# TDDE19
# Advanced Project Course – AI and Machine Learning
## Introduction

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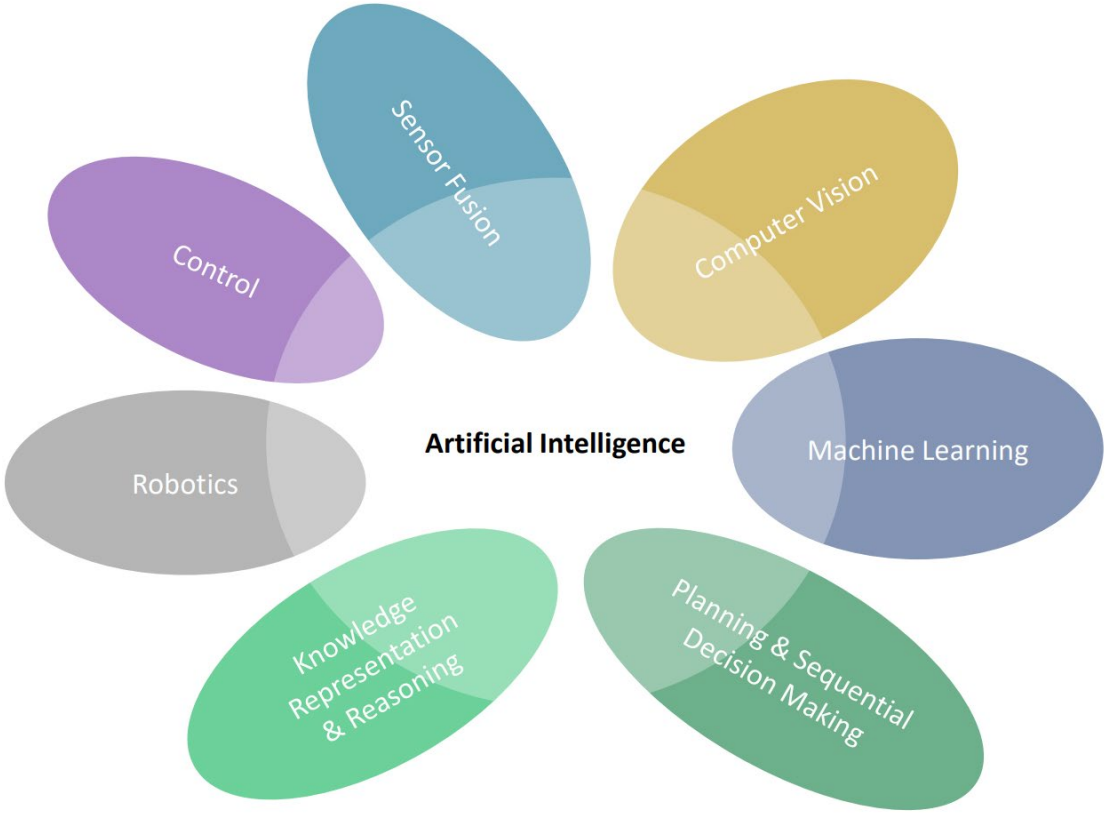
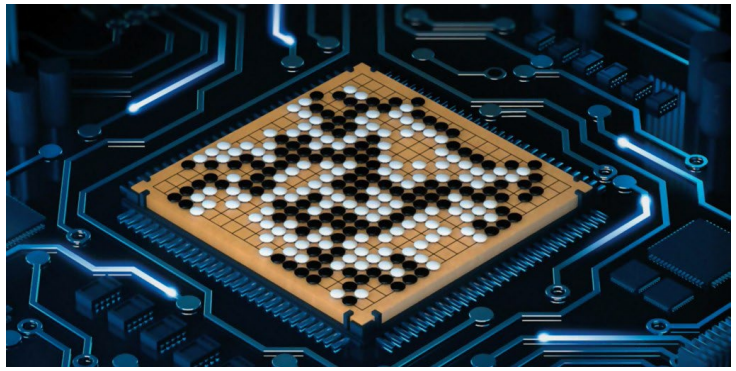
ARTIFICIAL INTELLIGENCE AND INTEGRATED COMPUTER SYSTEMS
AIICS

