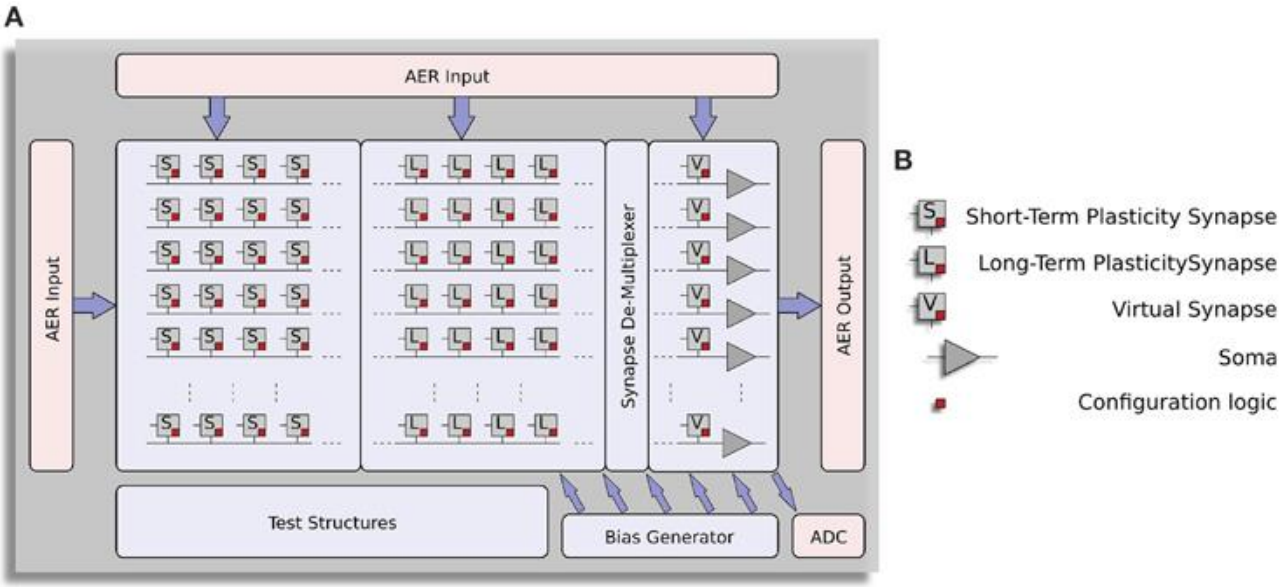
Artificial intelligence (AI) has become a topic of discussion globally due to its evolution from science fiction to reality. The impressive scope of AI lies in its ability to efficiently train on vast amounts of data. To further advance in this field, researchers are developing new and more powerful algorithms and computer components to unlock the potential of AI. One approach being explored is neuromorphic computing, which aims to gain a deeper understanding of the human brain's structure by transferring certain concepts into AI systems. By imitating the human brain, researchers hope to create sophisticated AI that can replicate human-like intelligence. This field of study is crucial in pushing the boundaries of AI, as it strives to reach new heights and discoveries.

The neuromorphic structure is borrowed from a part of the brain called the neocortex. Fundamentally, it consists of two main parts - neurons and synapses. The transmission of signals is extremely fast, which makes this technology so advanced. Neuromorphic computers form impulsive neural networks that contain impulsive neurons that transmit electrical signals efficiently and quickly, just like real ones. The main advantages from a technical point of view are:

1) Parallel processing, which allows for computations on multiple data streams simultaneously;
2) Low power consumption, which saves important resources and gives more space for use in mobile applications
3) Real-time learning, which is an extraordinary advantage in tasks requiring constant training.



Picture1: Architecture of ROLLS neuromorphic processor

When it comes to advanced neuromorphic chips used for commerce, Intel Loihi and IBM TrueNorth are worth mentioning. Loihi features a highly scalable architecture with millions of neurosynaptic cores (NSCs) - each core mimicking a neuron with integrated learning capabilities. This allows for building large-scale neural networks on a single chip or across multiple Loihi boards. Loihi allows on-chip learning, which is a huge advantage in comparison to TrueNorth. Applications, where Loihi shows its true power:

1) Robot Control: Researchers have used Loihi to control robots that can navigate complex environments and learn from their interactions. The chip's low-power consumption makes it suitable for battery-powered robots.
2) Financial Forecasting: Loihi's ability to handle high-dimensional data streams makes it suitable for analyzing financial markets and identifying trading patterns.
3) Pattern Recognition: Loihi's parallel processing capabilities enable applications like real-time anomaly detection in sensor data or image recognition tasks.

On the other side, TrueNorth focuses on low-power, high-density neural networks. It boasts a million cores arranged in a 2D mesh, enabling efficient communication between neurons. TrueNorth excels in these spheres:

1) Speech Recognition: TrueNorth's low power consumption makes it well-suited for always-on speech recognition on mobile devices.
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3) Speech Recognition: TrueNorth's low power consumption makes it well-suited for always-on speech recognition on mobile devices.

In summary, with the development of artificial intelligence, it is becoming more and more interesting to study the principles of human brain functioning. Inspired by this, more than a dozen technologies have been created, with neuromorphic chips being one of the most advanced. Thanks to their similar design, which contains neurons and synapses, these chips allow for fast real-time data processing without much energy consumption. The number of application areas is constantly growing, as is the number and variety of chips, allowing you to choose the right option for your specific task.