DIWAKAR RAVICHANDRAN

+1-951-231-8611 | dravi013@ucr.edu | Personal Website

 diwakar-ravichandran | bundle-adjuster | nightbaron | bundleadjuster

Riverside, California - 92507, United States

SUMMARY

Computer Vision Engineer with over 3 years of deep learning and sensor fusion experience. Expertise in developing robust end-to-end AI systems for multimedia, including 3D reconstruction, SLAM, and optimized keypoint detection using PyTorch and TensorFlow. Demonstrated success accelerating model convergence and enhancing accuracy through advanced computer vision techniques. Proven track record in designing and deploying innovative solutions for real-world applications.

EXPERIENCE

- **Jio Platforms Ltd. [⊕]**   *July 2020 - August 2023*
Data Scientist - Machine Vision   Bangalore, India
Tools: Python, C++, PyTorch, TensorFlow, Docker
  ◦ Headed two strategic sensor fusion projects, establishing data collection, preparation, model training and deployment pipelines end-to-end.
  ◦ Established sensor-fusion pipelines for LiDAR, IMU and Stereo-camera pairs, accelerating NeRF(Neural Radiance Fields) convergence by 30%
  ◦ Improved VO(Visual Odometry), VIO(Visual Inertial Odometry) and SLAM(Simultaneous Localization and Mapping) for coarse 3D reconstruction by 40%
  ◦ Developed a custom 3D reconstruction pipeline incorporating Multi-View Stereo for dense reconstructions.
  ◦ Spearheaded the development of a custom iOS application, utilizing the iPhone 12 Pro's sensors to collect synchronized multi-sensor data, decreasing data collection labor costs by 200%.
  ◦ Implemented custom keypoint detection and matching models using Graph Neural Networks, achieving top-tier performance on in-house datasets, surpassing off-the-shelf models by 15% in matching accuracy.
  ◦ Deployed an anchor-free person detection and tracking model on Azure cloud infrastructure; enhanced object detection accuracy by 30% and reduced model inference latency by 15 milliseconds.

- **Amtrak Tech. Pvt. Ltd. [⊕]**   *September 2019 - July 2020*
Solutions Architect - AI/ML/Big Data   Bangalore, India
Tools: Python, PyTorch, TensorFlow, OpenCV, C++, CUDA, TensorRT, DeepStream
  ◦ Engineered a crowd counting model, improving accuracy by 20%
  ◦ Developed Deepstream based multistream inference, increasing detections by 16 new video streams in parallel.
  ◦ Implemented TensorRT based model pruning, reducing latency by 30%
  ◦ Conducted precision calibration analysis to validate loss in quality of inference on model pruning.

- **NVIDIA Graphics Pvt. Ltd.[⊕]**   *January 2019 - September 2019*
Deep Learning Research Intern   Bangalore, India
Tools: Python, TensorFlow
  ◦ Refined Hebbian neural networks and incorporated them in generative adversarial networks(GANs) improving generated text quality by 7%.

- **Mathworks India Pvt. Ltd. [⊕]**   *June 2018 - August 2018*
Tech. Support Intern   Bangalore, India
Tools: MATLAB
  ◦ Engineered a code search algorithm that utilized regular expressions to find and replace code across the entire code base, reducing time taken by 50%.

EDUCATION

- **University of California, Riverside**   *September 2023 - June 2025*
Master of Sciences(Robotics)   Riverside, USA
  ◦ GPA: 3.83/4.00

- **BMS College of Engineering**   *September 2015 - August 2019*
Bachelors of Engineering (Mechanical)   Bangalore, India
  ◦ GPA: 8.1/10.00
  ◦ Scholaro GPA(Scaled): 3.513/4.00

- **Chethana PU College**   *April 2015*
Pre-University Education   Bangalore, India
  ◦ Grade: 90.833%

Projects

- **Collaborative V2V Communications system: For intelligent collaborative driving.** *September 2024 - December 2024*
  Tools: Python, PyTorch, OpenCV, Carla-BEV [O]
  - Developed visualization for ego vehicle sensors.
  - Implemented point pillars early-stage fusion for 3D object detection, achieving BEV images from point clouds.
  - Created a universal environment, ensuring no errors during installation and running of the pipeline.
  - Applied IOU(Intersection over Union) to analyze the accuracy of detections during real-time simulations.

