

Computational Intelligence in Games (CIG)

Sanaz Mostaghim
Chair of Computational Intelligence

Otto von Guericke University Magdeburg

Lecturers

Course:

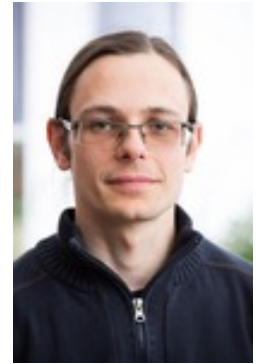


Prof. Dr.-Ing. habil. Sanaz Mostaghim
Chair of Computational Intelligence
Room: G29 – 008
Office hours: on request per email
Email: sanaz.mostaghim@ovgu.de

Research topics:

- Computational Intelligence (CI)
- Evolutionary Algorithms, Multi-Objective Optimization, Decision-Making
- Swarm Intelligence, Collective Decision-Making, Artificial life, CI in computer games
- Swarm Robotics, Evolutionary Robotics

Tutorials:



Dr. Christoph Steup
Chair of Computational Intelligence
Room: G29 – 014
Office hours: on request per email
Email: steup@ovgu.de



Sebastian Mai, M.Sc.
Chair of Computational Intelligence
Room: G29 – 013
Office hours: on request per email
Email: sebastian.mai@ovgu.de

Courses at the chair of Computational Intelligence

In WS:

- Intelligente Systeme, Bachelor (5 CP)
- Swarm Intelligence, Master (6 CP)

In SS:

- Computational Intelligence in Games, Bachelor (5 CP) und Master (+ Extra Work 6 CP)
- Evolutionary Multi-Objective Optimization, Master (6 CP)
- Introduction to Robotics (6 CP) --> Dr. Steup

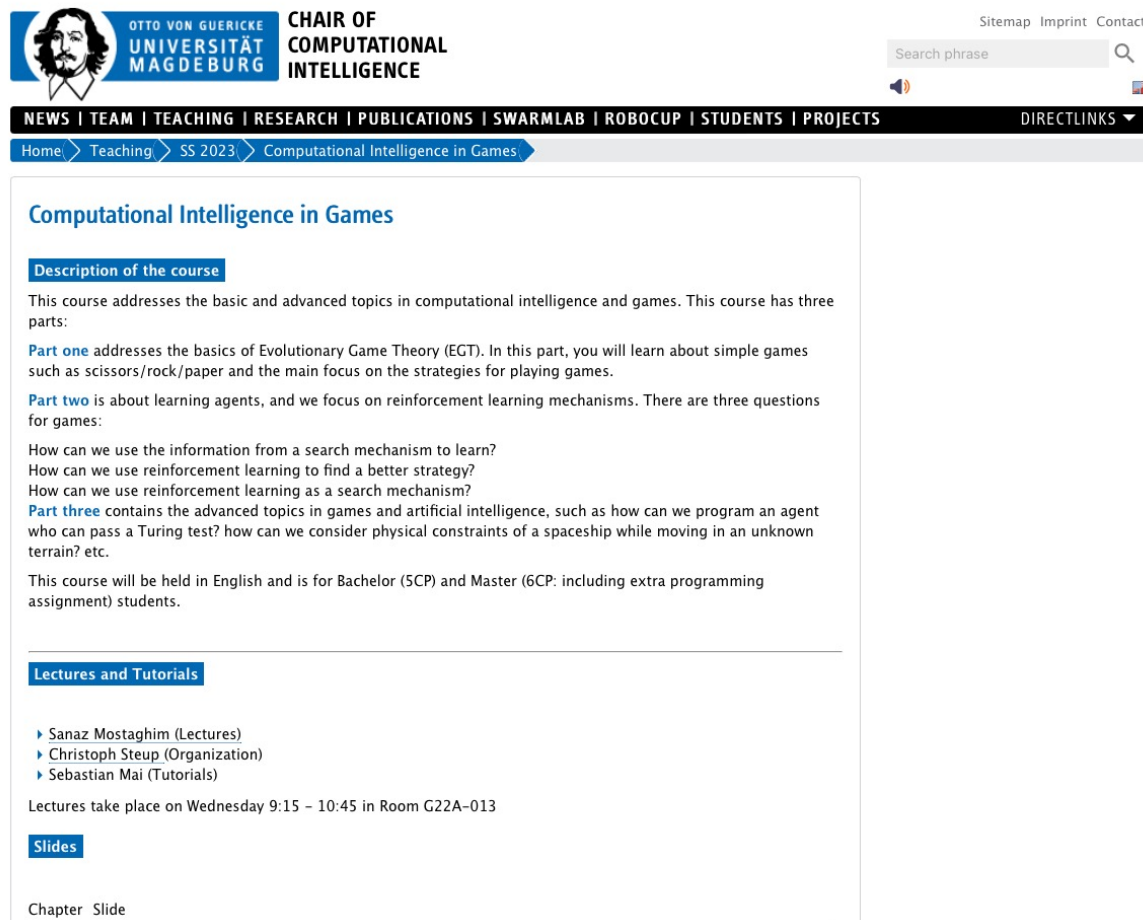
WS und SS:

