

Amr Kayid

RESEARCH ENGINEER · COMPUTER SCIENCE *Engineering* STUDENT · AI RESEARCHER

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Education

Technical University of Munich

Munich, Germany

M.Sc. IN COMPUTER SCIENCE AND ENGINEERING | INCOMING M.Sc. STUDENT & RESEARCH ASSISTANT

Winter 2020 – Fall 2022

- Research Interests: **multi-agent** reinforcement learning, multitask & meta learning, autonomous systems, and federated learning

VISITING RESEARCHER & BACHELOR PROJECT STUDENT | SUPERVISOR: PROF. DR.-ING. ALOIS KNOLL

Mar. 2019 – Sep. 2019

- Worked on my Bachelor Thesis and Project in the area of **Parallel & Distributed Deep Reinforcement Learning**
- Focus on building, testing and experimenting with new environments and simulations for **distributed reinforcement learning** agents
- The project was associated with **Human Brain Project** Organization and **Neurobotics Platform**
- Joined multiple events and hackathons including HackRoboy with amazing Roboy Team

German University in Cairo

Cairo, Egypt

B.Sc. IN COMPUTER SCIENCE AND ENGINEERING

Fall 2015 – Spring 2020

- Undergraduate Coursework:** Data Structures and Algorithms, Theory of Computation, Artificial Intelligence, Software Engineering
- Undergraduate Researcher:** Member at **Affective Computing** Research Cluster, worked on Facial Emotion and Speech Recognition
- Independent Coursework:** Advanced DL & RL (**DeepMind**), Meta Learning (**Stanford**), Practical Deep Learning (**fast.ai**)
- References:** Prof. Mervat Abuelkheir, Prof. Yasser Hegazy, Dr. Amr ElMougy, & Prof. Dr. Slim Abdennadher

Research & Work Experience

FOR.ai

Oxford, UK

MACHINE LEARNING RESEARCHER | ADVISORS: **AIDAN GOMEZ** (OXFORD/GOOGLE BRAIN) & **BRYAN LI** (EDINBURGH UNI.)

Oct. 2019 – Present

- Working with a team of scientists and engineers from **Google Brain, Oxford University, and Vector Institute** on **Advanced A.I.** topics.
- Collaborating with **OATML Oxford Research Group** on autonomous driving and Bayesian deep learning.
- Building **OATomobile** A research framework for autonomous driving for doing novel research.
- Experimenting with **CARLA simulator** for novel research in RL and autonomous driving with Uncertainty-Aware Policy Distillation.
- Upgraded algorithms of **for-ai/rl** library to Tensorflow 2 and working on a PyTorch codebase with more advanced RL algorithms.
- Researching curriculum learning, hierarchical reinforcement learning, self driving cars, and neural network optimization.

Manifold Computing

California, US

REINFORCEMENT LEARNING LEAD

Mar. 2020 – Present

- Open Research Collaboration in the theory and applications of Learning Systems, building the Infrastructure for Intelligence.
- Collaborating with research scientists from **Harvard, UCL, CMU, OpenAI** and Facebook.
- Designing better multimodal meta learning algorithms for robotics and reinforcement learning research
- Research on Creating, Managing, and Understanding Large, Sparse, Multitask Neural Networks
- Working on new algorithms for Neural Architecture Search with Differential Privacy.
- Applying multi-agent reinforcement learning and genetic algorithms for Autonomous Distributed Satellite Coordination.

OpenMined

Oxford, UK

RESEARCH ENGINEER | UCSF FELLOW & INFRA LEAD | ADVISORS: **ANDREW TRASK** (OXFORD/DEEPMIND) & **HARSH SIKKA** (HARVARD)

Jan. 2020 – Present

- Leading the Infrastructure team for multiple cloud deployment of **PyGrid Platform** providing Peer-to-peer Decentralized Data Science.
- Working on dynamic federated learning and data-centric federated learning as one of UCSF Senior Fellowship Recipient
- Built a multi-language library for translating commands between PyTorch, TensorFlow, and TensorFlow.js (**threepio**)
- Researching on multimodal and multitask learning, neural architecture search, and federated reinforcement learning (CampX)

Nodogoro

San Francisco, US

MACHINE LEARNING ENGINEER | ADVISOR: **JOHN CHIRIKJIAN** (YALE UNIVERSITY)

Apr. 2020 – Oct. 2020

- Creating artistic robot that can draw incredible portrait paintings with neural style transfer and StyleGANs.
- Developed automated pipeline for image modification & enhancement methods using generative adversarial networks.
- Helped with creating simulated environments for the robotic arm and training them with reinforcement learning algorithms.
- Designed a distributed pipeline system for integrating the software and hardware parts of the robots

Publications

Multimodal Modular Meta Learning

2020 HARSHVARDHAN SIKKA, ATHARVA TENDLE, **AMR KAYID**

NeurIPS 2020

Neural Information Processing Systems The Pre-registration Experiment (**NeurIPS'20** Workshop)

Investigating Learning in Deep Neural Networks using Layer-Wise Weight Change

2020 AYUSH MANISH AGRAWAL, ATHARVA TENDLE, HARSHVARDHAN SIKKA, SAHIB SINGH, **AMR KAYID**

arXiv

Neural Information Processing Systems (New In ML Workshop @ **NeurIPS'20**)

Projects

OATML/OATomobile [↗](#)

Research - Team of 7

AUTONOMOUS DRIVING

Jun. 2020 - Present

- OATomobile is a library for autonomous driving research, providing SoTA implementation and strong baseline for doing novel research.
- Building a modularized framework for developing strong agents for CARLA with simple APIs similar to OpenAI Gym and RL Research.
- Integrated Ray Tune & Weights and Biases for experiments tracking and hyperparameter optimization.
- Implementing **self-supervision** methods for vision modules and sequence modeling.

