

# Hanxiang, HAO

## PERSONAL INFORMATION

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**Gender:** Male      **Age:** 24      **Mobile Phone:** +01 607-882-3948      **Email:** haohanx323@outlook.com  
**Address:** 1000 Northside DR. Apt 1263, Atlanta, GA

## EDUCATION BACKGROUND

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**Cornell University** **2015. 08-2016. 12**

- Master of Engineering in Electrical and Computer Engineering
- GPA: 3.9/4.3

**Beijing Institute of Technology** **2011. 08-2015. 07**

- Bachelor of Engineering in Electrical Engineering and Automation
- GPA: 3.8/4.0

## PROFESSIONAL & INTERNSHIP EXPERIENCES

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**Computer Vision Engineer, Software Automation Inc., Atlanta** **2017. 07-Present**

**Description:** Involved projects related to the development of image-processing algorithms to support fabric handling, identification, as well as defect detection systems.

- Implemented deep learning network (Siamese Fully Convolutional Network) for semantic segmentation;
- Applied pruning to deep learning network for computation reducing and model compression;
- Implemented convolution operation using sparse kernel with CUDA support;
- Generated synthetic data by blender rendering engine for fabric-segmentation simulation.

**Researcher, Deep Learning Internship in Rice University** **2017. 02-2017. 06**

**Description:** Designed and implemented the algorithm for object tracking using deep reinforcement learning.

- Implemented Siamese network to compare the similarity between image patches with their search areas;
- Used Asynchronous Advantage Actor-Critic model to select the best patch from the similarity maps in the previous step;
- Improved the tracking accuracy by applying bounding box regression (R-CNN) on the selected patch.

**Individual Researcher, Project Lung Lobes Segmentation in CT Scans, Cornell University** **2016. 08-2016. 12**

**Description:** Accomplished the design of a pulmonary vessel and fissure segmentation system.

- Extracted lung vessel using 3D intensity-based region growing and morphological operation;
- Segmented the fissures among 5 lobes based on Hessian matrix and 3D vector-based region growing.

**Group Leader & Major Programmer, Project Cancer Cell Tracking, Cornell University** **2016. 04-2016. 08**

**Description:** Designed an algorithm for tracking cancer cells in image sequences.

- Applied feature-based strategy matching each cell to the previous frame;
- Used Recurrent Neural Network detecting the cells in mitosis procedure to refine the result of detection.

**Group Leader & Major Programmer, Project Automatic Panorama Stitching, Cornell University** **2016.02-2016. 04**

**Description:** Implemented feature detection, feature description, feature matching and image alignment to generate panorama from a series images.

- Executed Harris corner detector as feature detector;
- Applied MOPS (Multiscale Oriented PatcheS) as a feature descriptor to identify the feature points;
- Matched the feature points between two images with ratio test of SSD (Sum of Squared Differences);
- Implemented homography alignment with RANSAC (RANDOM SAmple Consensus).

**Group Leader & Major Programmer, Project Gradient based Eye Tracking Algorithm, Cornell University**

**2015. 10-2015. 12**

**Description:** Implemented a tracking algorithm for pupil localization in image sequence.

- Designed an algorithm based on gradient and cascade classifier to find the center of each pupil;
  - Applied the cascade classifier to search a coarse region of face;
  - Searched for the center of pupil by finding the local maximum of the dot product between the gradient of each pixel and unit displacement between the assumed center point and the pixel;
- Achieved the accuracy of 95% in BioID database

**Individual Researcher, Project Eye Fundus Image Segmentation, Cornell University**

**2015. 09-2016. 12**

**Description:** Designed a segmentation system to extract vasculature in eye fundus image.

- Designed and developed two algorithms based on matched filter response:
  - Matched filter with first-order derivative of Gaussian and genetic algorithm optimization;
  - Matched filter with piecewise threshold probing applying different threshold value on different region of interest in retinal image

**Group Leader & Major Programmer, Competition of Robotics, Cornell University**

**2015. 11-2015. 12**

**Description:** Designed a control system with computer vision technics to control a two-arm robot playing football game.

- Controlled the robot arm to pick up blocks as defenders on the playground with automatic detection with in-hand camera;
- Detected and picked up the golf ball with the camera of Kinect as an over-head camera;
- Designed a motion planner using rapidly exploring random tree (RRT);

**Individual Researcher, Project Auto-balancing System Design of 2-axis Camera Mount, BIT**

**2015. 03-2015. 06**

**Description:** Designed an auto-balancing system of a pan-tilt camera mount on aircraft.

- Developed a color-based segmentation algorithm to detect and localize the specific target using OpenCV;
- Designed a PID controller to control the 180-degree and 360-degree motors.

## **LANGUAGE AND PROFESSIONAL SKILLS**

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- Skilled in C, Java, C++, Python, Matlab, TensorFlow, PyTorch, CUDA, OpenCV and Blender;
- Keen interest in music, member of Percussion in Cornell University Wind-Symphony, with certificate of Snare Drum in Chinese Conservatory of Music (Ninth Level)

## **HONORS & AWARDS**

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- Second-class Scholarship (three times), BIT **2012-2014**
- Third-class Scholarship (twice), BIT **2012-2013**
- Merit Student, BIT **2012. 09**
- Second Prize in Innovation Competition of Century Cup (Freescale Intelligent Car) (2/55) **2014. 06**