Akash S Kumbar

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scholar.google.com/citations?user=FxJB1FQAAAAJ&hl=en

✎ ABOUT ME!

Enthralled by the captivating realm of **robotics** and **AI** and its potential to revolutionize the world, my primary focus lies in the field of robotics. With a strong **research background** in **3D computer vision** and a comprehensive understanding of **Electronics and Communication Engineering (ECE)**, I possess a deep-seated enthusiasm for **machine learning**, **deep learning**, and **embedded systems**. Continuously seeking new challenges to push the boundaries of my knowledge and skills, I thrive on innovation and remain dedicated to developing cutting-edge solutions that enhance human experiences. By leveraging my diverse interests and expertise, I am committed to utilizing my skills in pursuit of technological advancements that redefine the way we interact with and benefit from technology.

💼 PROFESSIONAL EXPERIENCE

Research Associate   Jul 2023 – present
Robotics Research Center, IIIT-Hyderabad   Hyderabad, India
Researching on dynamic scene reconstruction and small obstacle detection.

Research Intern,   Jan 2023 – May 2023
Center of Excellence in Visual Intelligence, KLE Technological University   Hubli, India
Researched 3D computer vision, representational learning, and refinement of point
cloud data. Published a paper in ICCVW-2023

Student Volunteer,   Aug 2021 – May 2023
Center of Excellence in Visual Intelligence, KLE Technological University   Hubballi, India
Worked on the refinement of 3D point clouds. Additionally, I volunteered as a resource
person and mentor to help others explore the point cloud domain.

📖 PUBLICATIONS

ASUR3D: Arbitrary Scale Upsampling and Refinement of 3D Point Clouds Using Local Occupancy Fields ⧉
Akash Kumbar, Tejas Anvekar, Ramesh Ashok Tabib, Uma Mudenagudi
Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV) Workshops, 2023
Proposed a method for arbitrary scale point cloud upsampling using proposed local occupancy fields.

TP-NoDe: Topology-Aware Progressive Noising and Denoising of Point Clouds Towards Upsampling ⧉
Akash Kumbar, Tejas Anvekar, Tulasi Amitha Vikrama, Ramesh Ashok Tabib, Uma Mudenagudi
Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV) Workshops, 2023
Proposed TP-NoDe, a novel Topology-aware Progressive Noising and Denoising technique for 3D point cloud upsampling. For bringing topology awareness we proposed Density Aware k-Nearest Neighbours(DA-kNN).

🎓 EDUCATION

B.E., KLE Technological University   2019 – Jul 2023
Electronics and Communication Engineering   Hubli, India
CGPA: 8.42/10.0

Pre University College (12th grade), JSS SMPU   2017 – 2019
Percentage: 82%   Dharwad, India

Tenth grade, JSS SMCS   2017
CGPA: 9.2/10.0   Dharwad, India

🧠 SKILLS

Programming
Python, C/C++, MATLAB, Simulink

Machine learning/Deep Learning
PyTorch, Tensorflow, popular Anaconda libraries

Computer Vision
3D vision, 3D deep learning, Images, Gesture recognition

Embedded systems
Embedded C, 8051, ARM microcontrollers

Computer Graphics
OpenGL

📁 PROJECTS

Refining Point Clouds: Upsampling, Denoising and Completion through Implicit Representation, [Internship project]Proposed a point cloud encoder that learns the features of point cloud with complex topology and leverages occupancy functions to give an implicit representation of point cloud.
Tools used: Python, C++, Cython, Pytorch, Pytorch3D

3D Point Cloud Refinement Using Explicit Prior, [Completed as a part of Sponsored Research Project][Under revision] introduced a new variant of KNN that is topology and density aware, and applied it to develop a novel methodology for upsampling and denoising 3D point clouds considering the topology of the data for better representation and recovery of missing information. ⇗
Tools used: Python, PyTorch, PyTorch3D, Open3D

3D Point Cloud Instance Segmentation, Proposed a U-Net based deep learning architecture for instance segmentation of 3D point clouds, we devised an encoder that was capable of learning the global features of the point cloud. ⇗
Tools used: Python, PyTorch, PyTorch3D, Open3D

Camera based vehicle functions, [Completed as a part of Bosch's PRIXEL program] Designed a computer vision solution to detect potholes and speed breakers on roads, utilizing a custom-engineered dataset that was collected and annotated in-house. ⇗
Tools used: Python, PyTorch, ONNX, OpenCV

Learning based refinement of 3D point clouds through hole filling, Developed a deep learning model to identify and repair point cloud gaps caused by occlusion and reflections. Designed an algorithm to generate datasets with realistic holes in point clouds for training and testing purposes. ⇗
Tools used: Python, PyTorch, PyTorch3D, Open3D

Gesture based hand-cricket game, Developed a computer vision-based game of 'hand-cricket' playable against a computer through webcam. The backend is powered by a Tensorflow image classification model, with the front-end built on OpenCV and PyGame. ⇗
Tools used: Python, Tensorflow, OpenCV

Guitar Bot,
Created a bot using Arduino that can play guitar and built an android application that lets you select the music. ⇗
Tools used: Arduino, Embedded C, MIT app inventor

📚 COURSES AND CERTIFICATIONS

3D Vision Summer School, International Institute of Information Technology, Hyderabad ⇗

Advanced Computer Graphics,
Collaboratively offered by Indian Institute of Technology-Delhi and KLE Technological University

PyTorch for Deep Learning and Computer Vision, Udemy ⇗

Data Structures, UC San Diego, Coursera ⇗

🎖 AWARDS

Certificate of appreciation in Bosch's PRIXEL Program, Bosch Global software technologies ⇗
Awarded for developing a robust, real-time computer vision-based, speed breaker, and pothole detection model.

Best project award in CEVI summer workshop,
Center of Excellence in Visual Intelligence, KLE Technological University
Awarded Best Project at CEVI Summer Workshop for Gesture-based Hand-Cricket game.

Certificate of appreciation for engineering exploration course project,
Centre for Engineering Education Research, KLE Technological University ⇗
Awarded as an outstanding project for making a Guitar bot using Arduino that plays music through a mobile app.

⚛ REFERENCES

References available upon request

✏ DECLARATION

I hereby declare that the details and information given above are complete and true to the best of my knowledge.

Akash Kumbar