University of Guilan

Computational Intelligence

Introduction

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Agenda

- Introduction to the course
- Headlines
- Course materials
- Evaluation
- Additional notes

Introduction to the course

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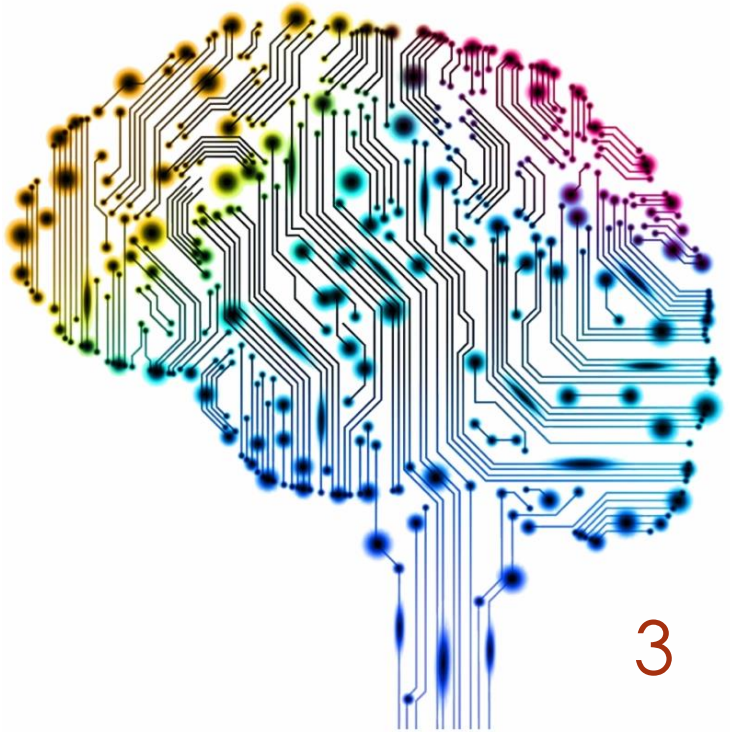
- Fundamentals of Computational Intelligence
  - Computer Science – Artificial Intelligence

- Previous knowledge:
  - Advanced Programming
    - You will need it to work on projects!
  - Artificial Intelligence
  - Algorithm Design (recommended)
  - Machine Learning (recommended)



Introduction to the course

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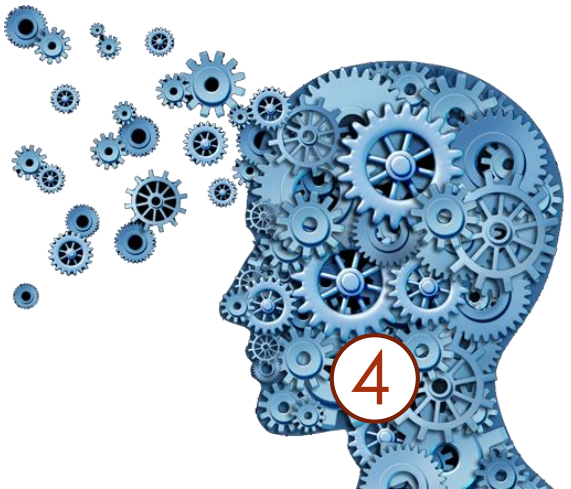
- Learning outcome
  - Being able to evaluate basic Machine Learning (ML) techniques
  - Being able to formulate specific algorithms for a given problem
  - Understanding the theories, methods, and algorithms of ML
  - Being able to apply the most appropriate ML algorithms in various applications
  - Getting familiar with Deep Learning as a great tool



