MUHAMMAD EMAD

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📍 College Station, Texas

PROFESSIONAL SUMMARY

CTO at PIRVision Lens, adept in Edge AI, IoT and sensing technologies with background in state estimation techniques and AI. Demonstrated excellence in leadership and system integration, significantly enhancing market adoption and production processes. Skilled in programming (C/C++/Python) and various sensing technologies such as IMUs, IR, Vision and ToF sensors.

EXPERIENCE

PIRvision Lens - CTO
College Station, *Texas • 08/2023 - Present*

- Spearheading the development of the PIRvision Lens technology. Innovating the PIR based sensing through Edge AI to create a market-ready product.
- Developing and implementing strategies for integrating the PIRvision sensor with various ecosystems (Apple, Matter, Alexa, IFTTT) to enhance market adoption.
- Working with customers and leading the company through the production phase, devising manufacturing processes for the end products.
- Develop technical partnerships with potential partners in various markets (residential, commercial, age-in-place, retail).

Texas A&M University - Research Assistant
College Station • 08/2017 - 08/2023

- Developed a Stationary Occupancy Detection and Tracking System that utilizes raw voltage signal from a patented Passive Infra-Red Sensor to estimate human occupancy in an indoor area for HVAC applications
- The system includes an Edge AI based training and inference engine and an IoT device embedded with a Particle or Bayes filter-based sensor fusion system
- Project optimizes accuracy, computation cost, and power overhead for the system through feature design and KNN based On-Device Lifelong Learning (ODLL) training framework.

University of Arkansas at Little Rock - Research Assistant
Little Rock • 08/2015 - 08/2017

- Worked at Intelligent Autonomous Systems Lab under NASA funded project

EDUCATION

Texas A&M University
08/2023

Doctor of Philosophy
Computer Science

University of Southern California
06/2008

MS in Computer Science

Foundation University Pakistan
06/2004

BS in Software Engineering

SKILLS

- Programming: C/C++/Python, OpenCV, OpenGV, PointCloud Library, Keras, SQL, .NET framework.
- Operating Systems, Databases, and packages: ROS, Linux (Ubuntu, Debian, RTAI), pThreads, OpenMP, Boost, Eigen, STL, Socket Programming, PostgreSQL, Matlab/MEX, Git. Cloud9(AWS), Heroku.
- Experience with Robotic Platforms, IoT Devices & Sensors: PIR Sensors, SICK LIDAR, Swiss Ranger SR4000,

- Improved accuracy and performance of state-of-the-art Vision-based navigation methods using Depth cameras
- Developed an EKF-based localization system employing Mono-SLAM for unstructured environments
- Achieved Sensor fusion via ROS involving IMU and Monocular Visual Odometry.

Computer Science Department, Carnegie Mellon University - Senior Research Engineer
Qatar • 02/2014 - 11/2014

- Worked on a Qatar National Research Foundation funded project titled Robust Localization and Mapping for Autonomous Gas Inspection Vehicles
- Contributed towards improving the accuracy and performance of EKF-based Visual Odometry localization algorithms

Robotics Research Group, King Saud University - Project Engineer
Riyadh • 06/2011 - 02/2014

- Implemented an autonomous mobile navigation system capable of traversing through a wide range of indoor environments
- Funding through National Science and Technology Program Grant (NSTP Project No 08-ELE200-02)

Dept. of Robotics & AI, National University of Sciences & Technology (NUST) - Lecturer
Islamabad • 07/2008 - 04/2011

- Prepared proposals, procurement, and commissioning robotics equipment at Machine Vision Lab, Advanced Controls Lab, Mobile Robotics Lab and Industrial Automation Lab
- Instructed an advanced training program focusing on elements of CAD-based CNC programming, manufacturing process design, and task optimization using Intelitek Computer Integrated Manufacturing System.

Interaction Lab, USC, Los Angeles, University of Southern California - Research Assistant
Los Angeles • 05/2007 - 05/2008

- Worked under an NSF funded project (Crosscutting Human and Social Dynamics program), on a pedestrian feet positional and trajectory dataset via multiple synchronized SICK laser measurement sensors
- Designed and implemented a real-time particle filter based pedestrian tracker and performed data analysis on dataset spanning over weeks of data, from laser scanners.

Landmark Graphics, Halliburton - Web Development Intern
Islamabad • 07/2003 - 10/2003

- Developed a web-based employee portal for Landmark Graphics, Islamabad office employees
- The portal included a discussion forum, and inter-employee webchat using ASP.NET, PHP, MySQL and Visual C++.

IntelSense R200, Intel UP Board, Raspberry Pi series, BeagleBoard, Arduino series, ESP32 based MCU, Apollo SoCs, Bumblebee2 & BumblebeeXB3 Stereovision systems, FLIR PTU, VectorNav IMU, Flea3 camera, Microsoft Kinect, Motive optical motion capture system, P3AT, PowerBot, and FESTO pneumatics.
- Machine Learning
- Robotics and Automation
- System Integration
- Edge Computing
- Technology Integration

WEBSITE, PORTFOLIO

- em22ad.wixsite.com
- linkedin.com/in/em22ad

LANGUAGES

- **Urdu**
  Native
- **English**
  Fluent
- **Punjabi**
  Fluent

AWARDS

- Project Investigator (NSF Small Business Innovation Research Award)
- Fulbright Fellowship