- Seminar Ethics in Computational Intelligence, B.Sc.
- Team/Software Projects in SwarmLab – Flying Swarm, Rolling Swarm, Driving Swarm

Time and locations of this course

All relevant information about this course are available on the Webpage:

<http://www.ci.ovgu.de/Teaching/>



The screenshot shows the website for the Chair of Computational Intelligence at Otto von Guericke University Magdeburg. The page is titled 'Computational Intelligence in Games' and provides a detailed description of the course, including its parts and lecture/tutorial information.

OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG CHAIR OF COMPUTATIONAL INTELLIGENCE

Sitemap Imprint Contact

Search phrase

NEWS | TEAM | TEACHING | RESEARCH | PUBLICATIONS | SWARMLAB | ROBOCUP | STUDENTS | PROJECTS DIRECTLINKS

Home > Teaching > SS 2023 > Computational Intelligence in Games

Computational Intelligence in Games

Description of the course

This course addresses the basic and advanced topics in computational intelligence and games. This course has three parts:

Part one addresses the basics of Evolutionary Game Theory (EGT). In this part, you will learn about simple games such as scissors/rock/paper and the main focus on the strategies for playing games.

Part two is about learning agents, and we focus on reinforcement learning mechanisms. There are three questions for games:

- How can we use the information from a search mechanism to learn?
- How can we use reinforcement learning to find a better strategy?
- How can we use reinforcement learning as a search mechanism?

Part three contains the advanced topics in games and artificial intelligence, such as how can we program an agent who can pass a Turing test? how can we consider physical constraints of a spaceship while moving in an unknown terrain? etc.

This course will be held in English and is for Bachelor (5CP) and Master (6CP: including extra programming assignment) students.

Lectures and Tutorials

- ▶ Sanaz Mostaghim (Lectures)
- ▶ Christoph Steup (Organization)
- ▶ Sebastian Mai (Tutorials)

Lectures take place on Wednesday 9:15 – 10:45 in Room G22A-013

Slides

Chapter Slide

The course is offered to the students:

Bachelor students - 5 cp

and

- MSc CV, WPF Informatik
- MSc INF, WPF Informatik
- MSc IngINF, WPF Informatik
- MSc WIF, WPF Informatik
- MSc DKE, WPF Applications

→ Master students have to do extra work to get 6 cp

Time and locations of the tutorials

The tutorials will take place each **Tuesday from 17:00 to 18:30** in the lecture hall **G29-307**. The first tutorial is on **April 25**.

There will be **written** and **programming** assignments during the semester, published on the homepage of the course.

Participation in the tutorials consists of:

- Preparing answers to the assignments at home,
- **Submitting them on the Moodle webpage** of the course. Format of the submission is explained on the Moodle submission platform.
- Attending the tutorials

At each tutorial, we may ask you **present your solution for those assignments** that you prepared and submitted. Please note that the file that you submit will be used for your presentation.

Exam requirements

You are allowed to write the exam, only if you submit at least 2/3 of all assignments and the programming competition assignment.

Each student is required to finish a semester programming assignment to participate in the exam Master students will need to finish an extra assignment to qualify for the 6th CP.

In the programming assignment you will apply algorithms from the lecture to an actual research competition game.

