



ALEX SHELDRICK

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SUMMARY

Dual M.Sc. in AI and Physics with two years' research in a leading university AI lab. Comfortable developing end-to-end machine learning pipelines using Python and PyTorch. Passionate about clean and efficient code. Bilingual in German and English and passionate about bringing innovative AI functions to vehicles.

EDUCATION

Master of Science Grade: 1.7 Robotics, Cognition, Intelligence Technical University of Munich	2023
<ul style="list-style-type: none">Robotics, Robot Motion Planning, Advanced Deep Learning for Computer VisionMaster-Seminar: Recent Advances in Perception for Mobile RoboticsPractical Course Deep Learning in Visual Computing	
Bootcamp Grade: 1.0 Datascience with Python Technical University of Berlin	2020
Master of Science Grade: 1.2 Physics Technical University of Berlin	2020

EXPERIENCE

Research Assistant Visual Computing & Artificial Intelligence Group	Apr. 2021 – Mar. 2023 Munich, Germany
<ul style="list-style-type: none">Performed deep learning research for novel view synthesis and 3D reconstructionAchieved 50-90% reduction in images required for photorealistic reconstruction of scenesDerived a novel loss for RGB-D supervision of neural radiance fieldsReconstructed colored meshes of objects and interiors from pointclouds and from single views	

SKILLS

Programming languages: Python, C++, Matlab
Databases: SQL
Frameworks: Jupyter, PyTorch, Lightning, NumPy, SciPy, Matplotlib, Pandas, scikit-learn, OpenCV
Concepts: Machine Learning, Computer Vision, Deep Learning, Data Visualization, Git
Languages: Native / bilingual proficiency in German (C2) and English (C2). Italian (C1)

SELECTED MACHINE-LEARNING & COMPUTER VISION PROJECTS

Neural Radiance Field Reconstruction with Depth and Normal Constraints Python PyTorch Lightning	Spring 2023
<ul style="list-style-type: none">Improved reconstruction quality by 24% in sparse view setting by formulating a novel method leveraging RGB-D sensors for NeRFsRealized a 50-90% training data reduction for photorealistic reconstructions by incorporating depth dataImproved model-training time by 4x compared to the baseline without novel CDF depth supervision	

3D Reconstruction: single-view colored mesh generation

Fall 2021

Python | PyTorch | scikit-learn

- Achieved a 2.7% improvement in IoU and a 464% reduction in Chamfer-L1 distance over contemporary 2D encoder decoder works by utilizing point-to-image plane projections for feature-map sub-selection
- Developed a 3D Convolutional Neural Network integrating both local and global features, producing fully colored meshes from single images by incorporating depth and camera parameters

Object detection using Random Forests

Spring 2020

C++ | OpenCV

- Achieved 95% accuracy in an object detection pipeline targeting three unique classes, by employing Histogram of Oriented Gradients for feature extraction and random forests for window classification
- Attained a combined 83% recall at 86% accuracy by incorporating selective search for region proposals (intersection over max area) and refining results with Non-Maximum Suppression for bounding boxes

ACHIEVEMENTS AND GRANTS

Fellowship Grant

Apr. 2021

Awarded to excellent Master's students to perform independent research in Visual Computing & AI

WoW Arena World Champion (Arena World Championship)

Nov. 2017

Founded and led an esports team to victory in a premier tournament with a \$280,000 prize pool

PUBLICATIONS

Nieto, P., Müller, D., Sheldrick, A., Günther, A., Miyazaki, M., & Dopfer, O. (2018). Effect of alkali ions on optical properties of flavins: Vibronic spectra of cryogenic m+lumichrome ions (m = li-cs) in the gas phase. *Phys. Chem. Chem. Phys.*, 20, 22148–22158. doi:10.1039/C8CP03950J

Sheldrick, A., Müller, D., Günther, A., Nieto, P., & Dopfer, O. (2018). Optical spectroscopy of isolated flavins: Photodissociation of protonated lumichrome. *Phys. Chem. Chem. Phys.*, 20, 7407–7414. doi:10.1039/C8CP00590G

Günther, A., Nieto, P., Müller, D., Sheldrick, A., Gerlich, D., & Dopfer, O. (2017). Berlintrap: A new cryogenic 22-pole ion trap spectrometer. *Journal of Molecular Spectroscopy*, 332, 8–15. *Molecular Spectroscopy in Traps*. doi:https://doi.org/10.1016/j.jms.2016.08.017