Kamran Ali

Hands-on cross-functional technical leader,
inventor, and problem solver; trained in research

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smkrali.github.io, Google Scholar

Experience

- **General Motors - Global Research & Development** — Mountain View, CA, USA
  Senior R&D/Applied Scientist - Connected ADAS/Autonomy and Vehicle Experience — *Feb 2020 - Present*
  - **Cross-Functional Collaborative Technology Development and Engineering Transfers**:
    - Proposed, managed, and delivered 6 advanced technology works to engineering (managed $1.5M+ in funding)
    - Mentored 10+ interns, contract engineers, and junior engineers with successful project outcomes
  - **Publications, IP Protection, Competitive Assessments**:
    - Documented and presented work in research reports, external publications, and records of invention to enhance the intellectual property portfolio of GM. Over 60 inventions (patents filed/granted), published works cited 2000+ times
    - Led and contributed to technology roadmap discussions, university collaborations, competitive assessments, and reviews as a subject matter expert in multiple areas, while maintaining up-to-date knowledge of industry trends
  - **Multi-Modal Embodied AI**: Evaluated novel E2E models and distillation techniques for autonomy and robotics
  - **5G Mobile Edge Computing**: Tech lead on low latency end-to-end system and algorithm development a vision-based connected vehicle safety platform using infrastructure sensing, 5G, and mobile edge computing (MEC)
  - **Integrated Sensing and Communications (ISAC)**: Tech lead on UWB, WiFi, and 5G/6G Cellular based ISAC Systems and Algorithms Development for Multi-Modal In-Cabin and External Sensing Applications
  - **Localization and Mapping for Autonomous Vehicles**: Led end-to-end system and algorithm development for 3D Radar SLAM with Automatic Dynamic Sensor Alignment and Crowd-Sourced Visual-Inertial-GPS SLAM. Achieved SOTA accuracies, 7+ inventions filed/granted, successful engineering transfers
  - **Federated Machine Learning on NVIDIA Jetson Orins**:
    - Developed Transformer- and CNN-based models for steering angle prediction
    - Deployed and tested models on Jetson Orins (vehicle clients) and PC server (cloud aggregator)
    - Built system using open-source FedML library
  - **Spatial-Temporal Image Super-Resolution on NVIDIA Jetson Nano & Xavier**:
    - Applied SR techniques (ESPCN, FSRCNN, VRT) to reduce transmission costs for AV camera data
    - Designed training methods and loss functions (e.g., obfuscation, focused loss, text-prediction loss for road signs)
    - Used efficient SR models (e.g., Edge-SR) to reduce latency/bandwidth in a real-time, 5G-enabled edge computing platform. Fine-tuned Edge-SR models with roadside data for improved SR performance on typical roadside scenes.
  - **Object Detection & Tracking on NVIDIA Jetson Nano**:
    - Used YOLO models and deep association metrics (e.g., Deep SORT) for real-time object detection and tracking
    - Employed TensorRT for efficient edge deployment on Jetson devices
    - Implemented tracking in world coordinates via unscented Kalman filters
- **Michigan State University** — East Lansing, MI, USA
  Research and Teaching Assistant - Connected Sensing Systems & IoTs, Edge ML — *Aug 2014 - Feb 2020*
  - **Prominent Works**: Human Activity/Gesture Recognition Using WiFi, RFID and mmWave Signals, Sleep Monitoring Using WiFi Signals, Fine-grained Vibration Based Sensing for Smartphones, Gesture Based Authentication on Smartphones, Distributed Spectrum Sharing in Powerline Communications
  - **Research Internships**: Applied Sciences Group, Microsoft (Redmond) – Networking and Mobility Lab, HP Labs (Palo Alto, USA) – Pervasive & Ubiquitous Systems Group, Nokia Bell Labs (Cambridge, UK) – Mobile Communications & Networking Group, NEC Labs (Princeton, USA)

Education

- **Michigan State University** — East Lansing, MI, USA
  Ph.D. in Computer Science & Engineering — *Aug. 2014 – Dec. 2019*
- **LUMS, School of Science & Engineering** — Lahore, Pakistan
  B.S. Major: Electrical Engineering, Minor: Computer Sciences — *Sep. 2009 – Jun. 2013*

Skills

- **Software**: Python, C/C++, MATLAB, JAVA, Objective-C, PyTorch/LibTorch, Tensorflow, OpenCV, PCL, ROS
- **Hardware**: Multilayer PCB Design, Micro-Controllers & Embedded Development, Sensors Integration & Interfacing, Lab Instruments (VNA, Spectrum Analyzer, Oscilloscope, Logic Analyzer, Multimeter), USRPs, RF Components
- **General Areas of Expertise**: Machine Learning, Wireless, Sensing Systems, Internet of Things, Robotics