- **Morphing Drone: With ability to change wing angle** *April 2024 - June 2024*
  Tools: Arduino Nano, Servo Motors, 3D Printing
  - **Aim** - To build a robot or drone that includes innovations in design and fabrication.
  - **Approach** - To build a drone whose wing angles can change depending on requirements.
  - **Videos** -
    * Wing Morph Test - [▶]
    * Motor Function Test - [▶]
    * Motion Test - [▶]
    * First Flight - [▶]

- **Line Feature Matching: Feature matching on detected line segments** *April 2024 - June 2024*
  Tools: Python, Pytorch, OpenCV, Jupyter
  - Developed a feature matching model that is trained on synthetic data based on homographic transformations.
  - Implemented a graph neural network(GNN), resulting in matching quality improvements of 30%.

- **Parallel Bundle Adjustment: Bundle Adjustment on NVIDIA GPUs** *September 2023 - December 2023*
  Tools: C++, CUDA, CMake [O]
  - Developed a parallel optimization pipeline, achieving over 10x speedup compared to CPU-based methods.
  - Video describing the process - [▶]

- **Graph Transferability: Determine transferability of GNNs across datasets** *September 2023 - December 2023*
  Tools: Python, Pytorch, Jupyter, Matplotlib [O]
  - Developed a metric that determines change in accuracy when transfer learning is applied.
  - Implemented Graph Attention Network and Graph Convolution Networks, trained against 6 datasets and transferability determined.

Patents and Publications   C=Conference, J=Journal, P=Patent, S=In Submission, T=Thesis

[T.1] Diwakar Ravichandran, et al. (2025). **Celesta – A fully differentiable optimization framework**.

Skills

- **Programming Languages:** C++, Python, MATLAB, C, MATLAB
- **Data Science & Machine Learning:** PyTorch, TensorFlow, OpenCV, Matplotlib, Pandas, Numpy, Deep Learning, Machine Learning
- **DevOps & Version Control:** Git, Docker
- **Specialized Area:** ROS, Gazebo, CUDA, NCCL, Thrust, MPI, CMake, Make, GTSAM
- **Research Skills:** LaTex, Doxygen, Markdown

Honors and Awards

- **Hackathon** *January 2025*
  Heartathon, Heartfulness Innovation Lab [⊕]
  - 2nd Position among 32 participating teams
  - Realized a RAG-based GPT model for a niche use case.

- **Grant** *January 2019*
  BMS College of Engineering
  - Awarded INR 15000 for most promising final project during undergraduate study.

LEADERSHIP & TEACHING EXPERIENCE

• **Teaching Assistant** *January 2024 - June 2024*
University of California, Riverside
  ◦ Served as teaching assistant for the following courses

    ∗ ME118 - Mechanical Engineering Modeling & Analysis
    ∗ ME018A - Introduction to Engineering Computation
    ∗ ME130 - Kinematic and Dynamic Analysis of Mechanisms

• **Department Coordinator, Dept. of Mechanical Engineering** *August 2016 - May 2019*
BMS College of Engineering [🌐]
  ◦ Founded Dynamech a techno-cultural fest for all students of Mechanical engineering department.
  ◦ Organized industry visits to National Aeronautics Laboratory and Hindustan Aeronautics Laboratory (Helicopter division).
  ◦ Invited prominent speakers to our college have tech. talks and panel discussions with students to understand the current trends in field of mechanical engineering

VOLUNTEER EXPERIENCE

• **Volunteer** *August 2016 - May 2019*
Rotaract Club of BMSCE
  ◦ Headed "iTeach", a program where the students of the university go to orphanages and teach students English, Basic Mathematics and Computers.
  ◦ Understood importance of social mobility, impact of education and technology in achieving the same.

ADDITIONAL INFORMATION

Languages: English (Native Speaker), Tamil (Native Speaker), Kannada (Native Speaker), Hindi (Native Speaker), Telugu (Conversational), French (Elementary)
Interests: Chess, Professional Gaming, Debating

REFERENCES

1. **Daniel Wong**
   Associate Professor, Department of Electrical Engineering
   University of California, Riverside
   Email: danwong@ucr.edu
   Phone: +1-951-827-2986
   Relationship: Thesis Advisor

2. **Mingyu Cai**
   Assistant Professor, Department of Mechanical Engineering
   University of California, Riverside
   Email: mingyu.cai@ucr.edu
   Phone: +1-610-758-4100
   Relationship: Project Supervisor, TA Supervisor