

ARCHANA KUMAR GOPIKUMAR

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Aspiration:

Seeking a full time position to work with a team and be a significant contributor in a challenging project.

Academic Qualifications:

Masters in Electrical Engineering
Emphasis in Signal Processing and Medical Imaging
University of Southern California, Los Angeles.

Graduation Date: 05/13/2011

Bachelors in Electronics and Instrumentation Engineering
Anna University, India.

May 2009

Courses pursued in Masters:

- 1) Linear Algebra – Vector spaces and Subspaces, Solving Linear Equations, Eigen Values and Vectors, Linear Transformations.
- 2) Digital Signal Processing – Discrete time Signals and Systems, Continuous time signals, Discrete Transforms, Z Transforms, Digital Filter Design.
- 3) Digital Image Processing – Image Enhancement, Noise Removal, Edge Detection, Morphological Processing, Digital Halftoning, Geometrical Modification, Texture Analysis, Dithering, Image Watermarking and Data hiding.
- 4) Mathematical Pattern Recognition – Classifier Design, Training Algorithms for Supervised Learning, Statistical Classification, Unsupervised Learning, Artificial Neural Networks.
- 5) Bio-Medical Imaging – X-ray CT, SPECT, Positron Emission Tomography, Magnetic Resonance Imaging, Functional MRI, Diffusion Tensor Imaging.
- 6) Multimedia Systems Design – Media capture and representation, Compression Algorithms, DCT, Digital Rights Management – Watermarking and Encryption.
- 7) Integration of Medical Imaging Systems – Imaging informatics of Modality Systems, Medical Image Compression, PACS, Telemedicine and Teleradiology.

Professional Experience:

Hardware Engineering Intern, Abbott Medical Optics,
Santa Ana, Summer 2010

- Developed Algorithms for positioning the Patient Interface centered on the eye for the Lasik Surgery using the Video and Image Processing blockset in Simulink.
- Employing methods for isolation of pupil for people with dark colored Iris under visible illumination due to lack of color contrast between iris and pupil.
- Making hardware changes to the video microscope for the illumination condition and better image quality.
- Designing three methods to track the patient Interface in Simulink and implementing the most effective algorithm using Labview.

Student Researcher, Children's Hospital,
Los Angeles, Feb 2011 – Present

- Development of a Template based Tractography for Clinical Neonatal Diffusion Imaging data.
- Pre-processing the images for the study – Skull stripping using FSL, Tensor Extraction and smoothing with MedINRIA.
- Performing Linear Registration on the images to correct for head tilting.

Projects:

- 1) Digital Image Processing Fall 2010
 - Manipulating the Image by Performing Color Space Transformation, Plotting the Histogram for a given image, equalizing the Histogram and testing the Low pass filter performance on the edges in an image using MATLAB.
 - Developing first order, second order and Canny edge detection algorithms, decoding secret messages from a dithered image using MATLAB.
 - Matching the Puzzle by developing a hole filling Algorithm and performing Face Morphing on Images using MATLAB.
- 2) Simulation of CT Reconstruction Jan 2010
 - Creating a CT image by forward projection of data using the Shepp and Logan Phantom Image in MATLAB.
 - Developing Simple and Filtered Back Projection algorithms to get back the original image from the CT image.
 - Testing the efficiency of the Filtered Back Projection Algorithm by adding random noise to the image.
- 3) Determination of Brain Activation using fMRI March 2010
 - Using a checker Board Pattern and a blank Image as visual stimuli when the functional Magnetic Resonance Imaging scan is performed.
 - Converting the images from DICOM to NIFTI format to be viewed with MRICRON and then processing the data with SPM8 along with MATLAB.
 - Pre-processing the images using the Registration and Segmentation method followed by masking and designing the model to see the active regions.
- 4) Image Matching Jan 2010
 - Developed a media based querying and searching algorithm in Java using a target image and various search images to determine if the target image is present in the search image.
 - Applying the brute force search method after the images are re-sized, rotated and cropped.
 - Analyzing the results to determine the limitations of the algorithm.
- 5) Position Control of an underwater ROV Jan 2009
 - Controlling the position of the underwater Remotely Operated Vehicle along the six degrees of freedom at National Institute of Ocean Technology, India.
 - Developing a Fuzzy Logic Control Algorithm using Simulink for the multi-variable PID controller to send appropriate voltages to the ROV to adjust its position.

Tools:

- MATLAB and Simulink
- Mathematica
- Labview
- SPM8, BrainSuite, MedINRIA and FSL
- SPSS

Programming/Scripting Languages – C, C++, Java, PERL.

Other Info:

- Open to Relocation
- Status: F1 Student – Starting OPT from June
- LinkedIn Profile: <http://www.linkedin.com/in/archanagopikumar>