Neural Networks

Seminar - Week 1

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Microsoft Teams

- Team - “**Neurónové Siete 2024**”
- Channel - “**Prednášky**”

Recommended Courses & Literature

- **Ian Goodfellow**
    - https://www.deeplearningbook.org/
- **Andrew Ng**
    - https://www.coursera.org/specializations/deep-learning

Recommended Courses & Literature

- **PyTorch**
    - https://www.learnpytorch.io/
    - https://pytorch.org/tutorials/
- **TensorFlow**
    - https://www.tensorflow.org/learn
- **We really recommend PyTorch**

Rules

			Min
Semester		60 points	
	Theory	3 points	
	Seminar Assignments	7 points	
	Semestral Projects	35 points	15 points
	Midterm Test	15 points	3 points
Final Exam		40 points	5 points
Total		**100 points**	**56 points**

Week	Lecture	Lecturer	
1	Introduction, Neural Networks, Back-propagation of Errors	IJ	Math !
2	Training, Regularization Techniques, Optimizers	IJ	
3	Convolutional Neural Networks, Conv. Architectures, Siamese Networks	IJ	Math !
4	Application of CNNs, Localization, Detection	IJ	
5	Recurrent Neural Networks, NLP, Attention	IJ	Math !
6	Vision Transformers, Multimodal Models, Foundation Models	TS, MH	
7	Midterm Test, Self-Supervised Pre-Training	IJ	
8	Introduction to Generative Models	IJ	Math !
9	Fun with GANs	IJ	Fun !
10	Diffusion Models	IJ	Math !
11	Interpretability, Explainability of Neural Networks	IJ	
12	NeRF, ChatGPT	TS	Fun !

Week	Seminar		
1	Introduction		
2	Assignment - Activation Functions, MLP, Forward Pass		
3	Assignment - Loss Functions, Derivatives, Back-propagation		
4	Assignment - Optimizers		
5	Consultation 1 - Semestral Project 1		
6	Presentation - Semestral Project 1		
7	Consultation 1 - Semestral Project 2		
8	Consultation 2 - Semestral Project 2		
9	Presentation - Semestral Project 2		
10	Consultation 1 - Semestral Project 3		
11	Consultation 2 - Semestral Project 3		
12	Presentation - Semestral Project 3		

Seminar Assignments

Individual

- Public GitHub
  - https://github.com/vgg-fiit/neural_networks_at_fiit_2024
  - New assignment every week

- Submit into AIS
  - All assignment files compressed into **ZIP archive**

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Formats we do not accept:

RAR, 7Z, LHA, LZH, ZIPX, SIT, SITX, HQX, BIN, GZ, GZIP, TGZ, BZ2, BZIP2, BZ, TAR, ISO, Z, LZMA, ACE, ARJ, ARC, PAK, ZOO, …

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`mrkvicka_assignment1.zip`

Projects

Teams of 2 Students

- Each team has unique assignment
- Optional - Competitive mode
    - Bonus 2 points for the winning team

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    - All assignment files compressed into **ZIP archive**

```
mrkvicka_karfiol_project1.zip
```