



# Alex Doumanoglou

**Electrical & Computer Engineer**

*Researcher in Computer Vision and Machine Learning*

*Software Engineer / Developer*



[Thessaloniki, Greece](#)



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[https://www.researchgate.net/profile/Alexandros\\_Doumanoglou](https://www.researchgate.net/profile/Alexandros_Doumanoglou)

I am a researcher in computer vision and machine learning with exceptional software development skills that allow me to quickly turn research ideas to fully working prototypes. I am self-motivated, problem solving oriented, with strong can-do attitude and extremely fond of developing solutions for complex problems. I am interested in getting involved in product oriented challenging projects that target high quality standards.



## Experience

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**August 2017 – Present**

**Research Assistant**

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

*Working in the fields of Computer Vision, 3D Graphics, Virtual Reality and Augmented Reality. More specifically, on the development of tele-immersive gaming applications that are supported by the virtualization technologies of 5G networks. Participating in the EU funded project 5G-MEDIA GA 761699. Key responsibilities include:*

1. *Developing a replay system for the multiplayer tele-immersive game “[SpaceWars](#)”.*
2. *Developing an offline, replay Virtual Reality spectator mode for the tele-immersive game “[SpaceWars](#)”.*
3. *Research in the area of Quality of Experience for 3D Immersive Media Streaming.*
4. *Studying and benchmarking Open-Source Static 3D Mesh Codecs for Live Immersive Media Streaming.*
5. *Conducting a theoretical study on the performance of the tele-immersion pipeline (in terms of end-to-end latency and frame rate) based on network conditions and Open-Source Static 3D Mesh codec choice.*
6. *Developed network code for a distributed, low-cost and portable multi-view volumetric capturing system based on Intel RealSense D415 RGB-D sensor.*
7. *Developed network code for a live 3D Media Transcoding Streaming Service that is deployed as Virtual Network Function (VNF) in a 5G infrastructure.*
8. *Project deliverables writing*
9. *Participation in project meetings*

*Technologies used: Unity3D, C#, ZeroFormatter, Zenject, UniRx, C++17, boost, amqpcpp, rxcpp, docker, Excel VBA.*

## **June 2018 – August 2018**

### **Software Architecture Consultant / Software Developer**

[Vianair Inc](#)

*Worked as a software architecture consultant and developer, bringing experience on software design patterns and good practices for code re-usability, debugging and maintainability to a development team of 4 individuals.*

*Technologies used: C#, WPF, MVVM Light, XAML*

## **September 2015 – December 2017**

### **Research Assistant**

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

*Worked in the fields of Computer Vision and Machine Learning. Participated in the EU funded project FORENSOR, GA 653355. Key responsibilities include:*

- 1. Research in the area of Human Activity Recognition in low resolution grayscale video, targeting lightweight algorithms that can be embedded in a low-power, low-cost vision chip.*
- 2. Research in the area of deep neural network architectures that utilize non-linear convolutional layers with applications in object recognition in color images.*
- 3. Research in the area of neuroscience that models the mechanics of the brain's visual cortex, particularly the slowness principle and the theory of slow feature analysis with applications in video human activity recognition.*
- 4. Project deliverables writing.*

*Technologies used: (OOP) MATLAB, Torch, Lua, C/C++, CUDA*

*Also worked in the fields of Computer Vision and 3D Graphics, in applications of the tele-immersive pipeline.*

*Lead developer of the multiplayer 3D-Teleimmersive game "[Space Wars](#)" (Unity3D, C#, RabbitMQ, custom C++ plugins for Unity3D)*

## **April 2012 – August 2015**

### **Research Assistant**

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

*Worked 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, like in 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 of the single player 3D-Teleimmersive game "[Castle In The Forest](#)" (C++, Ogre, OpenAL, boost)

### **May 2014 – June 2014**

#### **Freelance Software Engineer**

Developed a multi-view capturing software that could be used to calibrate a multi-view color camera setup, including intrinsic and extrinsic parameters and perform multi-view recording and playback. The software was developed in C++/CLI with OpenCV and boost and supported an arbitrary number of camera devices.

### **October 2012 – December 2012**

#### **Freelance Software Developer**

Intensively worked at [www.freelancer.com](http://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 engineers. 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), SlimDX.

### **July 2011 – August 2012**

#### **Freelance Software Developer**

Extended the desktop software ERP used by a language school by adding support for manual and automated SMS sending to students and/or their guardians and automating the production of finance and other statistical reports concerning the school's operation.

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 (powered by CMU sphinx) 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 solution was based on network flows and linear programming.*



## Education

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**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 acoustic radar utilized a microphone array for audio signal capturing and via digital signal processing it identified the direction of the incoming audio, giving an estimate for the location of the audio source. Two signal processing algorithms were implemented: beamforming and Time Delay of Arrival (TDOA) via waveform correlation. Moreover, the radar's software was able to perform audio source recognition utilizing 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.*

*Tools used: Orcad, P-SPICE, MultiSim, AltiumDXP*

**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

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**Greek:** Native speaker.

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



## Compute Science Skills

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**Platforms:** Microsoft Windows 8/10, Ubuntu Linux 18.10, Android.

