Path to Efficient AGI

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1 Introduction

This paper is the prelude of a series of papers that explore a new school of AI methodologies of a different nature than any existing ones. By combining these new ideas with established AI methods like deep learning, we will be making significant progress towards **efficient** artificial general intelligence.

Here **efficient** is stressed upon because we believe this is the key, which is largely missing in other discussions of AGI (I might be wrong, because I didn't read them). Specifically, the meaning of **efficiency** is twofold:

(i) Statistical efficiency. The ability to learn accurately from limited examples. This is an area what biological intelligence excels yet deep learning struggles.

(ii) Computational efficiency. The ability to perform computation in time and within resource boundary. Biological intelligence are good at it if the computation is critical for survival, whereas deep learning has to use large amount of computation resources to match with human in many tasks.

Remark. *Biological intelligence, with human intelligence being the most prominant, is still far from perfection. We are already beaten by computers in terms of memory, rule based computation.*

2 Related Works

3 Theories

3.1 Conventions

For the matter of succinctness, we shall restrict ourselves to Turing machine level when thinking of computation. This is of course far from reality, but it helps with illuminating the high level ideas.

3.2 NP Problems Arising from ML Problems

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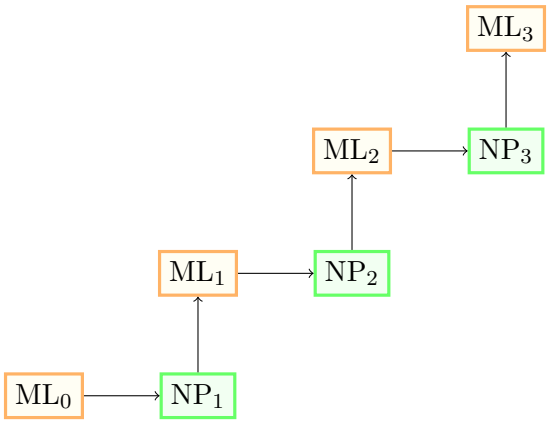
3.4 NP-ML Ascension



3.5 Reinforcement Learning

4 Type System

4.1 Concept Level Types

4.2 System Level Types

4.3 Types for Machine Learning

5 Language Requirements

6 System

6.1 Database

6.2 Debugger

6.3 todo