



ASWIN RAGHAV NIRMALESWARAN

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EDUCATION

Cornell University, School of Engineering, Ithaca, NY

Master of Engineering (M.Eng) in Biomedical Engineering,

May 2016 - May 2017

Coursework: *Computer Vision, Advanced Artificial-Intelligence, Statistical Signal Processing & learning*

University of Texas at Arlington, School of Engineering, Arlington, TX

Master of Science in Biomedical Engineering,

Jan 2016 - May 2016

Cumulative GPA: 3.667/4

(Transferred to Cornell)

Anna University, SSN College of Engineering, Chennai, India

Bachelor of Engineering in Biomedical Engineering,

Aug 2011- May 2015

Cumulative GPA: 7.4/10

NOTABLE PROJECTS

• **Segmentation of Skin Lesions using Combined Adaptive Thresholding and Connected Component**

Analysis (3rd best project award-during the course 'Computer Vision' at Cornell)

- Developed a novel algorithm involving RGB color channel operation, filtering & equalization, Otsu-based thresholding and logical operation of channels etc., to efficiently detect skin lesions.
- Trained the algorithm using a dataset of 900 clinical dermoscopic images & tested the performance.
- The algorithm removed hair and other artifacts; Segmentation was achieved with average Jaccard Index of 0.497

Skills and Expertise: Computer Vision (2D Color clustering, Adaptive Snake, Otsu's method) - using VisionX & C, MATLAB.

• **Automated Anatomical Landmark Detection in 3D Chest CT(DICOM) images**

- Design, develop, and evaluate algorithms (without using any prebuilt libraries) that will reliably detect unique locations including Supra-sternal notch & Costal notch using 50 DICOM (3D-CT) images.
- Algorithm developed include Thresholding in Hounsfield-units, Geometric filtering, ROI extraction, Slice based feature enhancement and tracking, Closing, Opening, Region growing, 2D to 1D mapping of features, Landmark localization etc
- The Algorithm produced a Mean Distance Error of 56.54 pixel from Manually marked Ground truth, producing a 3.931cm error in localization of Jugular Notch.

Skills and Expertise: Computer Vision in 3D DICOM images using VisionX & C

• **Observation and Identification of Erythrocyte Cell Membrane Vibrations for Differential Diagnosis**

- Invented a Diagnostic technology that measures induced Cell vibration (due to thermal excitation) in RBCs.
- Tracked the 2D Cell boundaries from recorded video and translated it into 1D vibration signal, using Kalman filter.
- Feasibility of Differential Diagnosis was proved with Normal, infected and cancerous RBC vibration-data.

Skills and Expertise: Image Sequence (Video) and Signal Processing using Matlab, SIMULINK; Fluorescent Microscopy.

• **Pore size estimation in developed Tracheal Scaffold using Circle Hough-transform.**

- Development of a Scaffold which aids in Directional Cell growth & suture-less implantation.
- Analysis of pore size in calibrated images of Scaffold using Hough transform.

Skills and Expertise: DS- SOLIDWORKS, Replicator-G, Image-J, Matlab.

PATENTS

MULTISYRINGE MODEL- JECTABLE

India Patent Application 5847/CHE/2014

A multi-injection pen which features reduced needle-pricking, Less manufacturing cost, Increased shelf life of drugs.

ELECTROMAGNETIC VASCULAR FORCEPS

India Patent Application 5848/CHE/2014

Electromagnetic forcep which can be electronically controlled during surgery without traditional lock mechanism

RELATED EXPERIENCE

HEALTHCARE TECHNOLOGY INNOVATION CENTER, Chennai, India

May- December 2015

Biomedical/Electrical Engineer Intern– Data Analysis

- **WEARABLE design-** using Freescale K53 MCU (Arm Cortex M4-100Mhz) & IAR Workbench
- Estimated the relationship between core body temperature & body's surface parameters like HeartRate, Blood Pressure, SpO2, skin temperature, atmospheric temperature & humidity;
Regression of dataset collected from 532 people. #Algorithm development #Data Analysis
- Circuit design for Body-Fat % estimation using Body Impedance. #Biosignal Acquisition using NI- ELVIS 2, NI- DAQ

SSN RESEARCH CENTER, Chennai, India

May-December 2015

Research Assistant

- Design, control and automation of custom temperature controller setup (involving LABVIEW, myRIO and circuit design) for Crystal Growth Research; #Signal Conditioning #Feature extraction #PID controller design
- Furnace temperature was controlled using a thyristor from the raw data-logged from K-type thermocouple
- Temperature data (30 to 1000°C) was measured from K-type thermocouple and calibrated according to NIST standard.
- Data logging of Calibrated signal was done to a remote PC using myRIO; this data was used to control the Furnace temperature through a Thyristor using a developed PID control loop.

THE MEDICCARE SCIENTIFIC SUPPLIES, Chennai, India

Sept 2012- Jan 2015

Design and Development Engineer- Part time

- **Image processing-** Developed algorithm to extract the bands in the captured Electrophoresis Gel Images and found their relative band distances in the 2D image.
- Design of H-bridge, ULN2004 circuits for Stepper motor & automation of optical filter setup in Professional gel documentation system named **Gelstan 4X/8X Chemi**

TEACHING EXPERIENCE

CORNELL UNIVERSITY, Ithaca, NY

Lab Assistant

PHYS 2213: Electromagnetism

August 2016- Dec 2016

PHYS 2214: Oscillations, Waves, and Quantum Physics

Jan 2017- May 2017

PHYS 1112: Mechanics & Heat

Jan 2017- May 2017

BHUMI, a Non-governmental Organization, India

May 2013- June 2015

HR Manager & Teaching Volunteer

Management of events and coordinating volunteers for teaching students of class 6,7,8.

LEADERSHIP

GEEKYCROC, Chennai, India

May 2015- Present

Founder- www.geekycroc.com

- College life experiences turned into a working E-commerce Business involving Textbooks, Consulting and material-supply for Higher education, Food review, Travel agency etc only for College Students;
- Also formed a network and logistics division; convinced clients for partnership; Annexed local businesses as a part.

HONORS AND AWARDS

- Ranked amongst one of the top 5 finalist in GE EDISON CHALLENGE 2013, Bangalore, India.
- Ranked among one of the top 20 venture proposals in ASSOCIATION OF BIOTECHNOLOGY LED ENTERPRISES- BEST 2014, Bangalore, India.
- Elected Speaker, Best 5 student papers in IEEE GLOBAL HUMANITARIAN TECHNOLOGY CONFERENCE 2014 - October 2014 at San Jose, California.
- Ranked amongst the top 150 semi-finalist teams in "BIG-C COMPETITION 2014" by Livestrong Foundation.
- Awarded best paper in National level Technical Conference on Bioengineering 2014 at Bharath University, India.

OTHER SPECIALIZED SKILLS

Languages

C,Java, JSP- Basics, Javascript, SQL, HTML-CSS, Python, Matlab, LABVIEW

Tools

Adobe Photoshop, Multisim, Office, SIMULINK, Adobe Lightroom, Adobe Aftereffects, FL Studio, Audition, SOLIDWORKS