Course Unit Descriptor

Study Programme: Computing And Control Engineering

Course Unit Title: Deep Learning for Autonomous and Networked Vehicles

Course Unit Code: CEM822

Name of Lecturer(s): Lukač Željko

Type and Level of Studies: master

Course Status (compulsory/elective): elective

Semester (winter/ summer): winter

Language of instruction: english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 6

Prerequisites: none

Course Aims:.

Introduce theoretical principles, practical aspects and advanced techniques for deep learning and artificial intelligence in autonomous and networked vehicles applications.

Learning Outcomes:
The students will gain detailed knowledge about fundamentals, practical and implementation aspects of deep learning and neural networks,. The will learn about applications specific to autonomous and networked vehicles.

Syllabus.
Deep learning belongs to the field of artificial intelligence and machine learning,Image classification, speech recognition, language translation, medical diagnostics, robot and vehicle control are limited applications of deep learning.
In this course we will cover the following topics.
- Introduction to machine learning and relationship to deep learning.
- The neural network architectures: feed-forward, convolutional, and recurrent.
- Learning and adaptation - with or without supervision, back-propagation, training, validation...
- Hyper-parameter optimization
- Reinforcement-learning
- Vehicular applications, case studies (YOLO algorithm, NVIDIA,...)

In addition to lectures, there is a hands-on lab work using the existing training data sets, Tensor Flow a,d the ALPHA board that integrates TI System-on-Chip. As an alternative a GPU NVIDIA platform will be considered.

Required Reading:
Relevant literature in English, tbd

Weekly Contact Hours: 2	**Lectures: 3**	**Practical work: 0**

Teaching Methods:
Lectures, case-study analysis, lab work, practical project assignment and lab work.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Attendance			
Computer exercises			
Tests (4x)			