Updated: 06/08/2024

Bernard Spiegl

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I am an enthusiastic, curious and adept engineer with an interdisciplinary background, currently working at the intersection of deep learning and neuroscience with prior experiences in audio and language. To this end, my goal is the development of new tools and solutions by intertwining both domain-specific and interdisciplinary knowledge.

Education

Master of Science - Signal Processing and Data Science *with honours* | Aalto University | Helsinki, Finland **2021 — 2023**
minors in ***Human Neuroscience and Technology; Acoustics and Audio Technology***
- Thesis: Palette View Synthesis - Novel View Synthesis using Diffusion Probabilistic Modelling
- Advisors: Stéphane Deny and Alexander Ilin

Bachelor of Science - Computer Science | University of Zagreb | Zagreb, Croatia **2018 — 2021**
- Thesis: Contrastive Learning for Image-to-Image Translation
- Advisor: Siniša Šegvić

Professional Experience

Researcher | Aalto University | Helsinki, Finland **OCT 2023 — PRESENT**
- Released proof-of-concept diffusion-based method for novel view synthesis, ViewFusion, as a part of Prof. Stéphane Deny's BRAIN lab. Currently working on upscaling our method to 1.5TB dataset using LUMI supercomputer.

Teaching Assistant (CS-E4890 - Deep Learning course, Prof. Alexander Ilin) | Aalto University | Helsinki, Finland **2023; 2024**
- Coordinated weekly TA sessions for over 400 enrolled students.
- Introduced experimental flipped classroom paper reading sessions for enthusiastic students.

Research Assistant | Aalto University | Helsinki, Finland **APR 2022 — JUN 2022**
- Implemented a deep neural network architecture that combines VQ-VAE to compress the audio and an autoregressive transformer producing latent responses, in an endeavor to simulate musical call and response interaction while providing interpretability.
- Part of a research project on usage of AI in music and creative processes coordinated by Koray Tahiroğlu in collaboration with Google Brain (Magenta Team). - [project page]

Data Scientist Intern | RealNetworks Inc. | Zagreb, Croatia **JUL 2021 — AUG 2021**
- Researched and tested deep learning architectures (CNNs, transformers, etc.) for speech classification in order to enable real-time robocall detection for the US telecommunications carriers.

Software Engineering Intern | Koncar – Electrical Industry Inc. | Zagreb, Croatia **JUL 2019; JUL 2020 — AUG 2020**
- Developed a GUI client for real-time network communication via Modbus protocol. - [code]
- Developed a real-time communication and data management web application for SCADA based wind turbine systems.

Undergraduate Teaching Assistant | University of Zagreb | Zagreb, Croatia **FEB 2019 — JUL 2019**
- Assisted students during laboratory exercises in Fundamentals of Electrical Engineering.

Publications

ViewFusion: Learning Composable Diffusion Models for Novel View Synthesis | under review - [PDF] [code] **FEB 2024**
Bernard Spiegl*, Andrea Perin, Stéphane Deny, Alexander Ilin*

Contrastive Unpaired Translation using Focal Loss for Patch Classification | preprint - [PDF] **SEP 2021**
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Achievements

HIIT Funding	Received 15,000€ MSc thesis funding from Institute for Information Technology.	**2023**
Dean's Incentive Scholarship	Received a scholarship awarded by Aalto University for good academic progress.	**2022**
STEM Scholarship	Received a scholarship for being among the top 5% students on matriculation exam in fields of Mathematics and Physics.	**2018**

Leadership

Head of Maintenance & Skipper | Teekkaripurjehtijat ry | Helsinki, Finland **2023 — 2024**
- Managing a sustainable electric sailboat refurbishment project valued at over 20,000€ in a student sailing club. Secured 4,500€ in external project funding thus far.

Ambassador | United Nations Office on Drugs and Crime | Vienna, Austria **MAR 2018**
- Represented Croatia at an international youth forum, organised by the UNODC in the margins of 61st session of the Commission on Narcotic Drugs, delivering a statement to the policy making body and giving an interview. - [link]

Skills and Interests

Languages	Fully proficient in Python (NumPy, PyTorch, TensorFlow, Pandas, matplotlib, scikit-learn, asyncio); intermediate in C/C++, SQL, R, MATLAB, Java, bash; working knowledge of web stack (JS, HTML, CSS)
Technologies	Git, Slurm, Cluster Computing (Distributed Training, Dataset Sharding, etc.)
Professional Interests	Deep Learning, Computer Vision, Neuroscience
Personal Interests	Sailing, Music Production and Sound Design, Guitar and Piano Playing
Natural Languages	Croatian (native), English (fluent), German (limited), Italian (limited), Finnish (basic)