Junaid Ahmed **Ansari**

Researcher | TCS Research, Kolkata, India

Webpage linkedin.com/in/junaidcs032 github.com/JunaidCS032

+91 9117271992 ansariahmedjunaid@gmail.com

Research interests : Interplay of computer vision, robotics, deep learning and human visual attention.

Education

2016-2019 **MS by Research** in Computer Science and Engineering, International Institute of Information Technology, Hyderabad, India. **GPA : 9.33/10.0**

2007-2011 **Bachelor of Engineering** (B.E.) in Computer Science and Engineering, SVCE, Bangalore, India. **Percentage : 68% (First Class)**

Research/Work Experience

September 2020 – Present | **Researcher | Cognitive Robotics group, TCS Research, Kolkata, India**

Conducting research in perception for understanding human visual attention and human-human/human-robot interaction for autonomous and socially compliant robot navigation.

Computer Vision | Robotics | Deep Learning | Human Visual Attention | Crowd Simulation

September 2019 – September 2020 | **Developer | Cognitive Robotics group, TCS Research, Kolkata, India**

Conducted research in perception and navigation for fast and accurate human motion forecasting on CPUs for autonomous and socially compliant robots. Worked on navigation of robots amidst dynamic humans.

Computer Vision | Robotics | Deep Learning

December 2016 – July 2019 | **Research Assistant | Robotics Research Center, IIIT Hyderabad, Hyderbad, India**

Conducted research in perception for autonomous driving in the areas of SLAM, monocular multi-body SLAM, multi-object tracking and trajectory forecasting

Computer/Machine Vision | Robotics | Deep Learning

Monsoon 2018 | **Teaching Assistant | CSE483 Mobile Robotics (Perception/Robotics), IIIT Hyderabad, Hyderbad, India**

Co-taught the Mobile Robotics (Perception/Robotics) course with Prof. K. Madhava Krishna

Computer/Machine Vision | Robotics

July 2016 – December 2016 | **Research Intern | Robotics Research Center, IIIT Hyderabad, Hyderbad, India**

Worked on stereo SLAM, multi-robot SLAM and frontier detection for autonomous robotic exploration

Computer/Machine Vision | Robotics

June 2013 – May 2015 | **Temporary Project Assistant | Raman Research Institute, Bangalore, India**

Worked on variety of projects related to Voice Activated Wheelchair project and Brain Computer Interface project with Prof. Ramesh Balasubramanyam and Prof. Hema Ramachandran.

Computer/Machine Vision | Robotics | Software Architecture | Hardware

2011-12 – 2015-16 | **Research Intern | Raman Research Institute, Bangalore, India**

Worked on variety of projects related to Voice Activated Wheelchair project with Prof. Ramesh Balasubramanyam; these include visual odometry, wheelchair control, voice recognition and software framework design and development.

Computer/Machine Vision | Robotics | Software Architecture | Hardware

Honors and Awards

2017-2018 **Qualcomm Innovation Fellowship (QInF**. Our proposal was shortlisted as finalist for QInF, India.

2017-2018 **QInF Award**. Our proposal was awarded **INR 10 00 000** for being the Finalis in the QInF, India

2016-2019 **IIIT Hyderabad research fellowship**. Awarded a fellowship to cover tuition and living expenses during my Masters. Total value (approx.) **INR 300 000**

2018 **Microsoft Research Travel grant.** Awarded to cover my travel expenses for IROS 2018, one of the premier robotics conferences.

2018 **IROS SDC Travel Award.** Awarded to cover my travel expenses for IROS 2018.

2010 **First Prize, Inter-state C programming competition**. Competition organized by IEEE Student Branch,SVCE, Bangalore, India

2007 **Fourth Prize, On-spot C programming competition**. Competition organized by CSE Department, SVCE, Bangalore, India

Publications

BirdSLAM : Monocular Multibody SLAM in Bird's-Eye View VISSAP, 2021
Swapnil Daga, Gokul B. Nair, Anirudha Ramesh, Rahul Sajnani, **Junaid Ahmed Ansari**, K. Madhava Krishna
Paper Video

Simple means Faster : Real-Time Human Motion Forecasting in Monocular First Person Videos on CPU IROS, 2020
Junaid Ahmed Ansari, Brojeshwar Bhowmick
Paper Video

Multi-object Monocular SLAM for Dynamic Environments IV, 2020
Gokul B. Nair, Swapnil Daga, Rahul Sajnani, Anirudha Ramesh, **Junaid Ahmed Ansari**, K. Madhava Krishna
Paper Video

INFER : INtermediate representations for distant FuturE pREdiction IROS, 2019
Shashank Srikanth, **Junaid Ahmed Ansari**, Sarthak Sharma, J Krishna Murthy, K. Madhava Krishna
Paper Video Project Page Code

The Earth ain't Flat : Reconstruction of Vehicles on Steep and Graded Roads from a Monocular Camera IROS, 2018
Junaid Ahmed Ansari*, Sarthak Sharma*, A Majumdar, J Krishna Murthy, K. Madhava Krishna
Paper Video (* Equal contribution)

Beyond Pixels : Leveraging Geometry and Shape Cues for Online Multi-Object tracking ICRA, 2018
Sarthak Sharma*, **Junaid Ahmed Ansari***, J Krishna Murthy, K. Madhava Krishna
Paper Video Project page Code (* Equal contribution)
SOTA on KITTI Tracking Benchmark-2018

