Alex Doumanoglou

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Gender: Male

Highlights

I am a passionate Electrical and Computer Engineer in applied problem solving, oriented towards developing practical solutions for complex problems and interested to be involved in product oriented projects targeting high quality standards.

Experience

April 2012 – Present

Research Assistant

Information Technologies Institute (ITI), Centre for Research & Technology – HELLAS (CERTH)

Working in the fields of Computer Vision and 3D Graphics. Particularly, in a Tele-Immersion pipeline from 3D Capturing to Rendering, involving 3D Reconstruction, mesh compression, networking and rendering. Participated in the EU funded project 3DLIVE, GA 318483. Key responsibilities include:

1. Research in the area of mesh compression.
2. Developing algorithms for mesh simplification.
3. Avatar animation retargeting from motion capture data.
4. 3D Graphics rendering of 3d reconstructed meshes.
5. Calibrating a physical camera and blending the real with the virtual, similar to augmented reality applications.
6. Developing algorithms for human sports activity evaluation (particularly jogging and skiing) via human skeleton extraction.
7. Writing integration performant, multi-threaded, code for 3d reconstruction, mesh compression, networking and rendering.
8. Project deliverables writing.

Technologies used: C++, C++/CLI, C#, OpenGL, Ogre, RealXtend, Unity3D, OpenNI, Microsoft Kinect SDK, PCL, OpenCV, boost, Eigen, Cgal, VTK, FFTW, Qt, CUDA.

*Contribution in the **105th MPEG Meeting**, 3D Graphics Group, with input document m30537 - Towards Real-Time and Efficient Compression of Human Time-Varying Meshes, **Alexandros Doumanoglou**, Dimitrios Alexiadis, Dimitrios Zarpalas, Petros Daras, Aug. 2013, Vienna, Austria.*

Lead developer for two 3D-TeleImmersive Games:

- *Castle In The Forest: A single player 3D-Teleimmersion game (C++, Ogre, OpenAL, boost)*
- *Space Wars: A multiplayer 3D-Teleimmersion game (Unity3D, custom C++ plugins for Unity3D)*

January 2015
Released Open-Source Software: Multi-Monitor Viewer

Multi-Monitor Viewer allows you to view the contents of any of your monitors inside a typical application window. In a typical scenario of a presentation, some of your monitors face your audience and if you need to work in extended desktop mode, there is no easy way to view what your audience sees without moving yourself in a proper position in space. This software aims to solve this particular problem. Multi-Monitor Viewer was developed in C# and published under open source MIT license.

May 2014 – June 2014
Freelance Software Engineer

Developed software that can be used

1. to operate multiple cameras in a synchronized manner,
2. as a multi-view video recorder and player and
3. to calibrate a multi-view camera setup, including intrinsic and extrinsic parameters.

The software was developed in C++, C++/CLI with OpenCV and boost and supports an arbitrary number of camera devices.

October 2012 – December 2012
Freelance Software Developer

Intensively worked at www.freelancer.com in various small scale projects. Here is my profile.

March 2011 – August 2012
Freelance Software Engineer / Developer

Developed a Computer Aided Design (CAD) Control to be used with the Microsoft .NET Framework, oriented for land surveying applications. Key features include:

1. 2D & 3D Views.
2. Add / Select / Edit / Remove Point, Line, Polyline, Polygon, Triangle support.
3. Typical camera operations Pan/Rotate/Zoom/Zoom Window.
4. 2D / 3D Canvas.
5. Numerous High Quality Shading modes.
6. Efficient Text Rendering.
7. Support for rendering texture-mapped land models.
8. Hierarchical Management of object entities in Project -> Base -> Layer manner.
9. Support for efficient lookup of entities based on geometric criteria.
10. Overall, highly optimized for execution time and efficient rendering. Supports efficient handling of models of over 1 million triangles in Intel Core i5 with nVIDIA GTX 550Ti GPU.
Technologies used: .NET Framework (C# & VB.NET), DirectX.

July 2011 – August 2012
Freelance Software Developer

Extended the ERP used by a language school with the following features:
1. Support for manual and automated SMS sending to students and/or their guardians.
2. Automate the production of finance and other statistical reports concerning the running of the language school.
Technologies used: Delphi, ADO, SQL.

December 2010 – March 2011
Freelance Software Engineer

Developed algorithms in C programming language for improving the performance of a speech recognition system in noisy environments. Key elements include a voice activation detection module and adaptive background noise filters. The software developed was targeting a portable device running Windows CE.

June 2005 – August 2005
Freelance Software Engineer

Developed algorithms in C++ for solving a complex variant of the nurse scheduling problem efficiently and effectively. The algorithms were integrated in a software product targeting the Greek market. The solution was based on network flows and linear programming.