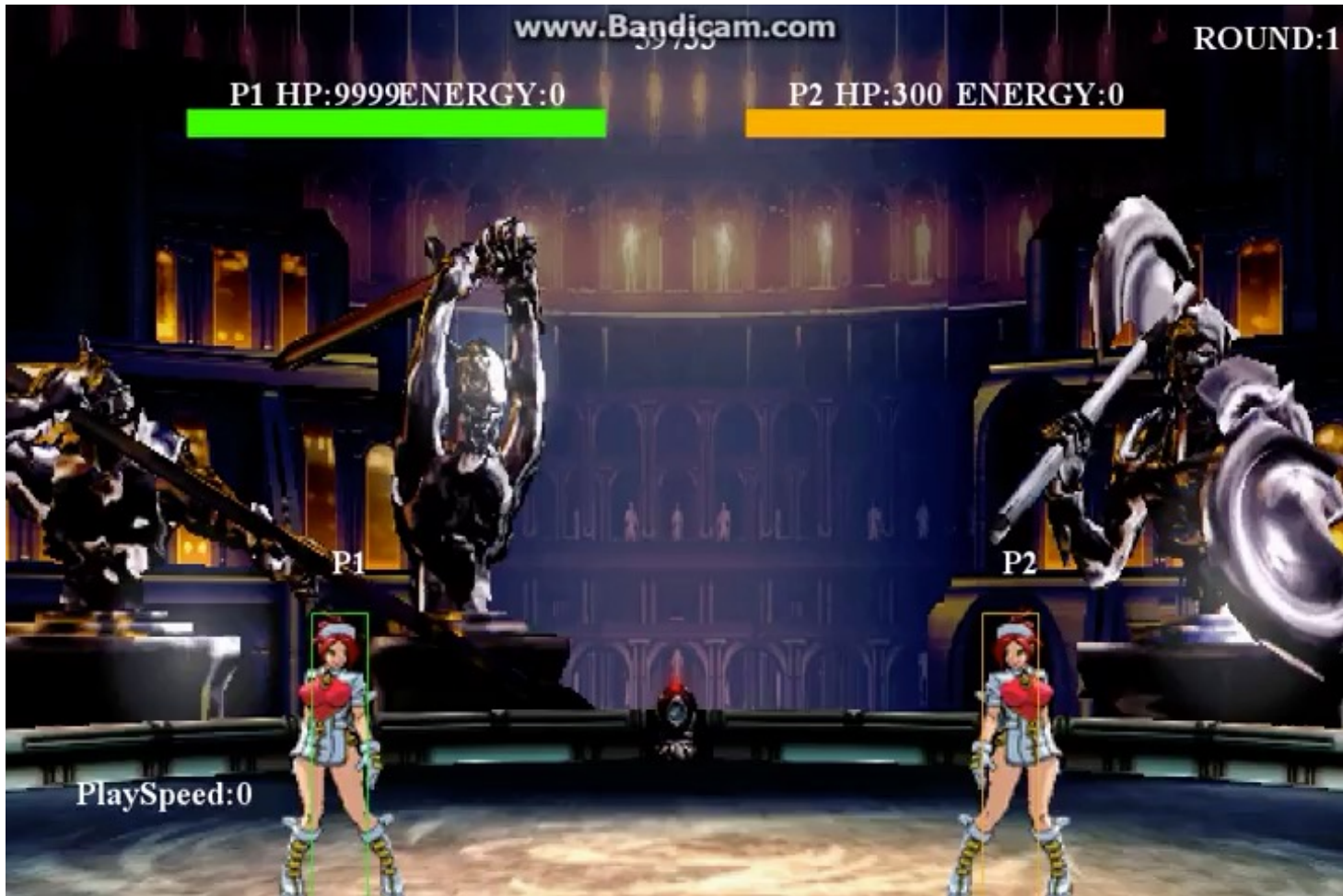
- You can work in groups of 2.
- You need to submit a short report.
- At the end of the lecture we will have an internal competition to determine the best solution. The best participants will have time to shortly describe their algorithm.

Submission deadlines will be announced in the exercise classes.

If you have a certificate of illness from your physician. Please notify us at sebastian.mai@ovgu.de, so we can account for your illness in the calculation. The respective sheet will not count towards the quota needed for taking the exam.