An Open Voice Command Interface Kit IEEE Trans. on Human-Machine Systems, 2016
Junaid Ahmed Ansari, Arasi Sathyamurthi, Ramesh Balasubramanyam
Paper Video Project page Code

VACU - Voice Activated Control Unit Poster, Indo-German workshop on Neurobionics in clinical Neurology, 2012
Arasi Sathyamurthi, **Junaid Ahmed Ansari**, Ramesh Balasubramanyam, Hema Ramachandran
Poster Video

Projects

Real-time monocular object SLAM system for dynamic road scenes 2017 - 2018
Robotics Research Center, IIIT Hyderabad. Funded by **Qualcomm Innovation Fellowship** (QInF), 2017, Qualcomm, India
Worked on monocular reconstruction of dynamic (and static) vehicles and localizing them in global frame in metric scale by recovering the scale. We relied on Shape Priors for metric level monocular reconstruction of dynamic vehicles from a moving camera.
Computer/Machine Vision | Robotics | Deep Learning

Safe and feasible frontier detection for autonomous ground vehicles 2016-2017
Robotics Research Center, IIIT Hyderabad
Developed a ROS (C++) package for detection of safe and feasible frontiers for autonomous ground vehicles. Obstacles are segmented by fitting road plane (along with camera height information) to the 3D point cloud generated using a stereo camera. Based on the obstacle information, vehicle dimension, frontier direction, and traversibility we compute all possible headings which are safe and feasible for the robot to move in.
Computer/Machine Vision | Robotics | Robot Operating System

Multi-Robot Simultaneous Localization and Mapping Project 2016 - 2017
Robotics Research Center, IIIT Hyderabad. Funded by Center for Artificial Intelligence and Robotics **(CAIR)**
Worked on stereo SLAM, stereo visual odometry, AR Tag based multi-robot map merging, collection of dataset and system setup of two mobile robot platforms.
Computer/Machine Vision | Robotics | Hardware | Robot Operating System

Voice Controlled Wheelchair Project

2013 - 2015

Raman Research Institute (RRI), Bangalore. Funded by RRI
Worked on voice activated wheelchair project. Designed and developed a light-weight and multi-threaded software framework in C++ for speech based activation of electric wheelchair. Developed all the required functionality such as motion, PID control, speed control, obstacle detection, integration of speech recognition engine, visual and auditory feedback interface, etc.

Computer/Machine Vision | Robotics | Hardware | Robot Operating System

Short Term Projects (2011 - 2016)

Corridor detection in point cloud

Raman Research Institute (RRI), Bangalore
Corridor is detected in the point cloud by looking for a dominant parallel line separated by a distance threshold in a 2D scan generated from the 3D data captured from Kinect sensor (we avoid plane segmentation for speed). The project was implemented in MATLAB.

Computer/Machine Vision

6D Visual Odometry Using RGB-D Cameras

Raman Research Institute (RRI), Bangalore
Implemented the full 6DoF Visual Odometry pipeline in C++ with OpenCV using Microsoft Kinect. No OpenCV functions used for the core functions.

Computer/Machine Vision

Draw-In-Air

SVCE, Bangalore
Draw-In-Air is an application for drawing, capturing images and controlling the mouse by color marker based gestures. Developed an algorithm for recognizing simple gestures employing two color markers for image capture.

Image Processing

EasyTestVR

Raman Research Institute (RRI), Bangalore
It is an application written in Processing (Java) for automatic analysis of 'recognition accuracy', 'response time', and other factors affecting the voice recognition of the COTS 'non-continuous speech recognition boards'.

Single beam reflection pattern simulator for surfaces in 2D

Raman Research Institute (RRI), Bangalore
This C++ application simulates the reflection of a user defined arrangement of arbitrary number of surfaces; it is a 2D case of a full-fledged simulator for the analysis of Radio Telescope surfaces for focus and undulation correction.

Professional Services and Volunteering

2020	Reviewer, ICRA (IEEE International Conference on Robotics and Automation)
2020	Reviewer, WACV (Winter Conference on Applications of Computer Vision)
2020	Reviewer, AAAI (Association for the Advancement of Artificial Intelligence)
2019-Present	Reviewer, IROS (IEEE/RSJ International Conference on Intelligent Robots and Systems)
2019-Present	Reviewer, IV (IEEE Intelligent Vehicle Symposium)
2019-Present	Reviewer, RO-MAN (IEEE International Conference on Robot & Human Interactive Communication)
2018	Student volunteer in R&D Showcase, 2016, Robotics Research Center, IIIT Hyderabad, India
2016	Student volunteer in R&D Showcase, 2016, Robotics Research Center, IIIT Hyderabad, India

Skills

Programming	C/C++, MATLAB, Python
Libraries	g2o, PyTorch, OpenCV, ROS, ceres-solver, ORCA
Operating System	Windows, Linux

References

Brojeshwar Bhowmick
Senior Scientist
TCS Research, India
@ b.bhowmick@tcs.com

K. Madhava Krishna
Professor, IIIT Hyderabad
Head of Robotics Research Center
@ mkrishna@iiit.ac.in

Ramesh Balasubramnyam
Associate Professor
Raman Research Institute, India
@ ramesh@rri.res.in