Salman Ul Haq

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Current

Founder & Chief Hacker @ TunaCode, the makers of CUVI and gKrypt.

Experience

Founder & Chief Hacker, TunaCode Inc. **2010 –**

Founded TunaCode, a GPU computing startup with a focus on Computer Vision and Data Security. Built a small but kick-a** team of engineers who would help solve tough problems in Computer Vision, Data Security and Compression, helping R&D teams, startups and some blue-chip companies build new Vision functionality or port existing to GPUs.

Highlight Technical Experience

Products:

- Helped conceive (idea!), build (code), productify (commercial SDK), market CUVI. Starting from just 5 simple functions and no users to well over hundred functions and thousands of users. Have been repeating the process with growing user base and community. Much of the work relates to transforming research paper (vision algorithms) into highly optimized code.
- Helped conceive, build, test and optimize (over and over) perhaps the fastest AES Rijndael encryption and decryption engine packaged inside a neat cross-platform and cross-language (C, Java and C# .NET) SDK available at gKrypt.
- Developed or supervised GPU accelerated implementations of several algorithms including KLT & Harris Corner Detectors, Discrete Wavelet Transforms (DWTs), Hough Transform (Houghlines & Houghcircles), LGTE, Fast Image Demosaicing, Maximally Stable Extremal Regions (MSERs), RANSAC, Optical Flows (Lukas & Kanade, Horn & Schunck), Fusion based image enhancement, Standard Deviation, Data Encryption using Rijndael AES 256-bit, Cryptographic hashing using SHA-256, Lossless Data Compression using LZ-77 variant Deflate/Inflate. Made the transition from primarily C-based to mainly C++ CUVI SDK.
- Initiated the OpenCL (opencv::ocl) support within OpenCV in the summers of 2011. Wrote the first versions of ocl::Mat, Optical Flow functions and spatial image filtering.

Consulting (Highlight):

- Executed Pre-Processing Pipeline for a Film Restoration app. Optimized to work in real-time. Previously required 2X Core i7 server to run on with both CPUs fully occupied while processing. Now it takes a high-end GeForce Fermi card with minimal load on the CPU. Wrote custom YUV color conversion and bit formats. Implemented a novel Debayer algorithm.
- Ported KLT feature computation and tracking to GPU for a blue-chip company's 3D reconstruction app. Brought down overall processing time from ~6mins to less than 0.5min. Identified a bug in early version of CUFFT resulting in mismatch b/w FFTW and CUFFT for 2d (fwd/inv) FFT.
- Supervised implementation of a portion of video stabilization pipeline - global motion estimation through reduction of local optical flow vectors into a pair of global motion vector. The algorithm was LGTE.
- Implemented a robust template matching pipeline for logo/patch detection through a RMSE, cross-correlation based approach coupled with template expansion for robustness.
- Wrote a desktop video app to subsea divers and added robust image enhancement in real-time. Hundreds of hours of under-sea dives recorded already.
- Proof-of-Concept for various computer vision centric projects including REST API for Cloud based image processing, face API (recognition, similarity-search in a photo set), template matching and recognition etc.

Highlight Business/Team/Soft Skills:

- Built and managed a small team of GPU and computer vision engineers for 4+ years.
- Coordinated with clients in every stage of a project from an idea to putting the product in the hands of end-users. Primary person to on-board new users for CUVI. Struct collabortions and partnerships with various parties.
- Conceived and ran marketing for both CUVI and gKrypt SDKs.
- Translated video/image processing ideas into executables for the team. Repeated several times over.
- Gave presentations, technical talks and attended conferences/competitions for GPGPU/GPU Computer Vision/GPU Data Encryption and business plan competitions.

Education

National University of Sciences & Technology - BS Computer Systems Engineering (2006-2010)

- Top-3 performer (academic) 2009-2010
- Wrote GPU accelerated functions for MATLAB Image Processing toolbox.
- 3.58/4.00 CGPA

Education

Sir Syed University of Engineering & Technology - Java Programming (SCJP & SCWCD) (2001-2003)

- Learned Java programming for 2 years at the age of 14.
- Wrote "SchoolWatch" school social network web app in 2003 all by myself. Hosted on a Windows PC in my room. The app won 2 national-level awards and had 200+ users at its peak.

Research

- **S. Haq**, J. Masood, A. Majeed, U. Aziz, “Bulk Encryption on AMD GPUs”, AMD Developer Forum, November 2011.
- **Salman Ul Haq**, Usman Aziz, Amir Majeed, Jawad Masood, “Lossless Data Compression using Delfate/Inflate for AMD GPUs”, AMD Developer Forum, November 2011.
- *(Research Poster for CUVI SDK*) Tauseef ur Rehman, **Salman Ul Haq**, Jawad Masood, Usman Aziz, “CUVLib: CUDA for Vision and Imaging Library”, Research Poster at Nvidia GPU Technology Conference, San Jose, CA, USA in September 2010.
- (*In Progress*) Co-authoring a book on Cloud Computing. Publisher: Wiley

Highlight Achievements

- BlackBox Connect (Google for Entrepreneurs powered immersion program in Silicon Valley) Summer 2013 Alum.
- Silver Award at APICTA (Asia Pacific ICT Alliance) Awards 2012.
- Gold Award two years in a row at P@SHA (Pakistan Software Houses Association) ICT Awards 2011 and 2012

Skills

- **Languages:** C, C++, Java, JS, C# .NET, HTML5.
- **Frameworks/Language Extensions:** CUDA, OpenCL, Node.js, MEAN Stack (MongoDB/Express.js/Angular.js/Node.js).
- **Platforms/OS:** Windows, Linux, Amazon AWS, Google AppEngine.

- **Development/Prototyping Tools:** Sublime Text (primary), Microsoft Visual Studio, Eclipse, MATLAB, Octave
- **Source Control/Versioning:** Mercurial (hg), git.
- **Highlight Libraries/Scripting:** OpenCV, PCL, Boost, Thrust, NPP, CUFFT, Shell scripting, CMake, Make.
- **Misc:** Algorithm design and implementation, Computer Vision, Machine Learning, Neural Nets.
- **More Misc:** Photoshop, Pixlr, CSS, PHP, MySQL, EC2, S3, CloudFront, FFMPEG, ImageMagick.

Cool Stuff I've Built

- **Project Name:** imgx.io
- **Technologies Used:** Node.js, OpenCV, MongoDB, nginx, internal code (C++ mainly).
- Team Size: 5'11", 187lbs (haha)
- **Implementation details:** GET API for GPU accelerated basic image manipulation (resize, crop, face/object based cropping, image transformations, filtering), REST API for Face detection, training, recognition, similarity search (face clustering); Object API for object training, classification based on a deep-learning training/classification engine. Deployed on Amazon AWS and scales up/down based on load.
- **Relevant Links:** http://imgx.io

Open Source

- Top-4 committer on node-opencv bindings, allowing complex computer-vision algorithms to be available in node.js
- (gist) script to pixelate all moving things in a video in real-time (link)
- (gist) script to install latest OpenCV version on Ubuntu Linux (link)

Links

- LinkedIn (http://pk.linkedin.com/in/salmanulhaq)
- Github (https://github.com/salmanulhaq)
- AngelList (https://angel.co/salman-ul-haq)
- Personal Website (http://salmanulhaq.github.io)
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