ETH
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Distributed Computing

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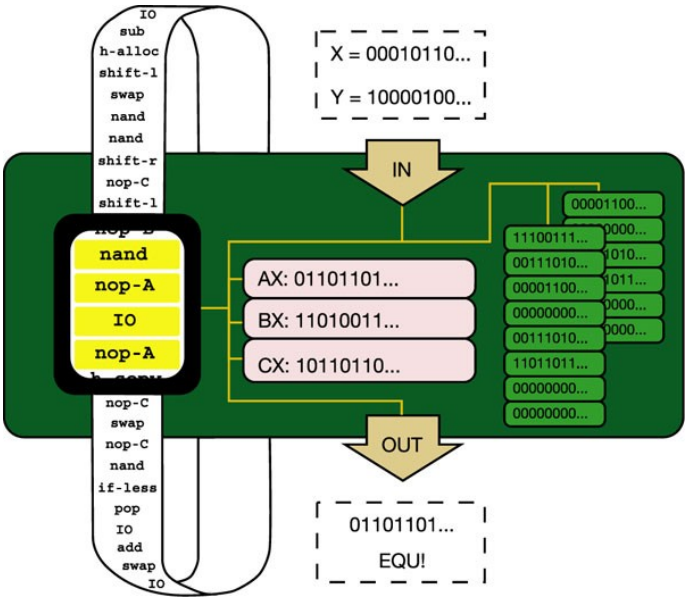
Evolutionary Methods for Sequences

The first number is 2. The second is 4. The third 6. What is the next number? The answer is 14. The solution is the following formula: $x^3 - 6x^2 + 13x - 6$. But if you ask anyone this question, everyone will answer 8. But why 8?

Machine Learning is one of the technologies that has made the most impact in recent years. In particular deep learning has shown some remarkable results.[1] However, deep learning models are data-hungry and seemingly simple problems as above are already difficult for them. This is an old and nascent pursuit in AI. However, with the increase of the computation power this area, similar to deep learning, is becoming more and more approachable.

The solution in the first example is "8", because it is the most simple one. It is much easier to write the following algorithm than any other algorithm that produces the same results.

```
for i in range(n):
    print(2*n)
```



The goal of this thesis, is to implement evolutionary methods to search for such sequences. In this thesis, we will focus only on simple sequences such as polynomials. We will start, based on theoretical justifications, to explore what are the best ways to search for these algorithms. The main focus is to find general techniques, observations that can be potentially applied in the future for other types of sequences as well.

Requirements: Prior experience or a strong interest in programming. Creativity skills are advantageous.

Interested? Please contact us for more details!

Contact

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[1] Examples include AlphaZero, AlphaFold and so on.