

# ANTHONY LOWHUR

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Specialization in Artificial Intelligence, Computer Vision, Machine Learning, and Human-Computer Interaction

## Skills

### LANGUAGES

Python  
C  
C++  
Java  
Javascript  
SQL  
PHP  
C#  
MATLAB  
HTML  
CSS  
Prolog  
ASP Sparc

### PLATFORMS

OpenCV  
Sklearn  
Pybrain  
Tensorflow  
ROS + Gazebo  
Unity3D  
Vuforia

### HARDWARE

Leap Motion  
Microsoft Kinect  
Arduino  
Raspberry Pi

## Education

**Rutgers University , New Brunswick**  
B.S. Computer Science 2018

### Online Course Work

Used Massive Online Open Courseware (MOOC) platforms for AI self studies, took higher level CS courses from top universities. Knowledge Acquired: Machine Learning, Adversarial Search, Reinforcement Learning, Parallel Programming

## Experience

**Rutgers University, New Brunswick**  
Research Assistant

New Brunswick, New Jersey  
Sep 2015 to Current

- Researched in image processing / computer vision and machine learning to have autonomous drone to analyze and recognize the shape of trash on the beach and pick them up accordingly.
- Implemented by using histogram backprojection and morphological transform, bag of words, and support vector machines as well as making dataset
- Currently designing intelligence of an Amazon Picking Challenge robot through computer vision & machine learning
- Researched in object recognition in 3D space, like correspondence grouping, using Microsoft Kinect.
- Implemented 2D object recognition with convolution neural networks. Currently researching in effective image segmentation algorithms for object localization. Leading team of industrial engineering students (senior undergraduate + master graduates) for the development of the autonomous robot.

**Texas Tech University**  
Research Assistant

Lubbock, Texas  
Jun 2016 to Aug 2016

- Designed a multi-agent intelligence algorithm (swarm intelligence) where a team of ally agents work together to surround and capture a fleeing enemy agent.
- Allowing agents to search for interest points to pursue and surround enemy agent with individual behavior, but minimal communication to work together as an agent team for capturing.
- Implemented planning and diagnostics algorithms using Answer Set Programming (ASP)

**Lehigh University**  
Research Assistant

Bethlehem, Pennsylvania  
Jun 2015 to Aug 2015

- Worked on an emotion recognition program on a robot by using computer vision and machine learning.
- Implemented dense optical flow and support vector machines to create robust classifier resistant to unique facial appearance and poor lighting.
- Research paper presented and published as 1st author at the 2015 IEEE 12th International Conference (MASS) workshop in Dallas, Texas.

## Personal Projects

### AI Algorithmic Melody Generator

- Takes in a song from a midi, analyzes patterns of the musical structure, and composes its own original melodies based on the patterns it had learned.
- Accomplished that by implementing Long Short Term Memory (LSTM) Neural Network.
- Attempting to make full AI song composer, an AI that can generate entire songs with a series melodies.
- Currently experimenting with restricted boltzmann machines and LSTM layer.

### Face Tracking via Haar Classification and Lucas Kanade

- Improved face tracking sample from OpenCV documentation by combining both Harr Classification and Lucas Kanade optical flow algorithm.
- This allowed the computer to track the face/head in various different angles (front face to side face) even with limited face dataset. (Python)

### Road Segmentation for Autonomous Vehicles

- Uses computer vision and processing algorithms such as histogram backprojection and morphological filtering to perform road segmentation in order to detect and recognize roads in a noisy environment.
- Made to be implemented in the DriveAI project, an initiative for open-source autonomous vehicles. (Python)

### Lyrics Generator based on Markov Chains

- Implemented markov chains on lyrics data scrapped from the web to create program that can generate its own unique set of lyrics based on genre.
- Have the capability of creating lyrics based on syllable count per line. Part of a long term project to create a full AI song composer. (Python)

**Check out my website or github to see a lot more projects!**

## Publications

Dense Optical Flow Based Emotion Recognition Classifier

Published at 2015 IEEE 12th International Conference on Mobile Ad Hoc and Sensor Systems

Anthony Lowhur (Rutgers), Mooi Choo Chuah (Lehigh)

Oct 2015