**EDAN70/90: Project in Computer Science
Theme: Intelligent Systems**

RSS group and friends

Dept. of Computer Science, Lund University, Sweden

March 20th, 2023

Plan for today

- Administrative stuff
- Projects, groups
- Planning for the rest of the term

Projects

- Define a study topic and an application in AI, machine learning, language processing or intelligent robotics.
- You may define them yourself or with the help of the instructor.
- Survey the relevant literature
- Define an implementation strategy and select algorithms
- Implement a prototype
- Evaluate it
- Write a project report
- Submit paper to a conference (optional). No guaranteed funding for conference fees and travel though.

About the course

- EDAN70: Project in Computer Science
  Theme: Intelligent Systems
- also EDAN90: Advanced Project in Computer Science
- http://cs.lth.se/EDAN70
- http://cs.lth.se/EDAN70/
  projects-in-artificial-intelligence/
- Serves as an announcement board as well!
- Teachers: We will see...
- Administrator: Ulrika Templing (expedition@cs.lth.se)

Contents

- 7,5 hp (ECTS)
- Grading: UG scale (pass/fail)
- Time span: 20/3–26/5–9/6
- Scheduled meetings: 2 (intro now and final presentation on 26th May)
- Supervision every week
- Home reading (textbook, papers, web, ...) and lab/home work
- You are assumed to have
    - AI background
    - programming experience

Evaluation

- Project performance: evaluated by the supervisor
- Result (code): evaluated by the supervisor (preferably in @git.cs.lth.se)
- Presentation during the last week
- Reports (to be filed in not later than 9th June, Friday).

End of the admin stuff

Questions? Comments?

Next: presentations of project proposals by potential supervisors.

Project proposal (Sverker S)

Investigating Whether Women are Perceived to have More Power than Men in Domains that are Viewed as Important in a Global set of Tweets

Previous research of gender differences in power have largely focused on the public domain (e.g., leadership positions), and to a lesser extent power on the private domain (e.g., power in private relations), where people may perceive these domains more or less important in their lives. Using natural language processing, and machine learning, we study gender differences in preference weighted power in different domains by weighting the perceived power with the perceived importance in life in a large set of Twitter messages from the different countries around the world. The hypothesis is that (a) men (tweets including "he") are semantically related to general power and (b) women (tweets including "she") being related to importance in life, which in previous research have been connected to the public and private domain respectively, (c) that women have higher preference-weighted power than men, (d) that effect size of these gender difference difference correlates with gender equality index

Key words: preference weighted power, gender, twitter, private, public, inequalities, cultural differences

Previous related publications:

https://journals.plos.org/plosone/article/authors?id=10.1371/journal.pone.0234961

Sikström, S. & Stille, L. (in press). Women are Perceived to have More Power than Men in Domains that are Viewed as Important in U.S. Tweets. Cyberpsychology, Behavior, and Social Networking.

Project Proposal (AH)

Quantification of functional deficits in preclinical rodent models of neurodegenerative diseases using AI

Parkinson's disease is a neurodegenerative disorder which is characterised by tremor, muscle rigidity, impairments in movement initiation, posture, and balance. The core pathology is caused by a loss of cells in the brain which produce the neurotransmitter dopamine.

Project: Movement tracking in order to quantify behaviour on rodent behavioural tests

Behavioural analysis of preclinical animal models of neurodegenerative diseases are imperative in order to develop and assess novel therapeutic interventions. These tests are quite labour and time intensive. Here we aim to track and score the movement of animals whilst they undergo different behavioural tasks.

Robotics (JM)

- robust calibration of a computer vision setup for picking experiments (opencv, ROS)
- programming a collaborative robot from a tablet (modification and redesign of legacy software!)

Robotic Skill Knowledge Bases (JM)

1. Robot skill knowledge base (secure access, storage of big files, manipulation, plug-in reasoners) using triple store RDF4J (or some other SPARQL-enabled graph database of choice);
2. Graphical robot programming tool;
3. Robot skill representation (SkiROS & co., using some graph database)
4.
5. Geometrical relations in the robot workspace (vocabulary, identification, planning, extraction from CAD files);
6. Reasoning about two-handed manipulation (parcel wrapping);
7. Knowledge base editing/visualisation (RDF4J, JavaScript, ???)
8. Behaviour Trees and Finite State Machines (e.g. Sequential Function Charts)