

# Junaid Ahmed **ANSARI**

## Researcher | TCS Research, Kolkata, India

🌐 Webpage [in linkedin.com/in/junaidcs032](https://www.linkedin.com/in/junaidcs032) [github.com/JunaidCS032](https://github.com/JunaidCS032)  
☎ +91 9117271992 @ ansariahmedjunaid@gmail.com

Research interests : Computer vision and machine learning for autonomous navigation and 3D scene understanding

## EDUCATION

- |           |   |
|-----------|---|
| 2016-2019 | <b>MS by Research</b> in Computer Science and Engineering, International Institute of Information Technology, Hyderabad (IIIT Hyderabad), India. <b>GPA : 9.33/10.0</b>             |
| 2007-2011 | <b>Bachelor of Engineering (B.E.)</b> in Computer Science and Engineering, Sri Venkateshwara College of Engineering (SVCE), Bangalore, India. <b>Percentage : 68% (First Class)</b> |

## RESEARCH/WORK EXPERIENCE

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|-----------------|---|
| Sep'19 - Now    | <b>Researcher   Cognitive Robotics group, TCS RESEARCH, KOLKATA, India</b><br>Conducting research in perception for understanding human visual attention and human-human/human-robot interaction for autonomous and socially compliant robot navigation.<br><div>Computer Vision Robotics Deep Learning Reinforcement Learning Human Visual Attention Crowd Simulation</div> <b>Developer   Cognitive Robotics group, TCS RESEARCH, KOLKATA, India</b><br>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.<br><div>Computer Vision Robotics Deep Learning</div> |
| Jul'16 - Jul'19 | <b>Research Assistant   Robotics Research Center, IIIT HYDERABAD, HYDERBAD, India</b><br>Conducted research in perception for autonomous driving in the areas of SLAM, monocular multi-body SLAM, multi-object tracking and trajectory forecasting. Also, stereo SLAM, multi-robot SLAM and frontier detection for autonomous robotic exploration<br><div>Computer/Machine Vision Robotics Deep Learning</div>  |
| Monsoon 2018    | <b>Teaching Assistant   CSE483 Mobile Robotics (Perception/Robotics), IIIT HYDERABAD, HYDERBAD, India</b><br>Co-taught the Mobile Robotics (Perception/Robotics) course with Prof. K. Madhava Krishna<br><div>Computer/Machine Vision Robotics</div>  |
| Aug'15- Jun'16  | <b>Research Intern   Raman Research Institute, BANGALORE, India</b><br>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.<br><div>Computer/Machine Vision Robotics Software Architecture Hardware</div>   |
| Jun'13 - May'15 | <b>Temporary Project (Research) Assistant   Raman Research Institute, BANGALORE, India</b><br>Worked on variety of projects related to Voice Activated Wheelchair project and Brain Computer Interface project with Prof. Ramesh Balasubramanyam and Prof. Hema Ramachandran.<br><div>Computer/Machine Vision Robotics Software Architecture Hardware</div>   |
| Jul'11-Mar'13   | <b>Research Intern (Visiting Studentship Program)   Raman Research Institute, BANGALORE, India</b><br>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.<br><div>Computer/Machine Vision Robotics Software Architecture Hardware</div>  |

## HONORS AND AWARDS

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|-----------|--|
| 2021      | <b>Finalist, best student paper award.</b> BirdSLAM, VISSAP (VISIGRAP), 2021   |
| 2017-2018 | <b>Qualcomm Innovation Fellowship (QInF).</b> Our proposal was shortlisted as finalist for QInF, India.  |
| 2017-2018 | <b>QInF Award.</b> Our proposal was awarded <b>INR 10 00 000</b> for being the Finalis in the QInF, India  |
| 2016-2019 | <b>IIIT Hyderabad research fellowship.</b> Awarded a fellowship to cover tuition and living expenses during my Masters. Total value (approx.) <b>INR 300 000</b> |
| 2018      | <b>Microsoft Research Travel grant.</b> Awarded to cover my travel expenses for IROS 2018, one of the premier robotics conferences.                              |
| 2018      | <b>IROS SDC Travel Award.</b> Awarded to cover my travel expenses for IROS 2018.   |
| 2015-2016 | <b>Visiting Student Fellowship</b> Raman Research Institute, Bangalore, India.   |
| 2011-2012 | <b>Visiting Student Fellowship</b> Raman Research Institute, Bangalore, India.   |
| 2010      | <b>First Prize, Inter-state C programming competition.</b> organized by IEEE Student Branch,SVCE, Bangalore  |
| 2007      | <b>Fourth Prize, On-spot C programming competition.</b> Organized by CSE Department, SVCE, Bangalore   |

## 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](#)

Finalist - Best Student Paper Award

### 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](#)

### SIMPLE MEANS FASTER : REAL-TIME HUMAN MOTION FORECASTING IN MONOCULAR FIRST PERSON VIDEOS ON CPU

IROS, 2020

**Junaid Ahmed Ansari**, Brojeshwar Bhowmick

[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 traversability 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