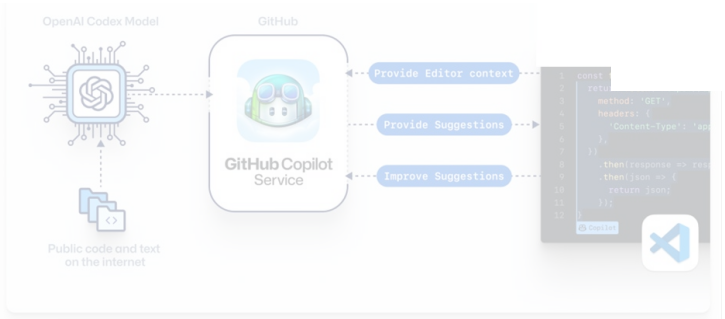
# Artificial Intelligence (AI)

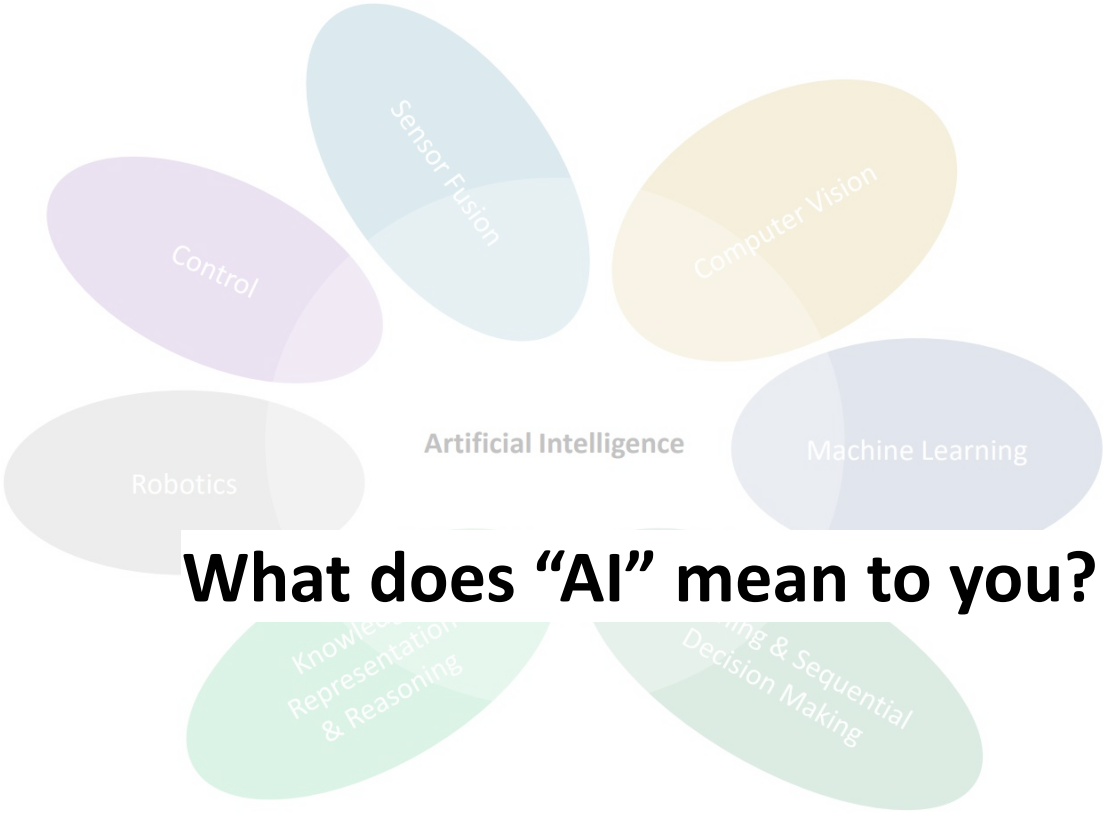




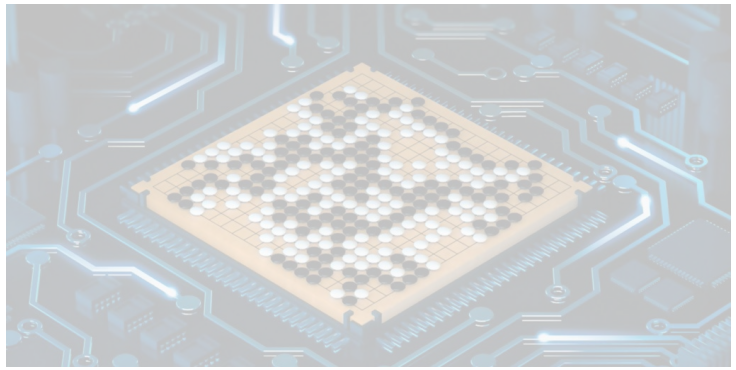



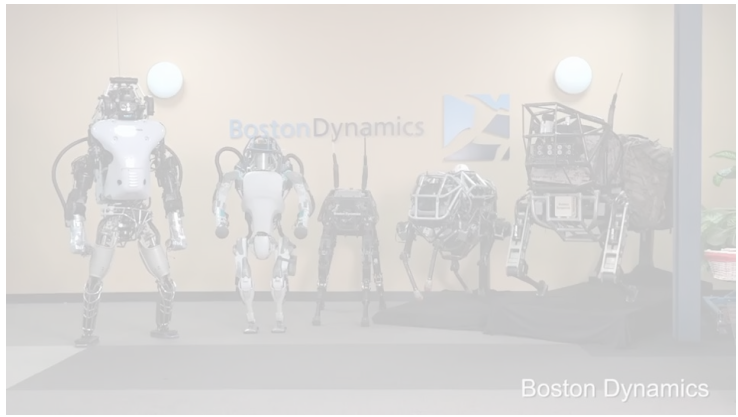

# Artificial Intelligence (AI)

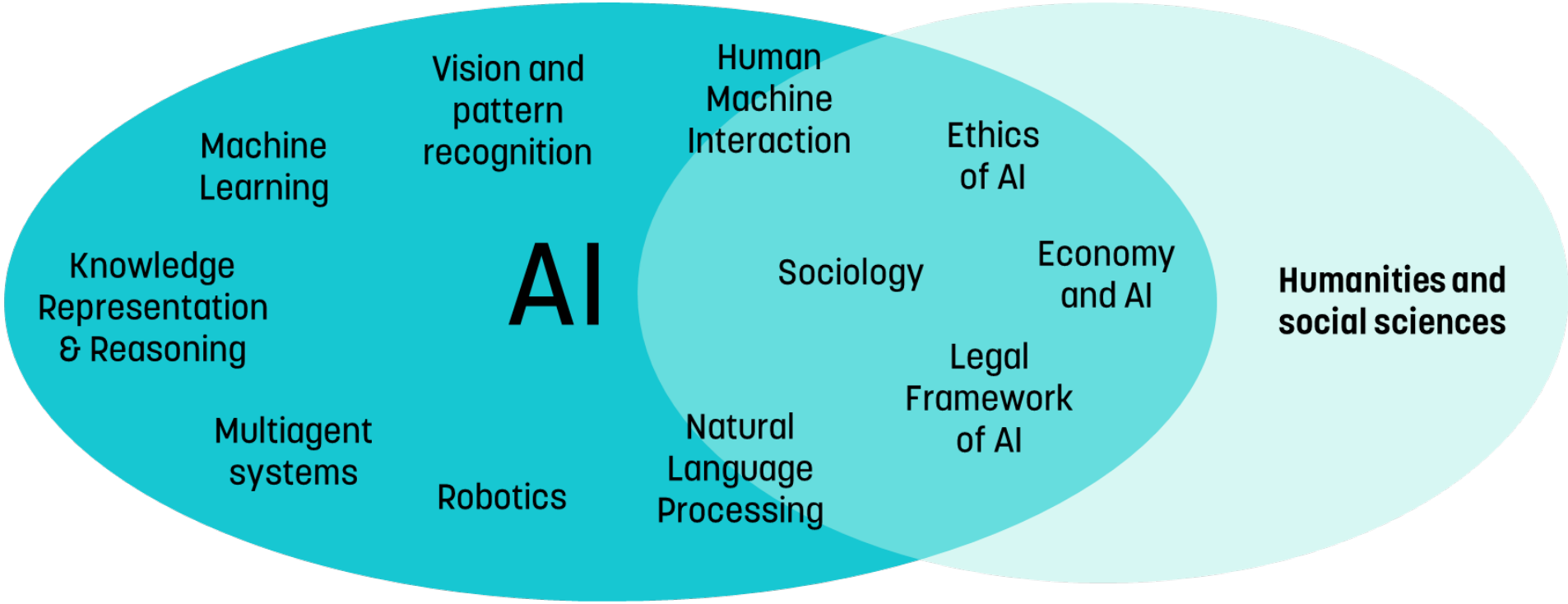




**What does "AI" mean to you?**






# LiU | AI


Machine Learning
