Future Directions
Theory

- Developing a better theoretical understanding about why is LLM’s self-supervision so effective in supporting multiple NLP tasks
  
  Use it to develop better supervision signals

- What needs to be done (in training and in inference) to better support few-shot and zero-shot performance of models?
Generating Good Incidental Signals
Finding Indirect Supervision Signals from A Massive Space of Models/Resources

Retrieving Indirect Supervision from a model hub

>100k models

Hugging Face

Models 103,814

bert-base-uncased
Updated Nov 16 • 20.7M • 387

prajwally/bert-tiny
Updated Oct 27, 2021 • 15.8M • 20

D&D

How to efficiently find the most contributive model for a new task?

① How to measure the informativeness of supervision signals?

② What would be the right “signature” of a model in terms of task-learnability?

③ Identifying and combining models with complementary signals?

Compact representation

Natural Language Inference

Automatic Text Summarization

How much contribution?
Can we use existing LLMs to generate incidental supervision?

Post-hoc Verification: when are they right?
Effectively Combine Human Feedback

Build accurate specialized models with distilled parameter sizes
Use LLMs for noise reduction and pattern generation
Algorithmic Approaches
Currently, Textual Entailment is being used to provide indirect supervision for a range of classification tasks. How can it be used to better support text generation tasks?

How can this methodology be leveraged to automatically transform anticipated responses into hypothetical statements?

Textual Entailment/NLI does not transfer well. What is needed to support better generalization across various target problems while minimizing human intervention?
Alignment and Multimodal

- How to learn to understand a complex scene through indirect signals? For example, recognize people buying food around food truck

- How to indirectly supervise for compositional generalization and identify visual concepts by analyzing their sub-components (e.g., tell difference between pot and frypan)
Indirectly Supervised Natural Language Processing

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July 9, 2023
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ACL 2023