

# Jonáš Kulhánek

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## EDUCATION

### Charles University

#### MSC IN ARTIFICIAL INTELLIGENCE

Sep 2019 – Expected Jun 2021

Faculty of Mathematics and Physics

Cum. GPA: 4.00 / 4.00

Major GPA: 4.00 / 4.00

### Czech Technical University

#### BSC IN COMPUTER SCIENCE

Jun 2016 – Jun 2019

Faculty of Electrical Engineering

Summa cum laude

Cum. GPA: 3.64 / 4.00

Major GPA: 3.74 / 4.00

Final exam grade: A

### Sungkyunkwan University

Sep 2017 – Dec 2017

College of Sciences and Engineering

One semester visiting student

Cum. GPA: 4.00 / 4.00

## LINKS

Github:// [jkulhanek](https://jkulhanek)

LinkedIn:// [jonaskulhanek](https://jonaskulhanek)

Google Scholar:// [Jonáš Kulhánek](#)

Research Gate:// [Jonas\\_Kulhanek](#)

## TEACHING

### Introduction to Artificial Intelligence

Teaching assistant | Summer 2020

zero-sum games, MCTS, A\*, CSP, MDP,

EA, planning, knowledge representation

FEL, Czech Technical University

## PROJECTS

### Neural scene representation

CV, TensorFlow 2, PyTorch

Using DNNs to generate 3D

environments from small sets of images

### Deep RL PyTorch

DRL, PyTorch

Library for training DRL agents

[github.com/jkulhanek/deep-rl-pytorch](https://github.com/jkulhanek/deep-rl-pytorch)

### LemmaTag

NLP, TensorFlow 2

Implementation of SoTA lemmatizer and

tagger achieving 98.75% and 96.67%

accuracies respectively on UD Treebank

[github.com/jkulhanek/lemmatag](https://github.com/jkulhanek/lemmatag)

other projects on my webpage

## SELECTED EXPERIENCE

### CIIRC | JUNIOR RESEARCHER

Aug 2020 – Now

- Visual navigation using deep reinforcement learning (DRL)
- Implementing SoTA DRL algorithms including **Rainbow**, **PAAC**, **AlphaZero**
- Publishing an open-source 3D environment simulator to train DRL agents
- Working with **Tomas Mikolov** on cellular automata applied to NLP
- Researching dialogue systems with pre-trained LMs (GPT2, BERT)
- Running large distributed GPU training
- Achieving **3rd place** in the DSTC9 end-to-end multi-domain dialogue task
- **PyTorch**, Slurm, Numpy, ROS, ...

### CTU IN PRAGUE | TEACHING ASSISTANT

Jan 2020 – Jul 2020

- Teaching Introduction to Artificial Intelligence course

### TU DELFT | RESEARCH INTERN

Feb 2019 – Apr 2019

- Visual navigation using deep reinforcement learning (DRL)
- Working under Prof. dr. **Robert Babuska** at 3me
- Publishing open-source DRL PyTorch library
- Evaluating navigation algorithms on real **mobile robots**
- **PyTorch**, TensorFlow, ROS, Numpy, ...

### CENTER FOR MACHINE PERCEPTION | RESEARCH INTERN

Feb 2018 – Jun 2018

- Building object detectors using fully convolutional neural networks
- Implementing RetinaNet, FasterRCNN, MaskNet (SoTA at that time)
- Preparing object detection datasets and data pipelines
- **TensorFlow**, Numpy, OpenCV, ...

complete list at <https://jkulhanek.github.io/#resume>.

## PUBLICATIONS

### Visual Navigation in Real-World Indoor Environments Using End-to-End Deep Reinforcement Learning

Apr 2021

Jonáš Kulhánek and Erik Derner and Robert Babuška,  
Designing DRL agent with auxiliary tasks for real-world navigation. Transferring policy pretrained on custom 3D simulator to the real world.

*published in RA-L 2021*

### Vision-based navigation using Deep Reinforcement Learning

Sep 2019

Jonáš Kulhánek and Erik Derner and Tim de Bruin and Robert Babuška,  
Extending PAAC with auxiliary tasks designed for visual navigation. Evaluating on AI2THOR, House3D, DeepMind Lab environments

*2019 European Conference on Mobile Robots (ECMR), 2019, p.1-8*

### AuGPT: Dialogue with Pre-trained Language Models and Data Augmentation

Feb 2021

Jonáš Kulhánek and Vojtěch Hudeček and Tomáš Někvinďa and Ondřej Dušek,  
Using pre-trained GPT2 with extensive data augmentation.

*submitted to SIGDIAL*