Build an AGI using Polya's method

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November 2, 2024 — 36c8eb68

0.1 Context

Polya's How to Solve It[1] is considered by many a reference on how to teach mathematical problem resolution to students. It is however also an interesting and invaluable tool that can be used to solve any problem in general. In this study, we attempt to apply his method to the problem "Build an AGI".

0.2 Learned in this study

0.3 Things to explore

- Is intelligence innate or acquired? If it is acquired, how much of it has to do with our genes and with our education?

1 Overview

2 Understand the problem

2.1 Do you understand all the words used in starting the problem?

- Build: use tools and materials in order to construct something
- AGI: artificial general intelligence
  - Artificial: Human made, as opposed to natural, that came from nature
  - General: As opposed to specific or specialized, capable of being/doing many things
  - Intelligence: (this is a list of attempts, not all of them are good, some are in fact pretty terrible, but the idea here is to explore the definition of intelligence as it is most likely the most important part of the problem)
    * the ability to accomplish goals in a given environment
    * the ability of an agent to adapt itself to an environment in order to accomplish goals
    * the ability of things to make use of energy in a constructive manner (build upon the past)
    * the ability to model the environment in order to devise effective plans to accomplish objectives
    * the ability to extract patterns in the environment and make effective use of them in an internal model of this environment
    * the ability for an agent to expand his ideology in other agents
    * the ability of an agent to make the most out of as little energy as possible
    * the ability to predict the future and make the most efficient use of that knowledge
    * the ability to make use of experience and context in a novel situation
    * the ability to build models and use these models
    * the ability to build Turing machines and simulate these machines (internally)
    * the ability to be self-directed
    * the ability to accomplish things (the more things you can accomplish, the more intelligent you are)

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[1] https://en.wikipedia.org/wiki/How_to_Solve_It

* the ability to process inputs into meaningful outputs (the more varied the inputs you can process, the more intelligent you are)
* the ability to resolve problems
* the ability to make efficient use of a limited amount of resources(energy/time) toward objectives
* the ability to abstract/generalize from examples in an efficient manner and to apply this knowledge to newer situations through analogy
* the ability to process information as efficiently as possible while making use of it in the most effective manner (determined by the environment)
* the ability to judge and evaluate the pertinence of information
* the ability to make links or establish relations between things

2.2 What are you asked to find out show?

- That AGI is possible
- One or many methods through which it would/is be possible to accomplish/reach AGI
- A path toward the development of AGI
- The requirements of AGI
- A/The definition of AGI

2.3 Can you restate the problem in your own words?

- Identify the components necessary to the construction of an AGI
- Determine how to assemble these components
- Assemble the components

2.4 Can you think of a picture or diagram that might help you understand the problem?

- Environment/body separation
- Environment/cell separation
- Input/process/output diagram

2.5 Is there enough information to enable you to find a solution?

No, maybe, we know that biology is able to produce natural general intelligence through humans, assuming that everything that goes inside the brain can be liken to signals transmission and processing, it should be possible run a brain in vat that is considered intelligent.

3 Devise a plan

- Construct a definition of intelligence that contains all the appropriate ingredients
  - Determine what those ingredients are

3.1 Intelligence

TODO: evaluate what is essential and what can be derived

- Constructed on experience
- Non random
- Is evaluable (can be ordered in one of many domains)
- The ability to evaluate the value of its own ideas (to build its own evaluation functions)
- The ability to do mathematical induction reasoning (causality)
- The ability to set goals
- The ability to evaluate the potential of a set of goals to determine the most promising ones

3.1.1 At the cell level

- Survive
  - Obtain energy
  - Use energy
  - Get rid of waste
- Execute their task
- Execute a set of instructions (DNA)
- This is probably too low level as animals also have cells and aren't considered "particularly" intelligent

3.1.2 Questions

- Is intelligence only based on the ability to apply prior knowledge or the fact that this prior knowledge is already available in its knowledge base and is properly used, or is intelligence the ability to derive this knowledge (aka some can and some will never be able to)?
  - Anyone can learn anything that someone else has been able to learn
  - What matter is prior knowledge as well as how much time it will require to learn
  - Thus, someone is more intelligent than someone else at a point t in time simply because the knowledge required to answer a problem is already available to them while it may not be for others
  - Instantaneous intelligence vs intelligence (similar to instantaneous speed vs speed)
    - * There might also be the concept of position, speed and acceleration for intelligence
- Is intelligence about learning?
  - According to keyword density of all the definitions in [2], intelligence would have to do with the ability/capability to learn and form knowledge in some environment
- What is adaptability about?

4 See also

- How to Solve It

5 References

- http://dendwrite.blogspot.ca/2016/06/on-intelligence-and-intelligent-design.html

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[2]http://arxiv.org/abs/0706.3639