Faculty of Electrical Engineering & Computer Science
Master Degree Course Electronics Engineering, MSc EE

HSB
Hochschule Bremen
City University of Applied Sciences

Master 2021

Mr. Sumesh Kannankatil Sadanandan

Siamese Neural Network for Human Identification based on RADAR Micro-Doppler Signatures.

ABSTRACT - Masterthesis

The radar micro-Doppler(μ-D) analysis is proved to be a dependable metric for human classification since it provides key information about human locomotion. Humans can be identified through a combination of μ-D signature of various body parts constituting a characteristic μ-D signature which is based on their walking styles.

The thesis addresses the application and implementation of Siamese few-shot learning techniques to achieve identification and classification between different humans based on their Micro-Doppler signatures. The thesis further explains the image processing techniques used to extract the human gait cycles from the radar data. In the proposed approach, μ-D signatures from several subjects of different genders and body characteristics walking in front of a high latency Doppler radar sensors using spectrograms are used as basis to human classification. Additionally, simulation of persons of different characteristics walking in front of radar was pre-pared and used to create the data-set used for training.

Siamese neural network is used to identify individuals from very few training data by learning the difference functions and not the signature shapes. Further studies on triplet loss to improve the classification performance was explored.