



## What is ASTRID

ASTRID is a Cognitive Architecture. This means: a software system that is capable of reasoning. The system can actually reason with the use of (complex) knowledge. This knowledge consists of a complex model of the world, that describes how everything in our world works. ASTRID builds and maintains this world-model all by itself. ASTRID is currently, as far as we know, the only known system with this capability.

## What is Common-sense Knowledge

There is a vast amount of information on how things work and behave in our world. We learn this information while we are growing up. We aren't even aware of most of this knowledge because it is common-sense. That is why we call it Common-sense Knowledge. For machines to understand the world around us, they also need this vast amount of Common-sense Knowledge.

Several large corporations, and even governments, emphasize that they see the capability for machines to be able to acquire Common-sense Knowledge as the next big step in applicable Artificial Intelligence.

## What is the difference between ASTRID and GPT-3

ASTRID learns (primarily) from text. So does language models like GPT-3 and Google's LaMDA. The big difference is in what is learned. So-called Transformer models, like GPT-3 and LaMDA, learn statistical information about how words follow other words in a sentence. These models subsequently try to predict a sentence that could be a reply, based on the learned word sequences. They cannot determine if the answer is correct, or if it's even a relevant answer. Because of this, there are (currently) no clear applications for systems like GPT-3.

ASTRID finds relations within texts, and builds a world-model with that found information. ASTRID learns how things in our world behave, relate to each other, and interact and (sometimes) influence each other. The answer that ASTRID can give, is not based on statistical word-pairings, it is based on understanding how our world works. Obviously, there are current applications for this.

## What can ASTRID do

ASTRID can learn complete knowledge domains, and do it way faster than humans can. With this knowledge, ASTRID can answer complex questions, or make decisions directly, as part of machines that need to navigate in our world, or even beyond.

## A few examples of ASTRID's capabilities:

### Robotics

Robots can be used in many important scenarios. In healthcare, to solve the growing problem of understaffing. In disaster relief, where humans cannot enter a disaster area to save victims, because of inhibiting circumstances like radiation or fires. And in space exploration, where robots can speed up things significantly, and help to get humanity into the future.

For all such applications, the robots need to be largely or even fully independent. Because in all these scenarios, there are no humans available or nearby, to pilot these machines remotely.

### Decision systems

Decision systems, like they are used, for example in the medical domain and legal domain, are currently based on statistical models. In the medical area, this has proven very successful for recognizing melanomas, for example. In the legal world, it has largely been a failure.

As soon as a decision has to be based on a complex set of interacting facts, the statistical approach fails. It is impossible to predict, and therefore train a statistical system, for complex combinations of facts. ASTRID learns specifically based on finding the combinations in complex sets of facts. ASTRID can even do this across different knowledge domains.

### Self-driving cars

The development of selfdriving cars has hit its ceiling several years ago. There have not been any significant breakthroughs since. The statistical approach has reached its limits here. Pattern recognition is great to identify all objects around a car, but it cannot anticipate all the constant changes in the situation. It can only make choices based on training data of things that have happened somewhere before.

ASTRID can use its insights into how things behave in our world, and anticipate the result of any combination of such behaviors. ASTRID can evaluate complete novel situations, based on the integral knowledge of the parts that make up that situation. For example, if ASTRID is trained with behavioral data on children playing just anywhere, it can reason how a playing child might behave on a sidewalk, and take that into account for the situation.

# ASTRID

## Fact Sheet