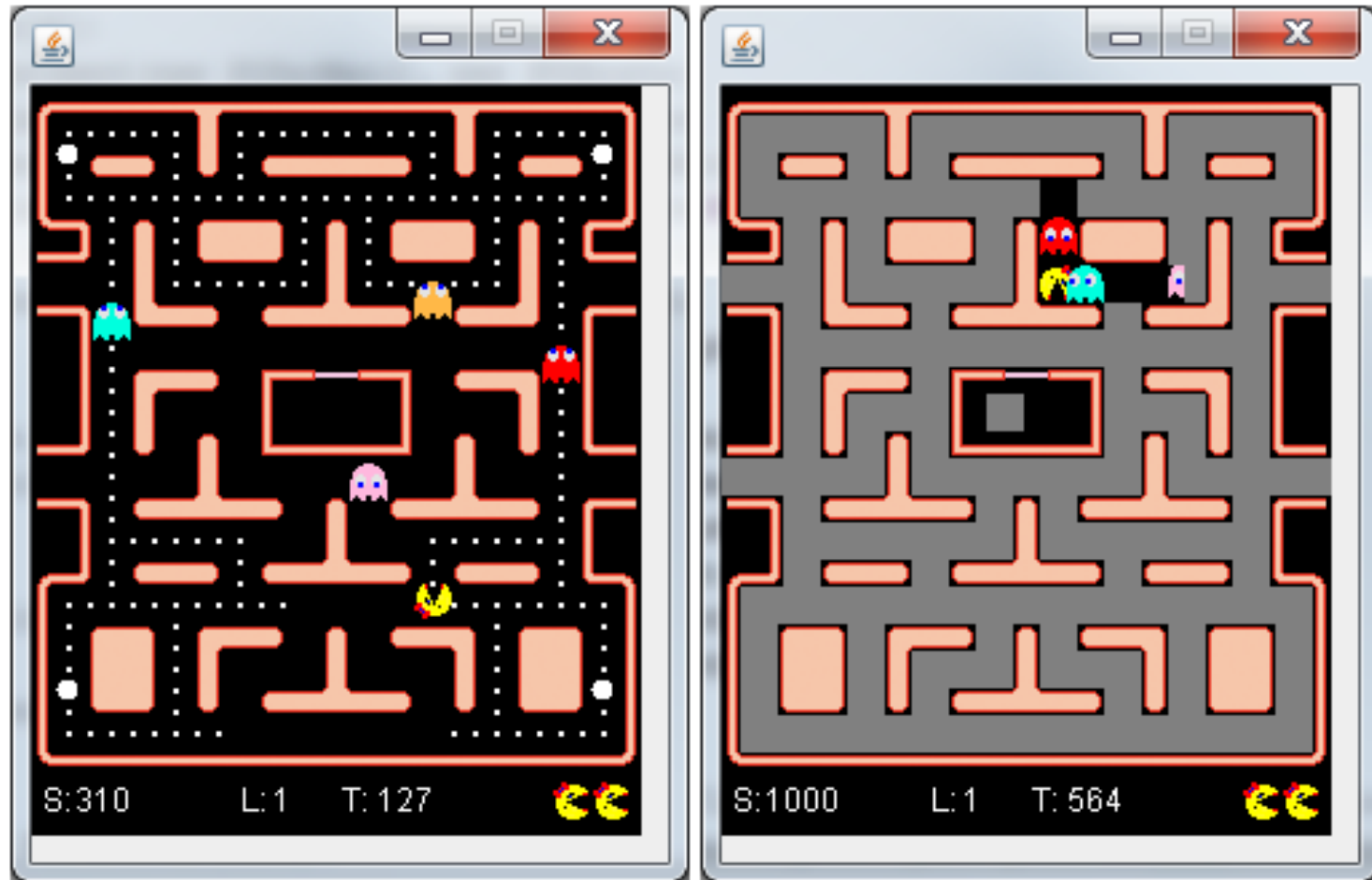
Previous competitions - CIG 2014 & 2015

Fighting Game Competition



Previous competitions - CIG 2016 and 2017

Mrs. Pac-Man Vs. Ghost Team Competition



Previous competitions - CIG 2018, 2019 and 2020

Hearthstone: Heroes of Warcraft



2021 and 2022 competition

Strategy Game: Micro RTS

Player 0 units have a blue outline **Selected unit is highlighted in green**

Player 1 units have a red outline

Barracks: train attack units

Heavy: high power but slow melee unit

Light: low power but fast melee unit. Heavy and Light units are very effective when micromanaged properly. Stay away from these units if you are not familiar with microRTS though.

Ranged: long range attack unit. Try to use this unit, as it is the most effective for human use.

Bases: accumulate resources and train workers

Workers: can harvest minerals and construct buildings

Minerals: harvest them with workers

998

Light Heavy Ranged

Select the unit to train/construct with mouse, or using the highlighted quick key.

This year's competition

Strategy Game: Micro RTS

Player 0 units have a blue outline **Selected unit is highlighted in green**

Barracks: train attack units

Heavy: high power but slow melee unit

Light: low power but fast melee unit. Heavy and Light units are very effective when micromanaged properly. Stay away from these units if you are not familiar with microRTS though.

Ranged: long range attack unit. Try to use this unit, as it is the most effective for human use.

Bases: accumulate resources and train workers

Workers: can harvest minerals and construct buildings

Minerals: harvest them with workers

998

Player 1 units have a red outline

Light Heavy Ranged

Select the unit to train/construct with mouse, or using the highlighted quick key.

Exam

1. During the lecture you will learn the theoretic background of many computational intelligence algorithms.
2. The tutorials will help you to understand how to apply them to a very constrained practical problem.
3. The programming assignment will ask you to apply and adapt the algorithms yourself.

The written exam will test your knowledge. Exam questions will test your understanding of all three previous phases.

- Exam questions will be in English.
- You may answer in English or German.