Tobias **Brandner**

MSc Computer Science · Specialization in Artificial Intelligence

Semmelstraße 9, 97070 Würzburg, Bayern - Deutschland

(+49) 179 829 8854 | tobias.brandner@gmx.de | brandnerkasper.github.io | BrandnerKasper | tobias-brandner

"There is a difference between forgetting something and never having learned it." - Dr. Frederic P. Schuller

Education

MSc in Computer Science - Specialization in Artificial Intelligence

Grade 1.5

Julius-Maximilian-University Würzburg — *Apr. 2021 - Sep. 2024*

- Focused on data processing and machine learning, specialized in the field of computer vision.
- Thesis topic: Real-Time Rendering Super Resolution with Unreal Engine 5
- Notable Courses: Computational geometry, Machine learning for NLP, Programming with neural nets

BSc in Games Engineering

Grade 1.8

Julius-Maximilian-University Würzburg — *Oct. 2017 - Sep. 2021*

- Focused on of math, algorithms/datastructures and programming for real-time interactive systems.
- Thesis topic: Crowdsourced Help Facility Design and Management for Authoring Platforms
- Notable Courses: Algorithms and datastructures, Software technology, Logic for informatics

Physics studies

No degree

Friedrich Alexander University Erlangen — *Oct. 2013 - Mar. 2017*

Abitur

Grade 2.7

Werner-von-Siemens-Gymnasium Weissenburg i. Bay. — *Sep. 2005 - Jul. 2013*

Experience

Research Assistant - C# Developer

Würzburg, Bayern

Julius-Maximilian-University — *Nov. 2021 - Aug. 2023*

- Worked part-time on a de-serializer for 3D scene data (json) to import scenes from the Mozilla Spoke editor into the Unity editor.
- Ensured that the behavior of the scene objects is mimicked correctly, e.g. lights influence the scene as desired.
- Encapsulated this functionality in modules (implemented in C#) to remove the dependency once the scene is converted.

Teaching Assistant - C++ Developer

Würzburg, Bayern

Julius-Maximilian-University — *Aug. 2020 - Aug. 2023*

- Taught a course part-time about building game engines in C++ with CMake, including rendering (OpenGL), input, asset management and physics.
- Extended the existing C++ code base (Gitlab) with additional lessons, adding and maintaining documentation (Markdown).
- Supported students on their own code projects.

Internship - C# Developer

Würzburg, Bayern

Gentle Troll Entertainment GmbH — *Apr. 2020 - Jun. 2020*

- Worked together with an agile team on a serious game teaching children about sport management developed with Unity.
- Programmed game play logic in C#.

Projects

Neural Rendering - Unreal Real-Time Rendering Super Resolution

Computer Vision, Pytorch, Python, Unreal Engine 5 — *Jan. 2024 - Sep. 2024*

- Developed a neural network to increase the resolution (1080p to 4k) as well as mitigating artefacts (e.g. aliasing) of rendered frames in real-time.
- Generated and labeled a new dataset (around 500GB) using Unreal Engine 5, containing different animated 3d-person characters traversing four different high fidelity environments.
- Designed and iterated on the neural network architecture (CNN, U-Net and ViT) in Pytorch (Python).
- Compared results to other implemented SOTA methods on image quality metrics (PSNR, SSIM and LPIPS), VRAM usage and inference speed.

Abyssal Engima - Dive In Edition (VR)

Virtual Reality, Unreal Engine 5 — *May 2023 - Nov. 2023*

- Collaborated on a first person deep sea exploration game made in Unreal Engine 5 in a team of 6 people, including writer, designer and artists.
- Implemented the first person controller, including animations, particle/audio effects and in-game cinematic.
- Ported the game to Virtual Reality (VR), incorporating anti-motion sickness techniques, e.g. virtual nose.

Multi Language Image Classification

Computer Vision, Pytorch, Python — *Apr. 2023 - Sep. 2023*

- Modified existing vision-language classification models to explore them in a multi-lingual context.
- Extended a Python/Pytorch code base with other open-source pre-trained vision-language models (Roberta-ViT-B32) and few-shot trained them on Caltech101 dataset.
- Analyzed the results to increase the models accuracy on more difficult multi-lingual tasks.

Exploring Game Flow - Boss'n'Run

Unreal Engine 5, C++, Python, Matplotlib, Pandas — *Sep. 2022 - Jun. 2023*

- Build a 3D Jump'n'Run prototype with two colleagues in Unreal Engine 5, where the level layout is procedurally generated based on the movement parameters of the player character.
- Designed, animated and rigged the player character (Blender) and implemented multiple different movement mechanics, e.g. climbing.
- Collected movement data from different 3D jump'n'runs, e.g. Super Mario 64, and analyzed the data in 3D plots (Matplotlib & Python).
- Presented this work at the Conference of Games (CoG) in Milan - 2024.

Publications

Analysis and Generation of Flow in 3D Jump'n'Run Games

Tobias Brandner, Marc Mussmann and Sebastian von Mammen — *IEEE CoG - 2024*

Investigating Crowdsourced Help Facilities for Enhancing User Guidance

Sooraj Babu, Tobias Brandner, Samuel Truman and Sebastian von Mammen — *IMET - 2023*

Skills

Programming	Python, C++, C#, Java, Rust
Frameworks	Pytorch, OpenCV, Matplotlib, Pandas, OpenGL
Game Engines	Unreal, Unity, Godot
Tools	Git, CMake, Blender
Languages	German (fluent), English (proficient)
Competencies	Curious, Consistent, Creative, Friendly, Patient

Honorable Mentions

2024	**Speaker**, IEEE Conference of Games	*Milan*
2024	**Collaborator of the winning team**, Healtcare Hackathon	*Würzburg*
2024	**Listener**, GodotCon	*Berlin*