AmrMKayid/NAM [↗](#)

Google Research Project

INTERPRETABILITY, EXPLAINABILITY IN DEEP LEARNING

Nov. 2020 - Present

- NAM is a library for generalized additive models research implemented in PyTorch
- Neural Additive Models (NAMs) combine some of the expressivity of DNNs with the inherent intelligibility of generalized additive models.
- Implemented modularized library for nam research working with GEOFFREY HINTON's student NICK FROSST (**Google Brain**)

OpenMined/PyGrid [↗](#)

Fellowship - Team of 9

INFRASTRUCTURE & FEDERATED LEARNING

Jul. 2020 - Present

- Leading the infrastructure team and working on deploying PyGrid on multiple cloud providers for both serverfull and serverless deployment.
- Built CLI for the infrastructure and deployment on cloud providers along with Grid Admin Panel.
- Testing and improving the platform on multiple cloud providers including GCP, AWS & Azure.

FOR.ai/RL [↗](#)

Research - Team of +10

REINFORCEMENT LEARNING | TENSORFLOW 2.0 | PYTORCH | OPENAI GYM

Oct. 2019 - Present

- Building Modular codebase for reinforcement learning models training, testing and visualization in Tensorflow 2.0 & PyTorch.
- Implementing SoTA RL algorithms (DQN, Vanilla Policy Gradient, DDPG, PPO, TD3, SAC)
- Working on supporting multiple RL environments (Procgen, Unity MLAgents)

KayPruning [↗](#)

Personal

NEURAL NETWORK OPTIMIZATION | PRUNING NEURAL NETWORKS IN TENSORFLOW 2

Oct. 2019

- I have built a modularized library for neural network pruning making neural networks **smaller and faster**
- The library follows *tensorflow best practices*, with customization and also used Keras APIs to integrate it with the project.
- The supported pruning methods are **weight and unit** pruning and can be extended easily to support more types of pruning and models.

Wheelchair Waiter [↗](#)

Team of 4

VR PROJECT | DAAD's GSG HACKATHON | 1st Place Winners

Jul. 2018

- VR App for job simulation and body swapping to experience and feel the difficulties that face disabled people
- The project was done in **Germany** @ University of Duisburg-Essen sponsored by DAAD
- implemented using Unity, VRTK and Oculus Rift.

MoodyAlexa [↗](#)

Team of 4

MACHINE LEARNING PROJECT | AMAZON HACKATHON

Mar. 2018

- Emotional Recommendation System that suggests recommendation to make user's mood better
- The System analyzes user's emotion through a camera, chatting and their social accounts posts

Nawwar [↗](#)

Team of 20

SOFTWARE ENGINEERING PROJECT | BEST Scrum Master & BEST TEAM

Mar. 2018 - May. 2018

- Educational Collaborative Platform for people doing homeschooling to find the best resources and share their knowledge.
- Worked on Authentication & Authorization System, implemented viewing other people profiles along with continuous integration

Skills

Languages Python, Java, Go, C/C++, bash, Javascript, Swift, Prolog, Haskell

Technologies TensorFlow; Jax; OpenAI Gym; Keras; PyTorch; CUDA; **Git; Vim; Docker; AWS;** Node.JS; Angular; SQL; MongoDB;

Interests Deep Reinforcement Learning, Meta Learning, Bayesian Deep Learning, Conversational AI, Virtual Augmented Reality

Honours & Awards

2021	Mediterranean Machine Learning Summer School , Undergraduate Participant	Virtual, Italy
2020	Google DeepMind EEML Summer School , Undergraduate Participant	Virtual, Poland
2020	OpenMined , OpenMined-UCSF Dynamic Federated Learning Senior Fellowship Recipient	Oxford, UK
2019	Hack Roboy Hackathon , <i>Roboy Imitator</i> Emotion and Voice Imitation & Telepathy	TUM, Germany
2018	DAAD's Geek for Social Good Hackathon , <i>WhyPhi? Team</i>	UDE, Germany
2019	GUCBrain , Reinforcement Learning Group Leader and Head Instructor	GUC, Egypt
2018	Amazon Innovation Hackathon , <i>MoodyAlexa Team</i>	AUC, Egypt
2018	Software Engineering Course , <i>Best Scrum Master & Best Team</i>	GUC, Egypt
2016	Junior Teaching Assistant , <i>Assist in Introduction to Computer Science I & II Courses</i>	GUC, Egypt
2015	Awarded Partial Scholarship for academic excellence , <i>German University in Cairo</i>	GUC, Egypt