

# Guan (Neal) SUN

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Homepage

## EDUCATION

08/2014- 12/2015	<b>Master of Science, Computer and Information Science (Robotics Program)</b> School of Engineering and Applied Science, University of Pennsylvania, US	GPA = 3.84/4.0
09/2011- 03/2014	<b>Master of Science, Power Engineering</b> School of Mechanical Engineering, Beijing Institute of Technology, China	GPA = 3.73/4.0
09/2007- 06/2011	<b>Bachelor of Engineering, Automation</b> School of Automation, Beijing Institute of Technology, China	GPA = 3.80/4.0

## PROJECT EXPERIENCE

05/2015 – 08/2015	<b>Machine Learning Intern</b> - <b>Description:</b> Focused on deploying machine learning algorithms on embedded hardware platforms to process and classify ambient audio data for scene/event understanding. - <b>Achievements:</b> (1) Developed audio feature extraction and GMM based classification software on Raspberry Pi to recognize environmental sounds. (2) Developed Android App for system control and user interaction.	Bosch Research
03/2015 – 03/2015	<b>Simultaneous Localization and Mapping Using Particle Filters</b> - <b>Description:</b> To map the structure of an indoor environment using the information from a walking humanoid, sensors including IMU, Kinect and 2D laser range scanner (LIDAR). - <b>Achievements:</b> (1) Implemented particle filtering algorithm to achieve accurate SLAM. (2) Built a 3D visualization of the environment by integrating camera and depth imagery from Kinect.	Penn
02/2015 – 03/2015	<b>Gesture Recognition Using Hidden Markov Models</b> - <b>Description:</b> To learn a set of HMM models to recognize different arm motion gestures using IMU sensor readings from gyroscopes and accelerometers. - <b>Achievements:</b> (1) Implemented Hidden Markov Model algorithm in Matlab. (2) Implemented Unscented Kalman Filter to process the IMU data.	Penn
02/2015 – 03/2015	<b>Object Detection Using Gaussian Mixture Models</b> - <b>Description:</b> To detect and estimate the depth of a red barrel using color segmentation and probabilistic models. - <b>Achievements:</b> (1) Implemented Gaussian Mixture Model algorithm in Matlab. (2) Implemented Expectation Maximum algorithm to train the GMM.	Penn
01/2015 – 03/2015	<b>Path Planning and Vision-based Control of Quadrotor</b> - <b>Description:</b> To plan a shortest path in 3D space and control the quadrotor both in simulation and in actual environment. - <b>Achievements:</b> (1) Implemented efficient Dijkstra and A* shortest path algorithm in Matlab. (2) Implemented a vision-based 3D pose and velocity estimator using optical flow.	Penn
11/2014 – 12/2014	<b>Real Estate Price Estimation</b> - <b>Description:</b> To predict the price of houses given their advertisement using machine learning. - <b>Achievements:</b> (1) Implemented more than 5 machine learning methods, including SVM, Decision Tree, Naive Bayes, KNN, Linear regression, PCA, etc. (2) Achieved the prediction on 20000 observations in 7 cities with 0.7210 RMSE.	Penn

09/2014 – 10/2014	<b>Image Mosaicing and Blending</b>	Penn
	- <b>Description:</b> To align multiple small images properly and create a panorama image. - <b>Achievements:</b> (1) Implemented image feature detection, feature matching and image mosaicing in Matlab. (2) Implemented 2-Band blending algorithm to smooth the mosaic result.	
10/2012 – 10/2013	<b>Solar Powered Race Car</b>	BIT
	- <b>Description:</b> To develop a solar powered race car to attend the 2013 World Solar Challenge and race 3000Km across Australia. - <b>Achievements:</b> (1) Built a highly efficient, lightweight and reliable electrical system. (2) Built a Simulink vehicle model to research on optimal energy management. (3) Ranked 19th in the 2013 World Solar Challenge.	
01/2010 – 08/2010	<b>Magnetic Navigation Intelligent Car</b>	BIT
	- <b>Description:</b> To develop a magnetic navigation intelligent car which can trace a navigation wire automatically and precisely at a high speed. - <b>Achievements:</b> (1) Proposed an accurate and adaptive path detection algorithm. (2) Implemented fuzzy PID algorithm for the lateral control on a microcontroller. (3) Ranked 5th in the National Students Intelligent Car Competition.	
08/2009 – 12/2009	<b>Data Glove</b>	BIT
	- <b>Description:</b> To develop a data glove, a human computer interface device can be used in sign language recognition, video games and virtual assembly. - <b>Achievements:</b> (1) Designed the glove circuit with inertial sensors. (2) Proposed an improved neural network algorithm to recognize gestures. (3) Elected to be exhibited in the Beijing Inertial Technology Exhibition.	

## PUBLICATIONS & PATENTS

Guan Sun, Youtong Zhang, Chunhui Yang, Yaojia Jian, *“Optimal Design of a Solar Car Electrical System”*, Applied Mechanics and Materials, 2013. [\[PDF\]](#)

Guan Sun, Dan Feng, Youtong Zhang, Dongdong Weng, *“Detection and Control of a Wheeled Mobile Robot Based on Magnetic Navigation”*, The 9<sup>th</sup> Asian Control Conference, Istanbul, Turkey, 2013. [\[PDF\]](#)

Ting Zhang, Xinyu Wang, Guan Sun, Dong Han, *“A Sign Language Recognition Device based on Data Glove”*, Chinese Patent: CN102063825A, 2011-05-18. [\[Link\]](#)

## SKILLS

<b>Specialties</b>	Robotics, Computer Vision, Machine Learning, Control, Mechatronics, Embedded System, Circuit Design
<b>Programming</b>	C, C++, Java, Matlab, Python
<b>Software</b>	Matlab/Simulink, Android Studio, Eclipse, OpenCV, ROS, CUDA
<b>Languages</b>	English (fluent) and Mandarin (native)

## AWARDS AND HONORS

2012	<b>Second Prize</b> for the 1 <sup>st</sup> Innovation Cup Science Popularization Speech Contest of BIT	(2/65)
2011	<b>Outstanding Graduate</b> awarded by Beijing Institute of Technology	(10%)
2011	<b>T-more Innovation Student Award</b> by Beijing Institute of Technology	(1/20000+)
2010	<b>My Favorite Top Ten Work Award</b> for the 3 <sup>rd</sup> Chinese University Students' Creativity Forum	(2/91)
2010	<b>First Prize</b> for the 5 <sup>th</sup> Freescalse Cup National Students Intelligent Car Competition	(5/300+)
2010	<b>Bronze Award</b> for the 6 <sup>th</sup> Beijing Venture Design Competition	(8%)
2009	<b>1<sup>st</sup> Level Scholarship of Overall Excellence</b> , School of Automation, BIT	(6/186)
2008	<b>Third Prize</b> for the National Undergraduate Physics Competition	(10%)
2008	<b>Excellent Volunteer</b> in Beijing Olympic Games	(5%)