



Instruction tuning

Alpaca

HUMANE Lab

김태균

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Overview

- What is the Alpaca model?
- How it was created
- Evaluation & Limitations

What is the Alpaca model?

- Instruction-following models still have many deficiencies
 - Such as OpenAI's text-davinci-003, Claude
- Fine-tuned from a LLaMA 7B model on 52K instruction-following data
 - Released in March 2023 by Stanford University's CRFM
 - Data, code, and model weights were released only for academic research

Data Generation Process

- Using the pipeline from 'Self-Instruct' with some modifications

SELF-INSTRUCT: Aligning Language Models with Self-Generated Instructions

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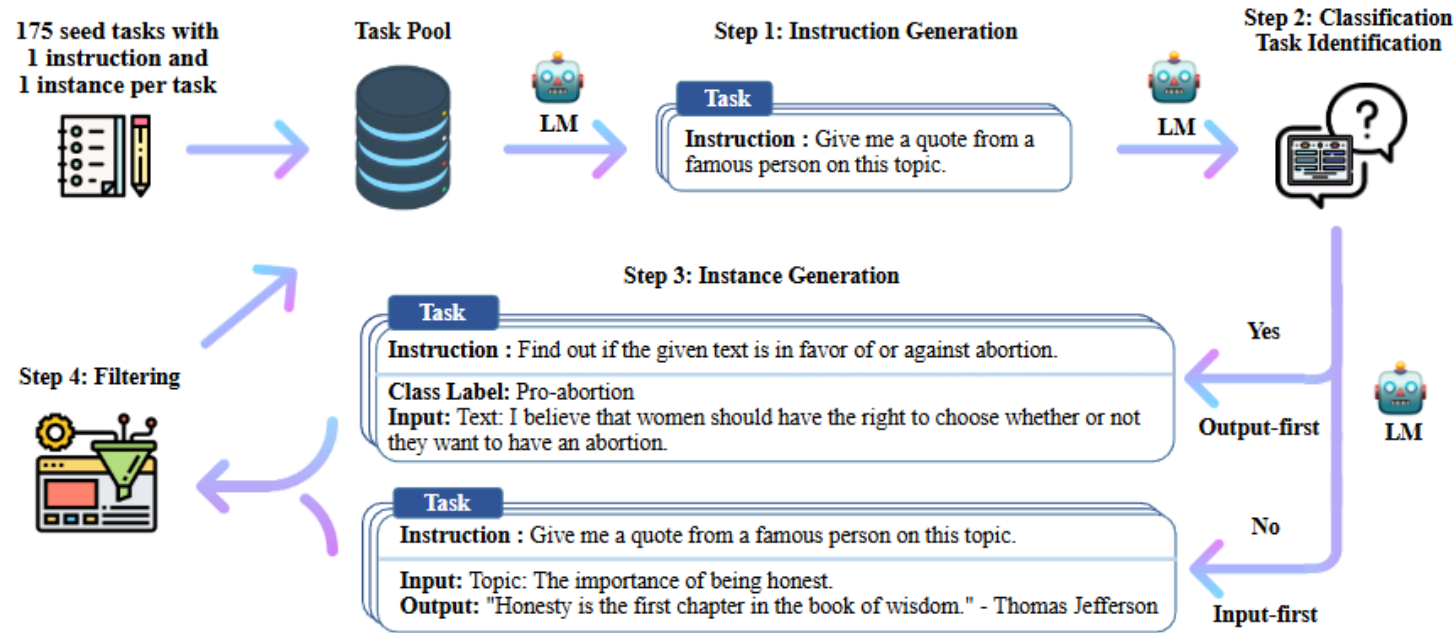
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Data Generation Process

- Model : text-davinci-003
- Modifications
 - Using a new prompt
 - Generating instructions in batches
 - Discarding the difference between classification and non-classification instructions
- Cost under \$500

