STEVEN HICKSON

PERSONAL INFORMATION

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GOAL

To continue learning and develop my skills in computer science, robotics, security, and computer vision in order to significantly contribute to global knowledge and understanding.

WORK EXPERIENCE

2013-Present   Graduate Research Assistant, GEORGIA INSTITUTE OF TECHNOLOGY

Georgia Tech   Working with Dr. Henrik Christensen and Dr. Irfan Essa on Robotic Perception projects.

2012-Present   Technology Blogger

Open Source work   Developed open source vision and embedded systems applications at http://stevenhickson.blogspot.com. Developed programs that are used by thousands of people and have been featured on Lifehacker, Hackaday, raspberrypi.org, Linux User and Developer Magazine, and more.

2013   Cyber Capabilities Developer, Intelligence Specialist (Operations), INSCOM/NSA

INSCOM/NSA   TS//SCI Clearance (valid until 2018) and NSA Blue Badge. Development work.

2011-2012   Undergraduate Research Assistant, CLEMSON UNIVERSITY

Clemson   Worked with Dr. Stan Birchfield and Dr. Brian Peasley on 3D computer vision projects with the Kinect including the ones listed in the publications section. Developed a Point Cloud Kinect Library using the Microsoft Kinect SDK including a later plugin to allow its use in PCL (The Point Cloud Library)

2011-2012   Software Support Specialist, CLEMSON COMPUTING IT

CCIT   Set up and programmed laptops as well as troubleshooting and fixing machines.

2010-2011   Test Engineer, ITRON INC

Itron   Set up and programmed robots to perform complex manufacturing tasks. Designed multiple parts of the automatic manufacturing line featured on MSNBC. Designed vision monitoring systems for intelligent automatic manufacturing.

EDUCATION

2013-Present   Georgia Institute of Technology

PhD in Computer Science, Intelligent Systems   GPA: 4.0 · School: Interactive Computing
Thesis Specialization: *Robotic Perception*
Description: A focus on segmentation, scene understanding, and object

recognition with 3D sensors such as the Kinect
Advisors: Prof. Henrik Christensen & Prof. Irfan Essa

2008-2012 Clemson University

Bachelor of Science in Computer Engineering Magna Cum Laude · *Computer Vision Specialization* · School: Computer Engineering
Description: Started undergraduate research with Dr. Stan Birchfield.

PUBLICATIONS

2012 An Energy Minimization Approach to 3D Non-Rigid Deformable Surface Estimation Using RGBD Data

IROS 2012 We propose an algorithm that uses energy minimization to estimate the current configuration of a non-rigid object. Our approach utilizes an RGBD image to calculate corresponding SURF features, depth, and boundary information without using predetermined features.
Authors: Brian Willimon, Steven Hickson, Stan Birchfield, and Ian Walker
Site, Paper, Video

Under Review Unsupervised Hierarchical Segmentation of RBGD Videos

Pending Review We present an efficient and scalable algorithm for segmenting 3D RGBD point clouds by combining depth, color, and temporal information using a multistage, hierarchical graph-based approach. Our approach is robust, is near real time, and works on any length RGBD video.
Authors: Steven Hickson, Stan Birchfield, Irfan Essa, and Henrik Christensen
Paper, Video

PROJECTS

Scene/Object classification using 4D segmentation from RGBD Data

I am currently working on using the Kinect and Kinect2 for scene classification and object recognition. I am segmenting the data using my 4D segmentation work then training the classifier using custom feature vectors defined by various region properties.

PCL Plugin for the Windows Kinect SDK and Kinect2

Because of the superiority of the Windows Kinect SDK compared to OpenNI and the large amount of algorithms provided by PCL (the Point Cloud Library), I created a plugin in C++ that allowed the use of the Kinect for Windows to be used with PCL. Since I was approved for the Kinect2 Alpha Development Kit program, I am working on extending this code to work with it as well. This will allow to me use the new Kinect with PCL, something that a lot of researchers want. Code

Using the Kinect and Oculus Rift with Unity3D to create an Immersive Environment

Since the Kinect gives 3D skeletal positions of a person and the Oculus Rift gives 3D virtual reality feedback, I combined the two with Unity3D in order to create a small game where the player sees in first person POV and throws fireballs at enemies.
Site, Code, Video

Hacking Snapchat's CAPTCHA using Computer Vision

In January 2014, Snapchat created a custom CAPTCHA. The day it was released, I released code to autonomously solve it that took me 30 minutes to write. I was featured on The Washington Post, Engadget, Mashable, Techcrunch, and others.
Site, Code

Controlling the Raspberry Pi/A linux machine via SMS with Google Voice

I wrote an API for Google Voice in C++ and used it and some custom scripts to control my Raspberry Pi via text message. This work was featured on Hackaday and Lifehacker.
Site, Code

Voice Control on the Raspberry Pi

Using Google's speech recognition and translation capabilities, I wrote a series of scripts that allow a computer to be voice controlled and respond with an easily customizable configuration file. This is an open source project thousands of people use that I continue to maintain. This was featured on Hackaday
Site, Code

Controlling Music with an EEG sensor.

For a project while a graduate student, I used Bayesian Estimation to train a machine learning classifier to classify music as good or bad using the alpha, beta, delta, gamma, and theta brainwaves from an EEG sensor. I then wrote a script to skip to the nexgt song on Pandora when it determines you are listening to a bad song. This was featured on Hackaday.
Site, Code

COMPUTER SKILLS

Programming	LaTeX, CC++ (6 years), C# (3 years), SQL (3 years), Perl (3 years), Python (2 years), VHDL, Assembly (3 years), Video and Image Processing, Network Security, OpenCV, EmguCV, CUDA (1 year), PCL, Web Programming, Visual Basic, XML, PLC Ladder Logic, Java, Android Programming
Online Presence	http://stevenhickson.blogspot.com, https://github.com/StevenHickson, http://www.linkedin.com/in/stevenhickson

AWARDS

Eagle Scout	2008 · Troop 49, Boy Scouts of America
NSF REU Fellow	2012 · Computer Vision REU under Dr. Mubarak Shah at the University of Central Florida.
SECCDC	2012 · Security competition focusing on ethical hacking, network defense, and network reliability.
Security+ Certified	2013 · CompTia
TS//SCI Clearance	2013-2018 · United States Department of Defense
2nd Degree Senior Black Belt and Instructor	2008 · Tae-Kwon-Do America
Interests	Tinkering with Robots · Raspberry Pi · Rock Climbing · Snowboarding · Martial Arts · Magic the Gathering

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