S. Mohammad Mostafavi I. - Applied AI *Research Scientist (Senior)*

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Interests

- Computational **Path**ology (Cell **Detection**, Tissue **Segmentation**, **Sub-cell** Models).
- **Event-based** (Neuromorphic) Cameras/**Vision** (**Reconstruction**, **Super-resolution**, **Depth/Flow** estimation).
- **Super-resolution** (**RNN**s for Event-cameras, weighted patches for Facial images).
- **Generative Models** (**Diffusion**-based, **Bridging**, **CTM**s, and **GAN**s).

Education

- Gwangju Institute of Science and Technology (GIST) - 2015 ~ 2021 - South Korea, Gwangju.
  - Ph.D. in electrical engineering and computer science (Presidential Excellence Award).
  - Doctoral Dissertation: **Event-based vision**: Image reconstruction, Super-resolution, Depth estimation.
  - Advisors: Prof. Jonghyun Choi (GIST), and Prof. Kuk-Jin Yoon (KAIST).

- Hakim Sabzevari University - 2009 ~ 2011 - Iran, Sabzevar.
  - M.Sc. in Electrical Engineering and Electronics.
  - Thesis: Facial Image **Super-Resolution** Using Weighted Patch Pairs.
  - Advisors: Prof. Javad Haddadnia (Hakim Sabzevari Uni.), and Prof. Payman Moallem (Uni. of Esfahan).

Selected Experiences

- Lunit Inc. - **Research Scientist (Senior)** (Jun. 2021 - Mar. 2024) and **Team Leader** (Mar. 2023 - Mar. 2024).
  - Oncology Model-Centric AI Research - Led a team of 3~4 members.
  - Performance improvement for the main products (SCOPE) and pharma-requested models/bakeoffs.
    - Deep-learning-based cell detection and tissue segmentation models for SCOPE (IO, PD-L1), and UIHC.
      - Taskforce leading in 4 out of 8 model development periods.
  - Establishing, persuading, and developing further product-oriented research directions.
    - Universal IHC models [A1], Sub-cellular models [P1], WSI synthesis, and End-point mutations.
  - Sharing recent CV/ML trends through study groups and weekly research seminars.
  - Publishing the findings, practices, and resources in Computational Pathology and PathOmics.
    - Abstracts [A1~A4], Journals [J3, J4], Patents [P1], and Challenges [S4].
  - Collaborating across pathology, biomedical engineering, product engineering, and business development.

- GIST - **Research Assistant** and **Ph.D. student** (Sep. 2015 - Jun. 2021).
  - Proposing novel deep-learning approaches on the event-based vision for image reconstruction [J1, C3], super-resolution [J2, C4], and depth estimation [C1, C2].
  - Publishing in top-tier journals (TPAMI/IJCV [J1, J2]), conferences (CVPR/IJCV [C1~C4] - **1 oral CVPR** [C3]), and registered a Patent [P2].
  - Mentoring a master's student, from teaching basic concepts to publishing in a CVPR paper [C1].
  - Reaching **Rank #1** in the CVPRW Event-based Vision Competition (2021).
  - Contributing to the research community by releasing 2 code repos on GitHub from papers:
    - https://github.com/gistvision/e2sri ★ **50** [C3] (as of Oct 2024).
    - https://github.com/yonseivnl/se-cff ★ **38** [C1] (as of Oct 2024).

- Others
  - **PostDoc** - Medical University of Isfahan, Medical Image and Signal Processing Center (Jun. 2024- Ongoing).
  - **Researcher** - Seoul National University - Machine Perception and Reasoning lab. (Mar. 2024- Ongoing).
    - Mentoring two MSc. candidates on Event Cameras and Continuous Trajectory Models.
    - Research paper contribution (under review NeurIPS'24).
  - **Instrumentation supervisor** - Esfahan Petrochemical Company (Spring 2013 - Fall 2015).
  - **Researcher** - Isfahan University of Technology (Fall 2012 - Spring 2013), Subsea R&D center.
  - **Instructor** - Islamic Azad University, Mobarakeh Branch (2011 and 2013).

