

KARTIKEYA GUPTA

Computer Science and Engineering
Indian Institute of Technology, Delhi

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ACADEMIC DETAILS

Year	Degree	Institute	CGPA/Percentage
2013-2017 (Expected)	B.Tech in Computer Science and Engineering	Indian Institute of Technology Delhi	9.67/10 Institute Rank 1
2013	Class XII, CBSE	Upras Vidyalaya, New Delhi	93%
2011	Class X, CBSE	Delhi Public School R.K. Puram, New Delhi	10/10

SCHOLASTIC ACHIEVEMENTS

- **Institute Rank 1** Consistently maintaining institute rank 1 among 850 students during academic years 2013-2016 at IIT Delhi. IIT Delhi granted scholarship for the same.
- **All India Rank 4** in Indian Institute Of Technology Joint Entrance Examination (JEE Advanced-2013).
- One of the 16 students selected nationwide for the **Aditya Birla Group Scholarship**, 2013 out of the students from different IITs.
- Selected as a National Talent Search Examination (**NTSE**) Scholar-2009 for being in National top 1000.

INTERNSHIPS AND MAJOR PROJECTS

Tango - Factory Calibration

Summer Internship

Google, Mountain View, USA

May - August, 2016

- Developed a tool to visualize statistics and flag outliers on multiple calibration datasets.
- Collected more than 2000 datasets on tango devices to obtain insights and find bugs in the calibration pipeline.
- Developed a script to control the entire calibration sequence for a device including robot motion, device capture and data processing. Presently being used at the factory line.
- Incorporated G-Sensitivity in the IMU Model for Tango to improve calibration and motion estimates. Performed multiple experiments to validate improvements in overall results of position and orientation estimates.

Robust Monocular SLAM

IIT Delhi Bachelor's Thesis

Prof. Subhashis Banerjee, Prof. Chetan Arora

August, 2016 - Present

- Proposed and implemented a novel approach for Simultaneous Localization and Mapping from monocular camera to accurately estimate camera pose and 3D geometry for hand held, car based and egocentric videos.
- Frames are processed in short batches to exploit local loop closures arising out of to and fro motion.
- Obtained reliable pose and 3D structure using 2D motion averaging, triangulation and bundle adjustment.
- Finally, batches were merged using 7 dof based batch alignment and carrying out a BA refinement post merging.

3D Reconstruction on Mobile Device

Summer Undergraduate Research Project

Prof. Subhashis Banerjee

January - November, 2015

- Developed a mobile app for near real time 3D reconstruction of monuments/objects.
- Uses accelerometer, gyroscope, magnetometer (IMU sensors) data for rotation and translation matrix estimation. The estimates are improved by using local regression and visual tracking.
- Uses a Kalman filter, dense and sparse optical flow to improve the extrinsic camera parameters.
- Designed a 2-point algorithm to reduce computational complexity.
- The challenge was to complete dense 3D reconstruction in near real time on mobile devices.

OTHER PROJECTS

IIT Delhi Wifi Log Management System

Prof. Huzur Saran, December, 2015 - May, 2016

Developed a system to process logs from all wifi routers on campus and generate alerts for suspicious user login. Presently being used to detect wifi misuse and generate statistics to improve the overall campus network.

Automated Theorem Prover

Prof. S. Arun Kumar, October - November, 2015

Devised and Implemented a theorem prover based on Analytical Tableaux in SML. Proved invalidity of a First-order logic formula by successively applying tableaux rules thus finding contradictions and closing branches. Tested the prover with several tautologies.

Network Based Multiplayer Game

Prof. Huzur Saran, March - April, 2015

Designed a multi-player p2p network based game of space invaders where one has to shoot down aliens in a given set of lives using OpenGL for graphics and UDP sockets as network component. To maintain seamless continuity of the game during network outages, a player losing connection is replaced by an Artificial Intelligence bot.

RISC Processor Implementation

Prof. Smruti Sarangi, April - May, 2015

Designed a RISC processor with RAM, Register File, ALU and Control in Logisim and ran successful simulations of the design. It involved pipelining and forwarding between different stages.

Cloud Storage System

Prof. Huzur Saran, February 2015

Created a cloud storage system in C++ allowing users to sync files with the server and share files with each other. Used FTP and TCP-IP for sync and transfer. Implemented data de-duplication to minimize server disk usage. OpenSSL was used to ensure encrypted file transfer.

RELEVANT COURSES

- **Computer Science:**

Data Structures & Algorithms, Discrete Mathematical Structures, Digital Logic Design, Programming Languages, Computer Architecture, Design Practices in Computer Science, Logic for Computer Science, Computer Networks, Artificial Intelligence, Analysis & Design of Algorithms, Theory of Computation, Numerical Algorithms, Parallel Programming, Operating Systems, Algorithmic Game Theory, Computer Vision

- **Mathematics and Electrical Engineering:**

Calculus, Linear Algebra, Intro to Electrical Engineering, Probability & Stochastic Processes, Signals & Systems

TECHNICAL SKILLS

- **Programming Languages:** C, C#, C++, Java, Python, SML, OCaml, Lex, Yacc, Prolog, MySQL, HTML, PHP

EXTRA CURRICULAR ACTIVITIES

- Elected as the Computer Science class representative 2016 - 2017.
- Runner up in Code.Fun.Do - 2015 organized by Microsoft amongst students from different colleges from India.
- Pursued an internship to work in the emergency child line service at Synergy Sansthan, an NGO in rural Madhya Pradesh in December 2013. It involved rescuing children in distress and providing them shelter, counseling and proper care.
- Junior diploma in Indian Classical Music - Tabla from Prayag Sangeet Samiti, Allahabad.