculator. While there has been significant progress

> in function calling with LLMs, there is still a dearth of open models that

> perform on par with proprietary LLMs like GPT, Claude, and Gemini.

> Therefore, in this work, we introduce the GRANITE-20B-FUNCTIONCALLING model

> under an Apache 2.0 license. The model is trained using a multi-task

> training approach on seven fundamental tasks encompassed in function

> calling, those being Nested Function Calling, Function Chaining, Parallel

> Functions, Function Name Detection, Parameter-Value Pair Detection, Next-

> Best Function, and Response Generation. We present a comprehensive

> evaluation on multiple out-of-domain datasets comparing

> GRANITE-20B-FUNCTIONCALLING to more than 15 other best proprietary and open

> models. GRANITE-20B-FUNCTIONCALLING provides the best performance among all

> open models on the Berkeley Function Calling Leaderboard and fourth overall.

> As a result of the diverse tasks and datasets used for training our model,

> we show that GRANITE-20B-FUNCTIONCALLING has better generalizability on

> multiple tasks in seven different evaluation datasets.

Subjects: | Machine Learning (cs.LG); Artificial Intelligence (cs.AI); Computation and Language (cs.CL)

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