Selected Publications - * indicates equal contribution across the marked authors |Full list at my Google Scholar NNvELCcAAAAJ - No. of citations: 477 and h-index: 8 as of Oct 2024. | ORCID 0000-0002-5883-3844 | Scopus 40461500600

Conferences *on Computer Vision / Machine Learning*

- [C1] "*Stereo Depth from Event Cameras: Concentrate and Focus on the Future*"- Y Nam*, **M Mostafavi***, KJ Yoon, JH Choi - *equal contribution - CVF/IEEE - **CVPR 2022** (**25.33**% accept. rate) **[Code]**
- [C2] "*Event-Intensity Stereo: Estimating Depth by the Best of Both Worlds*"- **M Mostafavi**, KJ Yoon, J Choi - CVF/IEEE - **ICCV 2021** (**25.9**% accept. rate)
- [C3] 🏆 "*Learning to Super Resolve Intensity Images from Events*" - **M Mostafavi**, J Choi, KJ Yoon - CVF/IEEE - **CVPR 2020** (**5%** accept. rate) **[Oral][Code]**
- [C4] "*Event-based high dynamic range image and very high frame rate video generation using conditional generative adversarial networks*"- L Wang*, **M Mostafavi***, YS Ho, and KJ Yoon -*equal contribution CVF/IEEE - **CVPR 2019** (**25.2%** accept. rate)

Journals *on Computer Vision / Machine Learning*

- [J1] 🏆 "*E2SRI: Learning to Super-Resolve Intensity Images from Events*" - **M Mostafavi**, Y Nam, J Choi, KJ Yoon - IEEE-Transactions on Pattern Analysis and Machine Intelligence - **TPAMI 2021** (IF **24.31**)
- [J2] "*Learning to reconstruct HDR images from events, with applications to depth and flow*" - **M Mostafavi**, L Wang, KJ Yoon - Springer- International Journal of Computer Vision - **IJCV 2021** (IF **11.54**)

on AI-assisted oncology and Computational Pathology

- [J3] "*Artificial intelligence-powered spatial analysis of tumor-infiltrating lymphocytes as a predictive biomarker for axitinib in adenoid cystic carcinoma*" - DH Kim, Y Lim, C-Y Ock, G Park, S Park, H Song, M Ma, **M Mostafavi**, EJ Kang, M-J Ahn, K-W Lee, JH Kwon, Y Yang, YH Choi, MK Kim, JH Ji, T Yun, S-B Kim, B Keam- **Head & Neck 2023** (IF **2.9**)
- [J4] "*Artificial intelligence-powered whole-slide image analyzer reveals a distinctive distribution of tumor-infiltrating lymphocytes in neuroendocrine neoplasms*" - HG Cho, SI Cho, S Choi, W Jung, J Shin, G Park, J Moon, M Ma, H Song, **M Mostafavi**, M Kang, S Pereira, K Paeng, D Yoo, CY Ock, S Kim - **MDPI Diagnostics 2022** (IF **3.99**)

Abstracts *on AI-assisted oncology and Computational Pathology*

- [A1] 🏆 "*Universal immunohistochemistry positivity classification of cancer cells across multiple cancer types and antibodies using artificial intelligence*" - B Brattoli*, **M Mostafavi***, S Choi, T Lee, S Kim, W Jung, SI Cho, J Lee, K Chung, J Ryu, S Park, S Pereira, S Shin, CY Ock - **AACR** Annual Meeting Abstracts **2023**
- [A2] "*1293 Fragmented pattern of tumor mass is related to fibroblast activation mitigating spatial interaction between tumor and immune cells* " - S Kim, S Song, S Kim, M Kang, **M Mostafavi**, D Yoo, CH Ahn, S Ali, C-Y Ock- **SITC** Meeting Abstracts **2023**
- [A3] "*123P Artificial intelligence (AI)-powered analysis of human epidermal growth factor receptor-2 (HER2) and*

tumor-infiltrating lymphocytes (TILs) in advanced biliary tract cancer (BTC)" - G Kim, C Kim, B Kang, S Shin, T Lee, S Song, S Kim, **M Mostafavi**, H Song, S Pereira, H Chon- **ESMO** Congres Abstracts **2023**

