Ahmad Rahimi

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RESEARCH
INTERESTS
- ⋄ Trajectory Prediction
- ⋄ Video Generation and World Modelling
- ⋄ Autonomous Vehicles

EDUCATION
- ⋄ **Ph.D. Degree in Computer Science** Sept. 2022 – present
  Department of Computer Science Supervisor: Alexandre Alahi
  Ecole Polythechnique Federal Lausanne (EPFL), Lausanne, Switzerland

- ⋄ **B.Sc Degree in Computer Science** Sept. 2018 – 2022
  Department of Mathematical Sciences **GPA: 3.94/4 (18.88/20)**
  Sharif. University of Technology, Tehran, Iran

PUBLICATIONS
- ⋄ **"GEM: A Generalizable Ego-vision Multimodal World Model for Fine-Grained Ego-Motion, Object Dynamics, and Scene Composition Control"**,
  Mariam Hassan*, Sebastian Stapf*, **Ahmad Rahimi***, and 17 more authors.
  We propose a generalizable ego-vision multimodal world model, GEM, that learns to predict future frames of egocentric driving videos, compromising various control signals. We build on pre-trained stable video diffusion model, adding a number of new features to incorporate controlability to the model and unleash long-term generation capabilities. The manuscript is under review at (**CVPR 2025**), link to arxiv.

- ⋄ **"A Multi-Loss Strategy for Vehicle Trajectory Prediction: Combining Off-Road, Diversity, and Directional Consistency Losses"**,
  Ahmad Rahimi and Alexandre Alahi.
  Traditionally, trajectory prediction models are trained using minADE losses, which only penalize the prediction closest to the ground truth. This sparsification of the loss function slows down model convergence and may lead to suboptimal predictions for less trained prediction heads. In this work, we propose a multi-loss strategy that combines off-road, diversity, and directional consistency losses which act on all prediction modes and improve the performance of trajectory prediction models. Currently in review at (**ICRA 2025**). link to arxiv.

- ⋄ **"Sim-to-Real Causal Transfer: A Metric Learning Approach to Causally-Aware Interaction Representations"**,
  Ahmad Rahimi*, Po-Chien Luan*, Yuejiang Liu*, Frano Rajič, and Alexandre Alahi.
  We investigate causal understanding in the context of multi-agent interaction prediction, where removing noncausal agents from the scene should not change model's prediction. We show modern prediction models are able to identify non-causal agents in the scene, but fail to properly model causal agent removals. We propose a metric learning approach to learn causally-aware interaction representations, which we show lead to better generalizability and robustness for out-of-distribution (OOD) and low-data regime scenarios. Currently under review at (**CVPR 2025**), link to arxiv.

- ⋄ **"Vehicle trajectory prediction works, but not everywhere"**,
  Mohammadhossein Bahari*, Saeed Saadatnejad*, **Ahmad Rahimi**, Mohammad Shahverdi Kondori, Seyed-Mohsen Moosavi-Dezfooli, Alexandre Alahi.
  We show that current trajectory prediction models fail to fully understand scene structure, where naturalistic perturbations in the scene, like introducing turns, can significantly affect the prediction quality of the model. We propose a scene attack method to evaluate the robustness of trajectory prediction models against such perturbations, and further show improvements of the models when trained with these adversarial examples. (**CVPR 2022**), link to arxiv.

HONORS AND AWARDS	⬦ **Third Place in LLM Hackathon at EPFL** — Apr. 2024 a 2 days hackathon on improving LLM architectures like GPT 2 and Llama 2 held at EPFL. ⬦ **Bronze Medal** — Sept. 2017 in the Iranian National Olympiad in Informatics (INOI). ⬦ **Ranked Second in !Optimizer Contest** — Sept. 2021 a nation-wide scientific contest in optimization held in Sharif University of Technology ⬦ **Ranked Third in Webelopers Contest** — Nov. 2019 a contest for web developers in Django among students in Sharif University of Technology ⬦ **Ranked 403** — Sept. 2018 in the nationwide universities entrance exam among more than 200,000 participants in Iran (placed in top 0.2% of the participants)

TEACHING EXPERIENCE

⬦ **Teaching Assistant**
Ecole Polytechnique Federal Lausanne (EPFL)

- · Deep Learning for Autonomous Vehicles   Spring 2023 Instructor: Prof. A. Alahi
- · Introduction to Programming   Fall 2023 Instructor: Dr. J. Sam
- · Deep Learning for Autonomous Vehicles   Spring 2024 Instructor: Prof. A. Alahi

⬦ **Teaching Assistant**
Sharif University of Technology

- · Principles of Computer Vision   Spring 2021 Instructor: Dr. M. Kamali
- · Principles of Image Processing   Fall 2020 Instructor: Dr. M. Kamali
- · Combinatorial Optimization   Spring 2021 Instructor: Mr. M. Alimi
- · Fundamentals of Probability   Spring 2020 Instructor: Dr. O. Mirsadeghi
- · Advanced programming   Spring 2020 Instructor: Mr. H. Boomari
- · Fundamentals of programming   Fall 2019 Instructor: Dr. A. Zarei

⬦ **Teaching Experience**
Olympiad in Informatics Teacher at Allameh Helli 10 (June 2018 - Sept. 2018)

- · Algorithm Design and Data Structures

OTHER VOLUNTEER ACTIVITIES

⬦ **Head of Iranian's student Association** — Aug. 2023
at EPFL where we organize cultural and scientific events such as our new year's eve with over 250 participants.

⬦ **Head of Students Scientific Association** — June 2019
in Department of Mathematical Sciences in Sharif University of Technology, named Hamband.

⬦ **Co-Organized Sharif Mathematical Sciences Summer School** — Aug. 2019
for 80 high-school students in which we taught the following fields in mathematics and computer science: Game Theory, Cryptography, Topology, and Geometry Drawings.

⬦ **Co-Organized Code Knock 3** — Jan. 2020
I co-organized a programming contest in Java for students in Sharif University of Technology.

SKILLS

⬦ **Deep Learning**: PyTorch (expert), TensorFlow (experienced), NumPy (expert)

⬦ **Programming Languages**: Python (expert), Java (experienced), C++ (experienced)

⬦ **Document Preparation**: LaTeX(expert), Office (expert)

⬦ **Tools**: Git (expert), Docker (experienced), WandB (expert)

LANGUAGES

⬦ Persian (native)

⬦ English (fluent, TOEFL:[Total:110, Reading:30, Listening:30, Speaking:24, Writing:26])

⬦ French (B1, intermediate)