Vision and pattern recognition
Human Machine Interaction
Ethics of AI
Knowledge Representation & Reasoning
AI
Sociology
Economy and AI
Humanities and social sciences
Legal Framework of AI
Multiagent systems
Natural Language Processing
Robotics

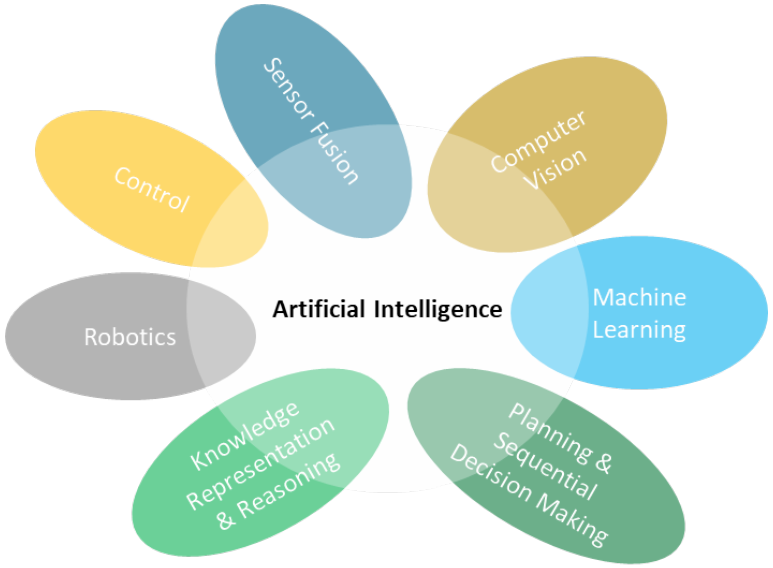