- **[A4]** "*Performance validation of an artificial intelligence-powered PD-L1 combined positive score analyzer in six cancer types*" - T Lee, SI Cho, S Choi, S Kim, W Jung, D Lee, S Lee, **M Mostafavi**, S Park, J Lee, J Shin, S Kim, K Paeng, CY Ock- **ASCO** Annual Meeting Abstracts **2023**

Patents

- **[P1]** A method and apparatus for analyzing IHC stained images using an AI model - **2024** - B Brattoli, **M Mostafavi**, Y Lee, CH Ahn, T Lee, and J Ryu. Korean Patent {AI 모델을 이용한 IHC 염색 슬라이드 이미지 분석 방법 및 장치}.
- **[P2]** A method and apparatus for generating super resolve intensity image - **2020** - J Choi, **SM Mostafavi I**, and KJ Yoon. Korean Patent (102366187) {고해상도 강도 이미지 생성 방법 및 장치}.

Honors and Awards

- 🏆 Presidential **Excellence Award** - Best Ph.D. **Dissertation** - GIST (2021).
- 🏆 **Rank #1** CVPRW Event-based vision competition for depth estimation from event cameras (2021).
- **Outstanding RA Award** - GIST (2020).
- **Doctoral Consortiums:** IEEE **CVPR** (2020 - USA, Virtual) and **KCCV** (2020 - Korea).
- **Best paper awards**: **KSC** (2019 - Korea), **IPIU Bronze** (2019 - Korea).
- **Scholarships**: Korean Gov. (2015-2019), Global Uni. Project (2015), Iranian Gov. Scholarship (2009-2011).

Languages

- English: **Bilingual fluency**, Farsi: Native, Korean: Low-Intermediate.

Programming Skills and Tools

- **Programming Languages:** Python, MATLAB, C++, Bash.
- **Libs.** : PyTorch, OpenCV, TensorFlow, Keras.
- **Tools:** GNU Linux, Google GCP, Docker, ROS, Git, Meshlab, LaTeX, Confluence, Jira, Notion.

Services

- **[S1]** Reviewer - MICCAI'24 workshops: COMPAYL, CaPTion, MOVI, and MLMI.
- **[S2]** Challenge organizer - Advances in Neuromorphic Vision - ICME 2024 [In progress].
- **[S3]** Volume Editor - MICCAI 2023 satellite events proceedings - Springer LNCS 2024 [In progress].
- **[S4]** Challenge organizer - *OCELOT 2023: Cell Detection from Cell-Tissue Interaction* - MICCAI 2023.
- **[S5]** Reviewer of CVPR, ECCV, ICCV | MICCAI | Springer: IJCV | IEEE: TIM, TCI | IET: IP.
- **[S6]** First Manager of IEEE Young Prof. Affinity Group in Gwangju Korea (2016).

Management Skills

- Performance management, One-on-one meetings, Roadmaps / OKRs (Objective, Key Results) management.
- Lunit research interview committee (Sep 2021 - Feb 2024) - 80+ screening and 20+ live technical interviews.

Teaching

- Teaching Assistant - GIST- Korea (Spring 20-20) Visual Recognition and Reasoning.
- Teaching Assistant - GIST- Korea (Spring 2017) Digital Signal Processing.
- Lecturer - Islamic Azad University - Mobarakeh - Iran (Fall 2011 ~ Spring 2013) Electronic circuits, and 6 labs.

References

Available on request.