



Course syllabus

# Maskininlärning för sakernas internet (IoT) Machine Learning for Internet of Things (IoT)

# EITP40, 7,5 credits, A (Second Cycle)

Valid for: 2023/24 Faculty: Faculty of Engineering, LTH Decided by: PLED C/D Date of Decision: 2023-04-18

# **General Information**

**Elective for:** C4-ks, D4-is, D4-mai, D4-ns, E4, F4, I4-pvs, MWIR1, MMSR2 **Language of instruction:** The course will be given in English

# Aim

The purpose of the course is to provide an introduction to artificial intelligence and machine learning techniques for IoT systems e.g. wearable sensors for health monitoring.

# Learning outcomes

*Knowledge and understanding* For a passing grade the student must

- understand the IoT domain and the corresponding challenges and opportunities
- understand the state-of-the-art machine learning and artificial intelligence techniques
- understand the fundamental ideas behind the state-of-the-art machine learning techniques in the context of IoT systems e.g. in wearable sensors for health monitoring and medical informatics.

*Competences and skills* For a passing grade the student must

- analyze the suitability of a given machine learning technique for IoT systems
- apply and implement the state-of-the-art techniques in machine learning and artificial intelligence in the context of IoT systems
- evaluate and validate the existing machine learning techniques for IoT systems, in terms of relevant domain metrics.

#### Judgement and approach

For a passing grade the student must

- show knowledge of the possibilities and limitations of artificial intelligence and machine learning in the context of IoT systems
- independently develop, train, and implement machine learning techniques on IoT systems and investigate the results obtained.

### Contents

- Introduction to IoT systems and the challenges and opportunities in this domain
- Introduction and foundation of machine learning and deep neural networks in the context of IoT systems e.g. for wearable devices and sensors for health monitoring and medical informatics;
- Machine learning for IoT systems and distributed resource-constrained platforms.

### **Examination details**

**Grading scale:** TH - (U,3,4,5) - (Fail, Three, Four, Five) **Assessment:** Approved laboratory assignments give grade 3. An approved final project is required for grades 4 and 5.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

# Admission

Assumed prior knowledge: Programming, Basic probability, statistics, and algebra. The number of participants is limited to: No

# **Reading list**

- Andreas Lindholm, Niklas Wahlström, Fredrik Lindsten and Thomas B. Schön: Machine Learning, A First Course for Engineers and Scientists. Available online http://smlbook.org/.
- Ian Goodfellow, Yoshua Bengio, Aaron Courville: Deep Learning. MIT Press, 2016.
- Pete Warden, Daniel Situnayake: TinyML:, Machine Learning with TensorFlow Lite on Arduino and Ultra-Low-Power Microcontrollers. O'Reilly Media, 2020.

# **Contact and other information**

Course coordinator: Amir Aminifar, amir.aminifar@eit.lth.se