BOLLIMUNTHA SHREYA

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Education

International Institute of Information Technology, Hyderabad, B Tech and Master of Science in Electronics and Communication Engineering by Research — Nov 2021 – May 2026

- CGPA - 8.65/10 | Dean's List Award and Research Award

Sri Chaitanya Junior Kalasala, Hyderabad, Grade 12 — 2019 – 2021

- TSBIE Percentage - 96.8%

Glendale Academy International School, Hyderabad, Grade 10 — 2009 – 2019

- CBSE Percentage - 96

Research

Robotics Research Centre (RRC)

Advisors: Dr. K. Madhava Krishna, Dr. Nagamanikandan Govindan, Dr. Arun K. Singh

- **Trajectory Diffusion for Dual-Arm Motion Planning *(Ongoing Research)*** Developing a trajectory diffusion model for feasible dual-arm motion planning that generates collision-free trajectories to goal configurations while satisfying kinematic constraints inherent to coordinated dual-arm systems. The framework leverages diffusion-based generative modeling to explore high-dimensional trajectory spaces, explicitly incorporating obstacle avoidance and kinematic feasibility constraints during the sampling process. Integrated with the DA-VIL variable impedance controller for trajectory execution and contact-rich manipulation tasks.

Precog

Advisor: Dr. Ponnurangam Kummaraguru

- Worked on election expenditure through social media advertisements.
- Worked on Multimodal Online Toxicity with Knowledge-Infused Learning.

Publications

DA-VIL: Adaptive Dual-Arm Manipulation with Reinforcement Learning and Variable Impedance Control — Sep 2024 Paper

Md Faizal Karim*, ***Shreya Bollimuntha***, Md Saad Hashmi,Autrio Das,Gaurav Singh, Srinath Sridhar,Arun Kumar Singh,Nagamanikandan Govindan, K Madhava Krishna
Accepted at International Conference on Robotics and Automation, 2025

DG16M: A Large-Scale Dataset for Dual-Arm Grasping with Force-Optimized Grasps — March 2025 Paper

Md Faizal Karim, Md Saad Hashmi, ***Shreya Bollimuntha***, Gaurav Singh, Nagamanikandan Govindan, K Madhava Krishna
Accepted at International Conference on Intelligent Robots and Systems, 2025

DART: Learning-Enhanced Model Predictive Control for Dual-Arm Non-Prehensile Manipulation — Sep 2025

Under Review

* Denotes Equal contribution

Experience

Stripe — *Software Engineer Intern*

Verifications and Identity Platform

- **Metric Anomaly Detection System:** Designed and deployed a high-throughput anomaly detection system for the Provider Platform, automating real-time monitoring of critical service metrics. The system proactively flags potential incidents, reducing mean time to detection and preventing production regressions through intelligent alerting mechanisms.
- **Production API Migration for India ORR:** Spearheaded the end-to-end migration of India's Onboarding Review Requirements verification services from sandbox to production endpoints. Upgraded APIs, implemented error handling and monitoring, ensuring seamless integration for critical identity verification services.

Game Theory *Computer Vision Intern*
CV and AI Team

- **Algorithm Development:** Designed and implemented computer vision and machine learning algorithms for sports analytics, focusing on automated badminton match analysis for performance metrics extraction and strategic insights generation.

Relevant Projects

Robotics and Motion Planning

- **STORM: Stochastic MPC Framework for xArm7 Manipulator** Deployed and customized STORM MPC on a 7-DOF xArm7 for real-time, joint-space motion planning, achieving 100 Hz reactive control via GPU-accelerated trajectory optimization for pose tracking and obstacle avoidance.
- **Robotics Planning & Navigation** Implemented advanced 2D path planning algorithms including RRT for static/dynamic obstacles, Model Predictive Control via MPPI for unicycle kinematics, and trajectory modeling using Bernstein Polynomials with CEM-based optimization under velocity, acceleration, and lane constraints.
- **Theo Jansen Walking Mechanism** Engineered a physical walking mechanism based on the Theo Jansen linkage. Developed forward kinematic model in Python to simulate gait, fabricated the linkage, and implemented coordinated Dynamixel servo control for stable locomotion.
- **Pose Graph Optimization for 2D SLAM** Developed a pose graph-based SLAM system using nonlinear least squares optimization with g2o to integrate odometry and loop closures, significantly reducing trajectory error against ground truth.

Computer Vision & Machine Learning

- **Exoplanet Detection via Iterative RPCA** Developed a novel iterative robust PCA model integrating SVD-based decomposition and Angular Differential Imaging for separating faint planetary signals from stellar noise, achieving uniform SNR enhancement on ESO-VLT SPHERE data.
- **Stereo Dense Reconstruction** Built a pipeline for dense 3D reconstruction using SGBM for disparity computation and Open3D for generating colored point clouds for autonomous robotic scene understanding.
- **Statistical Methods in AI** Implemented ML algorithms (Decision Trees, kNN, Naive Bayes, GMMs) and deep learning architectures (CNNs, Autoencoders, RNN-LSTM) from scratch. Achieved good performance on age prediction from facial images using VGG16 transfer learning.

CanSat Competition

Team Wanderlust, IIIT Hyderabad *Team Lead & Mission Control Officer*
American Astronautical Society *Sep 2023 – Jun 2024*

- Led a team of 9 students. We designed, fabricated, and launched a CanSat (soda can-sized satellite) to 750 m altitude. We ranked **4th in Design Review** and participated in world finals held in Virginia, USA.
- Engineered stabilization systems including heat shields, aerobraking mechanisms, and auto-gyro descent control, achieving a 5 m/s descent rate with a spin-stabilized dual-camera system.
- Designed custom PCBs and 3D-printed components; integrated a multi-sensor telemetry system for real-time transmission of temperature, GPS, altitude, and acceleration data at 1 Hz to the ground station.
- Managed international logistics, including travel coordination, sponsorship acquisition, and on-site troubleshooting during Launch Weekend.

Awards & Honors

- **Dean's List Award** for academic excellence at IIIT Hyderabad.
- **Research Award** for outstanding research contributions at IIIT Hyderabad.
- Awarded **Commendation** for significant contribution to the Music Club.
- Awarded **ICRA 2025 Travel Grant** to attend the International Conference on Robotics and Automation, Atlanta, USA.
- **Grade 7 Piano** – Trinity College of Music London.
- Won inter-college music, swimming, and basketball competitions.

Academic Service & Contributions

- **Reviewer:** IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025
- **Teaching Assistant:** Real Analysis, Computer Programming, Basics of Ethics (H1 & H2), IIIT Hyderabad
- **Music Club Overall Coordinator**, IIIT Hyderabad
- **E-Cell Marketing Team Head**, IIIT Hyderabad

Technical Skills

- **Programming Languages:** Python, C/C++, MATLAB, SQL
- **ML/AI Frameworks:** PyTorch, TensorFlow, scikit-learn, OpenCV
- **Robotics:** MuJoCo, Isaac Gym, Isaac Sim, ROS/ROS2, MoveIt
- **Tools & Technologies:** Git, Linux, CUDA, Docker, NumPy, Open3D, g2o, CVXPY, CASADi

Extracurricular Activities

- **Sports:** Competed in inter-district swimming competition and CBSE South Zone Chess tournament.
- **Theatre:** Performed in 2 theatrical productions, developing public speaking and performance skills.
- **Community Service:** Volunteered with Move The Wheel Foundation and Teach For India, teaching STEM courses to underprivileged students.