# Intelligent Systems (DVA439)

https://blackboard.mdh.se

Ning Xiong, Miguel Leon

Course examiner: Ning Xiong

# About Ning Xiong

- Obtained M.Sc from Donghua Uinv. in Shanghai, 1989
- Ph.D from Uni. Kaiserslautern (Germany), 2000
- Guest researcher in FOI and KTH,  2000-2002
- Docent in artificial intelligence, 2010
- Professor in artificial intelligence, 2016

Research directions: fuzzy systems, CBR,
machine learning & big data
evolutionary computation
knowledge and information fusion

# About Miguel Leon

- Master of Science from Univ. Granada in 2013
- Ph.D student at Mälardalen University since Aug. 2013
- Specialized in evolutionary computation algorithms
- Will be involved in supervision of course projects

# General About the Course

- This course aims to offer a foundation of intelligent system techniques and their applications in various real-world domains. Students will acquire foundational knowledge and necessary skills to design and implement a system with “intelligent” functionality.

- Mixed form: lectures, mini-project, project meetings, and seminar

# Content of Lectures

- Lecture 1: Intelligent agents
- Lecture 2: Fuzzy logic control
- Lecture 3: Fuzzy adaptive control
- Lecture 4: Decision analysis under uncertainty
- Lecture 5: Case-based reasoning and its relation to fuzzy reasoning
- Lecture 6: Multi-sensor data and information fusion
- Lecture 7: Evolutionary Multi-objective optimization
- Guest lecture:  Intelligent systems in industry (Dr. Ella Olsson, SAAB)

# Mini-Project in the Course

- The mini-project will take approximately 60% of the course period
- Students have freedom to select project topic and group members
- Opportunity to implement and test your own idea
- Problem-based learning
- Take more responsibility over the learning process
- Learn to define your problem, find a solution and solve it.
- Learn to set up appropriate goal given limited time and resources
- Learn to collaborate in groups
- Weekly project meeting with supervisors

# Seminar

- Seminar (2018.03.15 13:15 --) Project presentation.

Each group must do presentation in 12 minutes followed by 3 minute discussion. The group presentation must be shared by all members. Every student has to attend this seminar.

# Action Plan (Weeks 3-5)

- **Listening to lectures, communication with classmates for projects**

  Every group of project usually consists of 3-5 people

  Every project group has to send their project title and group members (names and email address) to miguel.leonortiz@mdh.se before **21:00 of Feb. 04**

- **Announcing project titles and groups in Blackboard on Feb. 05., together with a Doodle link for booking first project meeting**

  Every group has to select **unoccupied** time slot in doodle for the first project meeting, which is scheduled in week 6.

# Action Plan (Weeks 6-8)

- **Design phase of projects**. During this period students have to search and read relevant papers, decide their goals, methods, and systems more exactly.

Additionally, Lecture 7 (Evolutionary multi-objective optimization) will be given in Week 7 (Febuary 15).

# Course Plan (Weeks 9-10)

**Implementation phase of projects**.

Students have to work very intensively during this period to implement their methods with preliminary results.

# Action Plan (Weeks 11)

**Last phase of projects**

- Students are expected to make demon to supervisor and write project reports during this week.

- Final project results must be presented at a seminar in week 11. Each group presentation has 12 minutes followed by 3 minute discussion. **Each group has to send slides to miguel.leonortiz@mdh.se before 24:00 of March. 14.**

- The final project reports should be handed in to Ning Xiong (ning.Xiong@mdh.se) by **March 31.**

Hard deadline: August 31, 2017

# Project Report

Every group is supposed to write a report with 10-12 pages to present their work. It must cover following parts:

- Abstract
- Introduction
- Related work
- Problem formulation
- Approach and method
- Results and analysis (possibly with suggestion for improvement)
- Conclusion
- References

# Related Work Section

- Each student has to write comments on at least 2-3 relavant papers. It is student's own responsibility to search for and select related papers from the literature.

- Every student has to summarize the relevant paper and then write her/his own reflection.

- Each student has to mark the part of the text written by her/him in the section.

# Examination

The examination of the course consists of written exam and mini-project. The written exam covers the theoretical knowledge studied from the lectures. The following are required to get a full grade of the course

1. Pass the written exam
2. Make good presentations at the seminar
3. Complete mini-project in group
4. Complete and submit final project report.

# Overall Evaluation Criteria

| | Full Points | Minimum Required Points |
|---|---|---|
| Written exam | 40 | 20 |
| Mini-project and report | 40 | 20 |
| **Overall score** | 40 | 20 |

Overall score = 0.4*score of written exam + 0.6*score of project

# Swedish Grade

5: if the overall score lies in the range [34,40] ;

4: if the overall score lies in the range [27, 33] **and** the scores on both parts (exam and project) are not fewer than 20;

3: if the overall score lies in the range [20, 26] **and** the scores on both parts (exam and project) are not fewer than 20.

# ECT Grade

A: if the overall score lies in the range [34, 40]

B: if the overall score lies in the range [27, 33] **and** the scores on both parts (exam and project) are not fewer than 20;

C: if the overall score lies in the range [24, 26] **and** the scores on both parts (exam and project) are not fewer than 20;

D: if the overall score lies in the range [20, 23] **and** the scores on both parts (exam and project) are not fewer than 20;

# Assessing Projects and Reports

| Scoring Criteria | Full Points |
|---|---|
| Innovation and creativity | 5 |
| Technical soundness | 12 |
| Results and analysis | 11 |
| Presentation of report (organization, clarity, language) | 12 |

- The score on presentation can vary among members of the group due to their writing on the relevant work

# Course Literature

- Suggested reference book

Norvig, Peter; Russell, Stuart Jonathan; Artificial intelligence: a modern approach, 3rd ed., Pearson Education, 2010, ISBN: 9780132071482, or a more recent version

- Various papers and articles associated with the lectures
- A lot of reading material in the blackboard
- Each lecture will recommend reference to read on the corresponding topic