Gopi Krishna Tummala

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Visa status: H1B (I-140 approved)

Summary

Highly motivated Software Developer with experience in designing algorithms related to Machine Learning, Computer Vision, Computer Networking, Mobile and sensor systems. Skilled in programming with Python, C++, Java, HTML, CSS, JavaScript and MySQL.

Education

1.	IIT Madras	Electrical Engineering.	B. Tech	3.6	May 2012
2.	Ohio State University, Columbus	Computer Science	MS	3.6	May 2018
3.	Ohio State University, Columbus	Computer Science	PhD	3.6	Dec 2018

Work Experience

1.	Senior Systems Engineer	Qualcomm, San Diego, CA	Jan '19 – Present
2	Engineering Intern	Qualcomm, San Diego, CA	May '18 – Aug '18
4.	Research Intern	Microsoft Research, Bangalore, IN	May '16 – Aug'16
6.	Software Analyst	Standard Chartered Bank, Chennai, IN	Jun '12 – May'13
7	Project Intern	Tata Elxsi Chennai, Chennai, IN	May '11 – Aug'11

Technical Skills and Nano Degrees

- Coursera deep learning specialization.
- Languages and Scripting: Python (7+ years), C/C++ (3+ years), Java (2 years), SQL, Shell/Bash, HTML/CSS.
- Others: TensorFlow, PyTorch, XGBoost, GNU Radio, NS3, Arduino, Wireshark, SUMO, OpenCV, ROS-Framework, MATLAB, SUMO.
- Project and Software Managements: JIRA, Github, Fisheye

Software and Research Projects

1. [**2018 to Now**] Designing algorithms for Behavior Prediction for Autonomous vehicles.
    a. [2019 - Now] Responsible for developing algorithms for behavior prediction module. Designed behavior prediction algorithms for Qualcomm Snapdragon Ride platform. Responsible for designing algorithms, prototyping, automate ML pipelines to efficient hardware implementation.
    b. [2018] Developed a testing and automation pipeline for behavior prediction (python based). This is a complete visualization and analysis system that mines data from autonomous driving log files. The software extracts the interesting events along with the metadata to provide visualization and analysis options. It is a comprehensive and scalable software that is currently used for testing and visualization purposes.

2. [**2013 to 2018**] Advancing Vehicular Navigation and Manufacturing by Exploring Location services.
    a. Designed a system *DashCalib* for hands-free Dashboard camera calibration. (*Python based prototype and Android, CV based application*)
    b. Designed a system *VMaps* for generating Local Vehicular Neighborhood Map with Frequency-Pair Analysis. (*GNU Radio Python wrappers, MATLAB data processing pipeline*)
    c. Designed a system *Soft-Swipe* for Enabling High-Accuracy Pairing of Vehicles to Lanes using COTS Technology. Real-time system implemented in C++. (Patent bought by Honda)
    d. Designed a system *RoadView* for viewing the Road Ahead through Collaboration of

vehicles and improves vehicles sensed by a factor of 1.8x. (*Implemented in C++ using NS3, SUMO simulator libraries*).

e. Designed a system *RoadMap* for mapping vehicles observed over a dashboard camera to respective IP-Addresses. (*Implemented in C++ using NS3, SUMO simulator libraries*).

3. [**2016 to 2017**] Designing Automatic Traffic Camera calibration techniques.
   a. Designed a scalable system AutoCalib for hands-free traffic camera calibration with speed estimation errors of <10%. (*Python based implementation running on azure*)

4. [**2016 to 2017**] Indoor Navigation and sensing solutions for People with Visual Disabilities.
   a. Designing a system *CaneScanner* for low powered object detection using smart white canes. (*Implemented using Raspberry Pi and OpenCV*)
   b. Designed a system Vision-Track for accurate Indoor tracking of a moving camera with < 3% tracking errors. (*Android and OpenCV integration*)

5. [**2012 to 2013**] Automatic client reporting software design and development.
   a. Designed a client reporting system which pulls data from databases of Standard Chartered bank to generate the account summary reports. (*SQL, Crystal-reports, Websphere*)
   b. Automated several backend jobs by writing cleaning and monitoring scripts for Standard Chartered banks webservers (backend-python).