# AI and Integrated Computer Systems (AIICS)

**Safe, robust and explainable AI-systems that work in *the real world*. Hybrid AI.**

Mattias Tiger

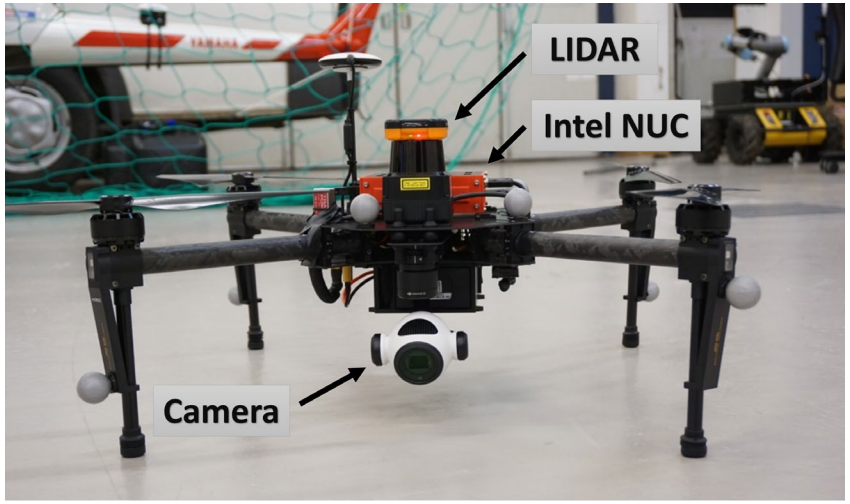
**ReaL Lab**

Fredrik Heintz




Humanoid Lab


AI Academy




UASTech Lab

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https://www.ida.liu.se/divisions/aiics/