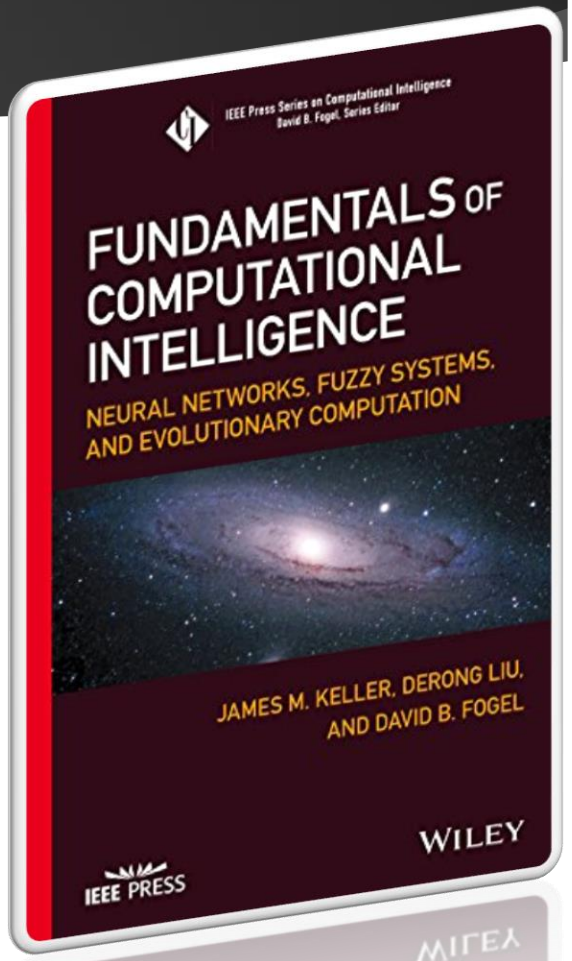
Headlines

- Soft Computing
- Artificial Neural Networks
- Fuzzy Logic
- Evolutionary Computation
- Swarm Intelligence

Course materials

[1] David B. Fogel, Derong Liu, and James M. Keller (2016) “Fundamentals of Computational Intelligence: Neural Networks, Fuzzy Systems, and Evolutionary Computation,” *IEEE Press,* ISBN: 1119214343. See Link

[2] Andries P. Englebrecht (2007) “Computational Intelligence: An Introduction”, ISBN: 978-0-470-03561-0. See Link



Evaluation

- Lecturing methods and activities:
  - Lectures + Homework + Final project

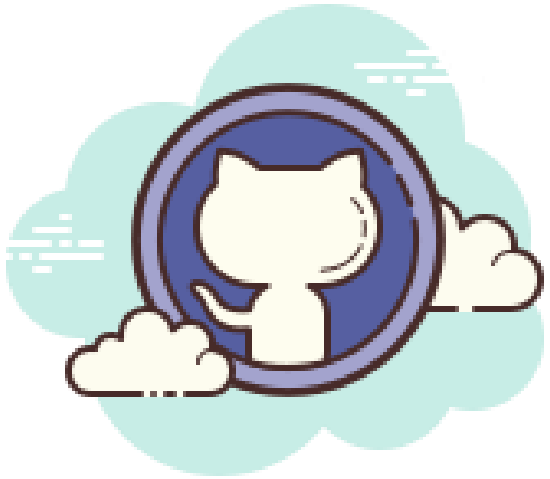
- Final Exam: 6/20
- Homework: 4/20
- Final Project: 10/20

Might change due to COVID-19

Evaluation

- Computational Intelligence final projects (Current Semester)
  - You will need to upload your final projects here

https://github.com/alitourani/computational-intelligence-class-9902



Evaluation

- Computational Intelligence final projects (Fall 2020)

https://github.com/alitourani/computational-intelligence-class-9901

#	Project title	Member(s)
1	Flappy bird game using Genetics Algorithm	960122680012
2	Recurrent Neural Network (RNN)	960122680007, 960122681005
3	Support Vector Machines (SVM)	9712268102, 9612268101, 960122680113
4	Generative Adversarial Networks (GAN)	960122680003, 960122680017, 960122681003
5	Radial Basis Network (RBN)	960122680039, 960122680006, 960122681017
6	Long/Short Term Memory (LSTM)	970122680014
7	Deep Convolutional Network (DCN)	960122680033, 960122680041
8	Liquid State Machine (LSM)	960122680074, 9612268100
9	Deep Residual Network (DRN)	960122681004, 960122681015, 950122680034
10	Inception Architecture for Image Classification	960122680119
11	Self-Organizing Map (SOM)	950122610006

Evaluation

- Computational Intelligence final projects (Spring 2020)

https://github.com/alitourani/computational-intelligence-class-9802

Evaluation

- Computational Intelligence final projects (Fall 2019)

https://github.com/alitourani/computational-intelligence-class-9801

Additional notes

- Download files, slides, chapters, etc. from http://www.alitourani.ir

Computational Intelligence

Lectured at the University of Guilan

- Slide intro – Main concepts and overview
- Slide#1 – An introduction to Computational Intelligence
- Slide#2 – Artificial Neural Networks (ANNs)
- Slide#3 – ANNs architectures, models, and parameters
- Slide#4 – ANNs in practice
- Slide#5 – Deep Neural Networks
- Slide#6 – Fuzzy Basics
- Slide#7 – Fuzzy Calculation and Relations
- Slide#8 – Fuzzy Logic and Inference
- Slide#9 – Fuzzy Controller
- Slide#10 – Evolutionary Computation
- Slide#11 – Genetic Algorithm and Programming
- Slide#12 – Swarm Intelligence

What's Next?

- What is Computational Intelligence?

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Questions?