Education

2009

Diploma in Electrical & Computer Engineering *(5 year program, equivalent to MEng)*
Specialization in **Telecommunications Engineering**
Grade: 7.79 / 10.0

Aristotle University of Thessaloniki,
School of Electrical & Computer Engineering

Diploma Thesis entitled: "Study and Construction of a Passive Acoustic Radar"

The term passive acoustic radar is used here to denote a device set-up able to detect an audio source in space without utilizing any transmitter. For this purpose, a microphone array was used for audio signal capturing. Via digital signal processing the direction of the incoming audio is identified, giving an estimate for the location of the audio source. Three signal processing algorithms were implemented: beamforming, Time Delay of Arrival (TDOA) and waveform correlation. Moreover, the radar's software was able to perform audio source recognition utilizing machine learning and pattern recognition techniques.

Involved in design and construction of 3 printed circuit boards (PCBs), developed software in C for Texas Instruments' TMS320C6711 DSP and user interface software for the PC connected to the PCBs in C++/CLI for visualization and parameterization of the radar.

September 2007 – October 2007

Internship in the Faculty of Electronics Engineering of Nis, Serbia
Developed simulations in order to determine bit error rates for signal transmission over wireless and satellite channels. Studied error correction codes. Algorithms were developed in C and MATLAB.

Languages

Greek: Native speaker.
English: First Certificate in English (FCE) awarded by the **University of Cambridge**.

Computer Science Skills

Platforms: Microsoft Windows 7 / 8, Ubuntu Linux 14.04, Android.
Programming Languages: C/C++/C++11, C++/CLI, C#, Java, VB/VB.NET, Delphi, x86 Assembly.
Web Technologies: (X)HTML, CSS3, Javascript, PHP, MySQL, jQuery.

Frameworks: MFC, Qt, .NET Framework, WPF, Reactive Extensions for .NET

- Windows GUI Programming
- Win32API
- DirectX, OpenGL and the respective shading languages: HLSL, GLSL, Cg
- nVIDIA CUDA

3D Graphics / Game Engines: Ogre, Unity3D, realXtend
Familiarity with Open Source Libraries: boost, OpenCV, Cgal, Pcl, Eigen, Flann, VTK, OpenNI, CMU Sphinx

- Object Oriented Analysis and Design
- Design Patterns
- Parallel Computing
- 3D Graphics Programming
- Network Programming
- Game Development
- Computer Architecture
- Low Level Debugging
- Reverse Engineering
- Algorithms and Theory of Computation (shortest paths, minimum spanning trees, network flows, graph theory, computational geometry, greedy programming, dynamic programming and other heuristic techniques)
- Genetic Algorithms
- Android development using Android SDK and Android NDK
- Experience with depth sensors, particularly Microsoft Kinect

- Experience in using/modifying various open source code
- Experience with version control systems (Mercurial and Git)

Engineering Skills

Software: MATLAB, Mathematica, Orcad, P-SPICE, MultiSim, AltiumDXP

- Machine Learning
- Pattern Recognition, Artificial Neural Networks
- Linear Programming
- Linear Algebra
- Numerical Analysis
- Mathematics, Calculus, Statistics, Probabilities, Optimization Theory
- Fuzzy Logic
- Computer Vision, 3D Reconstruction
- Signal Processing
- Speech Recognition

- Compression Algorithms
- Information Theory
- Theoretical Computer Science
- Cryptography (Knapsack, Skipjack, RC4, DES, Blowfish, Twofish, MD5, SHA-1, RIPEMD, RSA, DSA, El Gamal, Elliptic Curve Cryptography (ECC), attacking RSA and ElGamal)

Publications

- S. Crowle, **A. Doumanoglou**, B. Poussard, M. Boniface, D. Zarpalas, P.Daras, "Dynamic Adaptive Mesh Streaming for Real-Time 3D Teleimmersion", 20th International Conference on Web 3D Technology, Heraklion, Crete, Greece, June 18-21, 2015.
- D. Alexiadis, **A. Doumanoglou**, D. Zarpalas, P. Daras, "A case study for tele-immersion communication applications: from 3D capturing to rendering", IEEE International Conference on Visual Communications and Image Processing, VCIP 2014, Dec 7-10, Valletta, Malta.
- **A. Doumanoglou**, D. Alexiadis, S. Asteriadis, D. Zarpalas, P. Daras, "On human time-varying mesh compression exploiting activity-related characteristics", IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Florence, Italy, May 4-9, 2014.
- **A. Doumanoglou**, D. Alexiadis, D. Zarpalas, P. Daras, "Towards Real-Time and Efficient Compression of Human Time-Varying-Meshes", IEEE Transactions on Circuits and Systems for Video Technology, Issue 99, 2014.
- **A. Doumanoglou**, S. Asteriadis, D. Alexiadis, D. Zarpalas, P. Daras, "A Dataset of Kinect-based 3D scans", 11th IEEE IVMSP Workshop: 3D Image/Video Technologies and Applications, Yonsei University, Seoul, Korea, 10-12 June 2013
- Zlatko J. Mitrović, Bojana Z. Nikolić**, Alexandros E. Doumanoglou**, "Detection Of BPSK Signal in Ricean Fading Channel Using SC in the Presence of Imperfect Reference Carrier Signal Extraction", Telecommunication Forum, Belgrade, November 20-22, 2007.

Interests

algorithmic design towards problem solving, learning new technologies, design and construction of electronic circuits, applying theory into practice, demoscene, video games, music, dancing, cinema, theater, sports.