# Lecture content

- Course overview
- Projects
- Resources and practical matters

# Course evaluation and improvements

- Students were generally satisified
  - But there is room for improvements
- Good with a project process (e.g. SCRUM)
  - But SCRUM / the execution of SCRUM was not good

**New:**

- Multiple customers
- Each customer is a projecy supervisor (and a subject matter expert)
- Projects now have connection on-going research
- A more suitable project process for AI projects will be used

# Project Work

- A project group: ~6 students
- Common theme (a project), different tasks within the group
- Expected work load: 160h
- Customer/supervisor
- Regular meetings with customer/supervisor: ~1h/week
- Emphasis on *integration* and *operational constraints*

# Dividing work load

- Some projects can involve preprocessing / visualization / ”getting others code to work”, make sure to spread that load among the student group.
- Subgroup of maximum 2-3 students
- Designate a project leader
  - Responsible for the *active planning document* and its weekly update
  - Make sure that coordination and integration works smoothly
  - Everyone must sync (report to) the project leader each week.

# Project Deliverables

- **Planning report**
- **Individual and collective activity update of *active planning document***
- **Half-time report**
- **Code** (on gitlab)
- **API and installation documentation** (on gitlab)
- **Group report** presenting AI techniques and results

# Project Deliverables | Planning report

***Why?***

**As an individual**

- To get you to think about the whole and the details

**As a group**

- To get you to decide your part and understand what other members are doing

**Examination and guidance**

- To grasp what each individual should do
- To catch group related problems early

# Project Deliverables | Active planning document

**As a group and individually**

**For every week:**

- What do you plan to do?
- How many hours do you plan to work?
- What was done?
- How many hours did you work?

| Vecka | | Alla | Mattias Tiger | … |
|---|---|---|---|---|
| **45** | **Timmar plannerade** | | | … |
| | **Timmar gjorda** | | | … |
| | **Plannerat** | | | … |
| | **Gjort** | | | … |
| **46** | **Timmar plannerade** | | | … |
| | … | | | … |
| **47** | **Timmar plannerade** | | | … |
| **…** | … | … | … | … |

**Make a plan for all weeks of the project**

- Concrete/detailed close in time
- More vague further into the future

**> Update ahead of each weekly meeting <**

everyone (not just the project leader)

# Project Deliverables | Code and Readme

- **Each group will get a Gitlab repository**
- Access will be granted for
  - Group members
  - customer/supervisor
  - examiner
- License: MIT
- At the end of the project, the result has to be **reproducible** by following the **Readme instructions**

# Project Selection

- After this presentation, you should form groups on your own
  - Add them to webreg
- **Email me before Wednesday 13:00** with**:**
  - Your group number
  - A ranked list of **all** projects

More info on the course website: https://www.ida.liu.se/~TDDE19/info/projects.en.shtml

# Projects

- Semantic mapping
- Solve Sokoban with AlphaZero
- Safe Autonomous Systems
- LLM From Scratch
- Natural Language to Query
- Deep Fake in Practice

# Projects

See: https://www.ida.liu.se/~TDDE19/info/projects.en.shtml

# Resources and practical matters

- You will get temporary access to AI workstations at the AI Academy lab (E-bulding, next to Gödel).
- RTX 3090TI
- Rootless Docker give you freedom


- No central storage!
  - You can log on to any machine, but the storage for your account is local.

- **Be nice and share**
  - Sometimes you can have multiple machines. Most often: 1 machine per group.
  - More than you that use the reasources and who have equal rights to them.

# Remember

- Deadline for project preferences is Wednesday 4th of September at **13:00**.
- After this presentation, you should form your groups
  - Add them to webreg: https://www.ida.liu.se/webreg-beta/TDDE19-2024-1/PROJECT

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www.ida.liu.se/~matti23/mattisite/research/

www.liu.se/ai-academy

www.liu.se/medarbetare/matti23

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AIICS

TAILOR
Foundation of Trustworthy AI:
Integrating Learning, Optimisation and Reasoning

WASP
WALLENBERG AI, AUTONOMOUS SYSTEMS AND SOFTWARE PROGRAM