

# 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

Jul 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://www.linkedin.com/in/jonaskulhanek)  
Google Scholar:// [Jonáš Kulhánek](https://scholar.google.com/citations?user=JonášKulhánek)  
Research Gate:// [Jonas\\_Kulhanek](https://www.researchgate.net/profile/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

### Deep RL PyTorch

DRL, PyTorch, gym  
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)

### DMHouse

DRL, Bazel  
An indoor 3D environment simulator for pre-training VN agents  
[github.com/jkulhanek/dmhouse](https://github.com/jkulhanek/dmhouse)

## SELECTED EXPERIENCE

### CIIRC | RESEARCH ASSISTANT

Jul 2019 – 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 on 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, ...

### TU DELFT | RESEARCH ASSISTANT

Jan 2019 – May 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, ...

### VALATRON | BACKEND DEVELOPER

Jun 2018 – Jan 2019

- Designing Node.js API backend and .NET Core backend
- Leading a team of developers
- Working on SPA frontend (React.js)
- Deploying applications built using Azure Functions
- Node.js, .NET Core, Azure Functions, React.js, ...

### CENTER FOR MACHINE PERCEPTION | RESEARCH ASSISTANT

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

Oct 2020

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.  
*submitted to ICRA/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*

### Visual Navigation using Deep Reinforcement Learning

May 2019

Jonáš Kulhánek,  
*Bachelor thesis*