Radar Gesture Recognition with Spiking Neural Networks

Background

Spiking neural networks consist of biological inspired neurons and synapses. They encode information into the presence and precise timing intervals of short energy pulses “spikes”. Although they have been shown to solve problems more efficiently than today’s commonly used artificial neural networks, they still lack practical applications.

Description

The aim of this thesis is to develop a network architecture to recognize gestures performed in front of a radar. Sensors like that are used in the new generation of smartphones and will become more common as human-machine interface.

The first proposal for a suitable network structure is the Hierarchical Temporal Memory (HTM), which is an unsupervised learning, auto-associative network based on a theory how the human cortex works.

Tasks

This student project consists of the following tasks:

- Familiarizing with spiking neural networks, signal processing, and radar
- Evaluating different architectures given in the literature
- Developing and implementing an architecture based on the research
- Testing the networks on radar gesture data
- Generating data if needed
- Documenting the results

For more information please contact us:

Phone: +49.89.289.18141
E-Mail: daniel.auge@tum.de
Internet: www6.in.tum.de/en/people/daniel-auge-msc/