Liangfu Chen

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Education

Nanjing Xiaozhuang University, China		2005.09 ~ 2007.08
- Major:	Biological Science	
- Degree:	Bachelor of Science	
Woosuk Unverisity, South Korea		2007.09 ~ 2009.08
- Major:	Pharmaceutical Engineering	
- Degree:	Bachelor of Science	
Chung-Ang Unverisity, South Korea		2010.01 ~ 2012.02
- Major:	Computer Science and Engineering	
- Degree:	Master of Engineering	
- Laboratory:	Virtual Reality Lab. < http://vrlab.cau.ac.kr >	
- Supervisor:	Bong-Soo Sohn, Byung-Woo Hong	

- Full scholarship during spring and autumn in 2010.
- Thesis: Hybrid Acceleration for Interest-based Contour Component Extraction

Work Experience

Teaching Assistant at Chung-Ang Univ.
C Programming   Spring, 2010 & Spring, 2011
Object-oriented Programming   Fall, 2010

    The duty includes reviewing papers, giving guidance during absence of instructor, holding office hours for one-to-one discussions and monitoring the students during exams.

Algorithm Engineer at Mobinex Inc.   2012.03 ~ 2013.10

    The Majority of my work focus on implementing efficient algorithms that detects, tracks human body parts (e.g. hands) and recognize its pose in real time. Responsibility includes computer vision algorithm discussion and implementations, bug fix and performance improvements in implemented code, documentation of implementation details, attend international conferences etc.

Software Engineer at Brainnetome Center & NLPR, CASIA   2013.11 ~ present
- ❖ Software team lead in developing Near infrared spectroscopy & ElectroencephaloGraphy(NEG) system.
- ❖ Maintain Brainnetome Atlas website for interactive visualization of structures and connectivities human brain.
- ❖ Develop software solution for processing and visualizing diffusion MRI data.
- ❖ Develop computer vision solution for video-based behavior analysis of primate groups.

Project Experience

Quantitative Visualization of 3D biomedical Imaging Data   **2010.01 ~ 2011.05**
- ❖ Software Environment: Qt-3.3.8, OpenGL, CUDA, pthread/boost::thread
- ❖ Development Tools: Emacs under Linux, Visual Studio under Windows
- ❖ Project Description: Developing computer algorithms that improves the effectiveness of the data visualization by (semi)automatically computing quantitative information and geometric properties.
- ❖ Responsibility: We analyze 3D volumetric imaging data by constructing contour tree structure from the raw data set. I designed and implemented GPU and multi-core acceleration algorithms for 3D surface extraction of each individual contour components in the volume.

Depth estimation using stereo cameras   2012.03 ~ 2012.05
- ❖ Software Environment: OpenCV-2.3, configuration interface created upon wxWidgets
- ❖ Development Tools: Emacs under Linux, Visual Studio under Windows
- ❖ Project Description: The project aims to estimate the distance between human body and the stereo camera at real-time efficiency. First, camera calibration is performed to get the camera parameters. Then, the disparity map is estimated from rectified images. And finally, distance is projected from the disparity map.
- ❖ Responsibility: Full implementation of the project, include creating a convenient interface for camera calibration, computing rectification upon raw image pair and performing depth estimation through block matching method.

Articulated hand segmentation and tracking using level sets   2013.01 ~ 2013.10
- ❖ Software Environment: OpenCV-1.0 or later versions
- ❖ Development Tools: Emacs under Linux, Visual Studio under Windows; MATLAB for training data sets and testing; SCons for building source code under Linux.
- ❖ Project Description: We started the detection of a hand in the scene using boosted of haar-like features. Then the foreground model and background models are built and updated when a new frame is retrieved. We employ level sets to segment the foreground and background, then maximize the likelihood of the foreground model between frames during the tracking stage.
- ❖ Responsibility: Implement segmentation and tracking system for accurate location of each hand. I integrated a learned shape prior for constraining segmentation result, which improves the robustness of hand tracking. Also, hand pose estimation is done by learning its HOG features and classifying with kernel fisher discriminant.

Face recognition via sparse representation   2013.06 ~ 2013.08
- ❖ Project Description: We aim to make a practical system for real-time face registration and recognition that is efficient and accurate.
- ❖ Responsibility: Responsibility include writing algorithms for solving L1-norm minimization problems in dictionary learning and integrate the learned dictionary with the face recognition system.

Near infrared spectroscopy & ElectroencephaloGraphy   2013.11 ~ 2016.10
- ❖ Project Description: We implemented a system for real-time synchronnized fNIRS and EEG data retrieval for capturing electrical activity and functional neuroimaging simultaneously along the scalp.
- ❖ Responsibility: I led the software engineering team in developing Near infrared spectroscopy & ElectroencephaloGraphy (NEG) system, which retrieve simultaneous electronic and optical signal from human brain. A data retrieval software, which communicate with hardware devices via USB interface and store huge amount of data efficiently, along with a data analysis software, which perform signal processing upon the retrieved data to get quantitative result for clinic applications, have been developed.

Web-based Interactive Visualization of Brainnetome Atlas   2013.11 ~ 2016.10
http://atlas.brainnetome.org   DOI: 10.1093/cercor/bhw157
- ❖ Project Description: We employed a connectivity-based parcellation strategy by which we identified 246 regions in the brain, and then integrated this data with connectivity analyses and functional characterizations to build the Brainnetome Atlas.
- ❖ Responsibility: I maintain the Brainnetome Atlas website for interactive visualization of structures and connectivities human brain, which include: mapping brain regions to statistical connectivities with other brain regions, mapping brain regions to behavior domain analysis, as well as interactive connectogram visualization.

DiffusionKit - Solution For dMRI Data Processing And Visualization   2014.01 ~ 2016.10
http://diffusion.brainnetome.org   DOI: 10.1016/j.jneumeth.2016.08.011
- ❖ Project Description: We aim to construct full pipeline for processing and visualizing diffusion MR images that is portable, compact and efficient. Existing solutions we found are either made with MATLAB, which is huge in size and hard to deploy to a specific platform, or limited in some functionalities such as DICOM image conversion, portability to MS Windows, visualization of ODF and tractography.
- ❖ Responsibility: I'm responsible to develop visualization software, which provides multiple

options to display volume images, tractography results and orientation distribution functions. It also integrates the command line toolkits with user friendly graphical interface. Besides, I managed to maintain all the source code in order and create redistributable software packages targeting both MS Windows and Linux distributions.

Video-based Behavior Analysis of Primate Groups   **2014.08 ~ present**
http://liangfu.github.io/dnn
- ❖ Project Description: We monitor primate behavior in order to relate its statistical behavior with its brain functionality. Due to unknown behavior of monitored primates, it is challenging to handle occlusion, motion blur, and illumination problems.
- ❖ Responsibility: I created tools for annotating training data set of primates and refine deep neural network based pose estimation algorithms. In order to achieve accurate detection and tracking result, we built a skeleton model and estimate pose of each individual with visual attention based deep neural network models, which are trained to sample different locations of input video frames in order to detect locations of body parts.

IT skills

  - C/C++ programming with OpenCV (daily), MATLAB (almost daily), Python (very often)
  - Experience with Caffe, Theano, Boost, pthread, VTK, Qt, wxWidgets, CUDA, OpenCL, OpenGL, NDK for Android, LaTeX, Javascript, C# and Java etc.
  - Technical document writing and translation, e.g. DiffusionKit, The Boost C++ Libraries
  - Use Emacs as text editor daily, in Linux of course.