BAKKALAUREATSARBEIT/ MASTERARBEIT

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n·t·h·f·s

INSTITUT FÜR NACHRICHTENTECHNIK UND HOCHFREQUENZSYSTEME

Topic:

Deep Neural Network for Imaging Radar
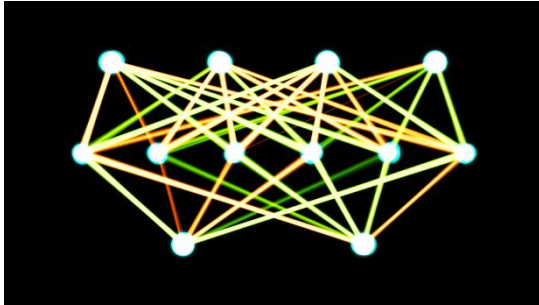
Figure 1 By Akritasa - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=41652 686 5

Figure 2 RadarLog, Quelle: www.inras.at

Motivation and Goals:

Digit recognition from camera images is a widely used example for using deep neural networks (DNNs).

Imaging radars are cable to produce an "image" from the field-of-view with properties differing from video cameras. For example: radar signals contain depth and range-rate information but compared to video cameras, no color and with less resolution.

Moving the radar system will produce a synthetic aperture to increase the resolution.

The goal of this master thesis is to mount a radar system on a freely moving platform, e.g. robot arm, scan the environment and employ a DNN framework to identify metal digits.

Task 1: Radar Signal Processing

The radar shall be mounted on a robot. Data needs to be acquired while the radar is moved and images need to be calculated from the radar data. An additional camera will be used for verification.

Task 2: Design and Application of a DNN

Based on the examples for using a DNN to identify digits, a DNN should be designed to identify metal digits from radar data. Environmental influences, e.g. misalignments and rotation of the metal digits, as well as benefits of the radar sensor compared to the camera, e.g. depth information, shall be studied.

Further Work

This topic aims to gain knowledge on the use of DNNs to identify objects from radar measurements. Therefore, this topic suitable for being continued with a PhD thesis.

Possible start: now (01/2020)

Contact Persons

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