6. [**2011 to 2013**] Efficient algorithms for computing Null space of Block Convolution Matrix.
   a. Designed efficient algorithms for computing Null-Space of MIMO-OFDM channel matrix (block convolution matrix) exploiting its special structure. (*MATLAB*)
   b. Reduced matrix inversion run-time complexity from cubic order to linear.

Honors

1. *Best paper awards:* ACM BuildSys 2017, IEEE MiSeNet 2018
2. *Best demo awards:* ACM BuildSys 2017
3. *NSF Travel awards:* ACM SenSys/BuildSys 2018, IEEE SECON 2017
4. *Royalty:* Received 40% share of royalty awarded by Honda North America.
5. *Merit Scholarship:* IIT Madras Merit cum Means (MCM) Scholarship (2008 -2012) Award. KKR Educational Intuitions Merit Scholarship, top 50 of the state Andhra Pradesh, India (2006 – 2008).
6. *Academic ranks:* All India Rank-274 IIT JEE, Top 200 (top 1%) in Indian Physics & Math Olympiads.

Academic and Volunteer activities.

1. *Reviewer/TPC/PC:* IEEE/ACM Transactions on Sensor Network (TOSN) journal, IEEE/ACM Transactions on Mobile Computing (TMC) journal, Paper Management System Administrator for IEEE SECON 2016
2. *Positions of responsibility:* Mess Secretary, IIT Madras 2010-2011. Equipment Coordinator for SHASTRA, IIT Madras annual TechFest.

Selected Publications.

1. Gopi Krishna Tummala, Tanmoy Das, Prasun Sinha and Rajiv Ramnath “SmartDashCam: Automatic Live Calibration for DashCams", in Proc. Of **ACM IPSN 2019, ACM TOSN** March 2018
2. Gopi Krishna Tummala (Co-Primary), Romil Bhardwaj (Co-Primary), Ganesan Ramalingam, Ramachandran Ramjee and Prasun Sinha, “AutoCalib: Automatic traffic Camera Calibration at Scale,” in **Proc. of Buildsys**, Delft, Netherlands, Nov 2017,
3. Gopi Krishna Tummala, Dong Li, Prasun Sinha, “Live View of On-Road Vehicular Information”, **IEEE SECON 2017**
4. Gopi Krishna Tummala, Dong Li, Prasun Sinha, “RoadMap: Mapping Vehicles to IP Addresses using Motion Signatures”, **ACM CarSys 2016**
5. Gopi Krishna Tummala, Istdeo Singh and K Giridhar, Null-Space of Block Convolution Matrix", **In Proc. of IEEE National Conference on Communications**, Delhi, India, Feb [15-17] 2013.
6. Tummala, Gopi Krishna. *Automatic Camera Calibration Techniques for Collaborative Vehicular*

Applications. Diss. The Ohio State University, 2019.

7. Tummala, Gopi Krishna. *Null Space of Channel Matrix*. Diss. Indian Institute of Technology (IIT) Madras, 2012.

Patents

1. *Gopi Krishna Tummala*, Monu Surana, Ahmed Sadek, Aolin Xu, Tianqi Ye and Avdhut Joshi “Tree based behavior predictor”, **U.S. Patent Application No. 17/352,886**.
2. Ganesan Ramalingam, Ramjee Ramachandran, Romil Bharadwaj and *Gopi Krishna Tummala* “Automatic Camera Calibration.", **U.S. Patent No. 10,580,164.**
3. Tanmoy Das, *Gopi Krishna Tummala* and Prasun Sinha, Scalable RFID Communication through Multi-Frequency Analysis", Patent Application No. **PCT/US18/58167.**
4. *Gopi Krishna Tummal*a, Derrick Cobb, Prasun Sinha and Rajiv Ramnath, Methods and Apparatus for enabling Mobile communication device based Secure Interaction from Vehicles through Motion Signatures", **U.S. Patent No. 10,032,370**.

Teaching

1. Lecturer for Introduction to Computer Programing in Java [Spring-2014], [Fall-2014, 2015].
2. Grader for Introduction to Low-Level Programming and Computer Organization [Fall-2013].
3. Grader for The UNIX Programming Environment [Fall-2013]

Hobbies

- Badminton, running, hiking, swimming, biking and Meditation. Watching NFL, Cricket and nature documentaries.
- Book reading, Writing, Foodie (likes to try different cuisines), cooking (mainly Indian, Chinese and Mediterranean dishes).