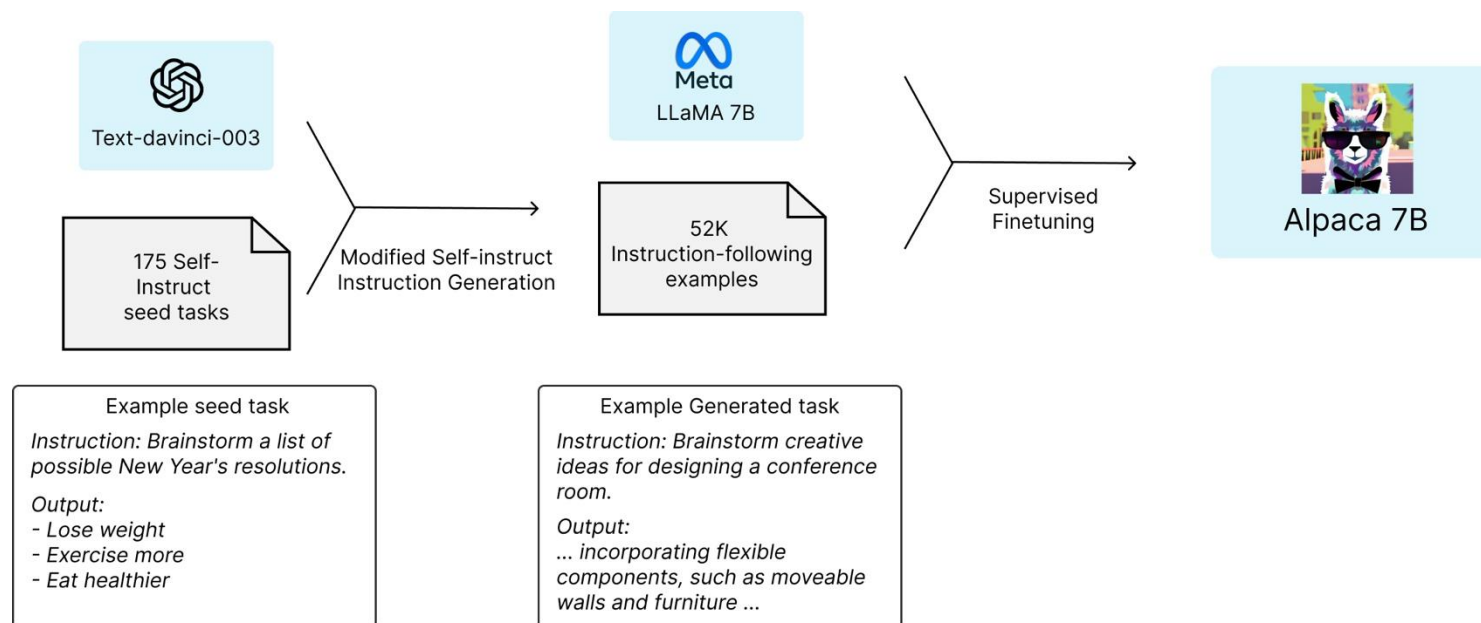
Data Generation Process

- Data example
 - Around 40% of the examples have an 'input'

```
{
  "instruction": "Classify the following into animals, plants, and minerals",
  "input": "Oak tree, copper ore, elephant",
  "output": "Oak tree: Plant\n Copper ore: Mineral\n Elephant: Animal"
},
{
  "instruction": "Explain the use of word embeddings in Natural Language Processing",
  "input": "",
  "output": "Word embeddings are one of the most powerful tools available for Natural Language Processing (NLP). T"
},
```

Training Recipe

- Fine-tuned the LLaMA using Hugging Face's training framework
 - FSDP (Fully Sharded Data Parallel)
 - Mixed Precision
- Cost under \$100



Evaluation

- Conduct human evaluation
 - Blind pairwise comparison between text-davinci-003 and Alpaca 7B
 - Alpaca wins 90 versus 89 comparisons against text-davinci-003

Limitations

- Alpaca also exhibits several common deficiencies of LM
 - Hallucination, toxicity, stereotypes, etc.
- Can be used with malicious intent

Conclusion

- Alpaca is a small instruction-following model
 - Combination of well pre-trained model and self-instruct
 - Achieves performance comparable to large LLMs at a low cost