**Programming Languages:** C/C++17, C++/CLI, C#, Java, VB/VB.NET, Delphi, x86 Assembly.

**Web Technologies (Novice):** (X)HTML, CSS3, Javascript, PHP, MySQL, jQuery, ASP.NET, ASP.NET WebAPI.

**Frameworks:** MFC, .NET Framework, WPF, Reactive Extensions for .NET, Java Spring Boot

**Dependency Injection Frameworks:** Ninject, Zenject, boost.di

**Object-Relational-Mappers:** NHibernate, Entity Framework

**Graphics:** OpenGL, DirectX, HLSL, GLSL, Cg, Unity3D, Ogre

**GPGPU:** NVIDIA CUDA

**Familiarity with Open Source Libraries:** rxcpp, cpplinq, boost, amqpcpp, plog, opencv, cgal, pcl, eigen, flann, VTK, CMU sphinx, UniRx

Good knowledge of object-oriented analysis and design, design patterns, algorithms and theory of computation (shortest paths, minimum spanning trees, network flows, graph theory, computational geometry, greedy programming, dynamic programming and other heuristic techniques), parallel computing, win32api, network programming, 3d graphics programming, low level debugging, reverse engineering, android SDK and android NDK.

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



## Engineering Skills

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**Software:** MATLAB, Mathematica

Expert in 3D mesh compression and slow feature analysis. Good knowledge in stereo vision, 3d reconstruction, machine learning, deep learning, linear algebra, linear programming, mathematics, calculus, statistics, probabilities, optimization theory, information theory, signal processing, cryptography (Knapsack, Skipjack, RC4, DES, Blowfish, Twofish, MD5, SHA-1, RIPEMD, RSA, DSA, El Gamal, Elliptic Curve Cryptography (ECC), attacking RSA and ElGamal)



## Publications

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- K. Christaki, K. C. Apostolakis, **A. Doumanoglou**, N. Zioulis, D. Zarpalas, and P. Daras, "[Space Wars: An AugmentedVR Game](#)", 25th International Conference on MultiMedia Modeling (MMM), Thessaloniki, Greece, January 8-11, 2019.
- K. Christaki, E. Christakis, P. Drakoulis, **A. Doumanoglou**, N. Zioulis, D. Zarpalas, and P. Daras, "[Subjective Visual Quality Assessment of Immersive 3D Media Compressed by Open-Source Static 3D Mesh Codecs](#)", 25th International Conference on MultiMedia Modeling (MMM), Thessaloniki, Greece, January 8-11, 2019.
- K. Konstantoudakis, E. Christakis, P. Drakoulis, **A. Doumanoglou**, N. Zioulis, D. Zarpalas, and P. Daras, "[Comparing CNNs and JPEG for Real-Time Multi-view Streaming in Tele-Immersive Scenarios](#)", The 14th International Conference on Signal Image Technology & Internet based Systems (SITIS 2018), Las Palmas de Gran Canaria, Spain, 26-29 November 2018.
- V. Sterzentsenko, A. Karakottas, A. Papachristou, N. Zioulis, **A. Doumanoglou**, D. Zarpalas, and P. Daras, "[A low-cost, flexible and portable volumetric capturing system](#)", The 14th International Conference on Signal Image Technology & Internet based Systems (SITIS 2018), Las Palmas de Gran Canaria, Spain, 26-29 November 2018.
- **A. Doumanoglou**, D. Griffin, J. Serrano, N. Zioulis, T.K. Phan, D. Jimenez, D. Zarpalas, F. Alvarez, M. Rio, P. Daras, "[Quality of Experience for 3D Immersive Media Streaming](#)", IEEE Transactions on Broadcasting, Special Issue on Quality of Experience for Advanced Broadcast Service, Volume: 64, Issue: 2, pp 379-391, June 2018.
- **A. Doumanoglou**, N. Zioulis, D. Griffin, J. Serrano, T. Khoa Phan, D. Jimenez, D. Zarpalas, F. Alvarez, M. Rio, P. Daras, "[A System Architecture for Live Immersive 3D-Media Transcoding over 5G Networks](#)", Workshop on Media delivery innovations using flexible network models in 5G, IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB18), Valencia, Spain, 6th – 8th June 2018

- **A. Doumanoglou**, N. Zioulis, E. Christakis, D. Zarpalas, P. Daras, "[Subjective quality assessment of textured human full-body 3D-reconstructions](#)", International Conference on Quality of Multimedia Experience (QoMEX 2018), Sardinia, Italy, 29 May - 1 June 2018
- A. Karakottas, A. Papachristou, **A. Doumanoglou**, N. Zioulis, D. Zarpalas, P. Daras, "Augmented VR", IEEE VR, Reutlingen, Germany, 18-22 March 2018, [https://www.youtube.com/watch?v=7O\\_TrhtmP5Q](https://www.youtube.com/watch?v=7O_TrhtmP5Q)
- G. Zoumpourlis, **A. Doumanoglou**, N. Vretos, P. Daras, "[Non-linear Convolution Filters for CNN-based Learning](#)", IEEE International Conference on Computer Vision (ICCV 2017), Venice, Italy, October 22-29 2017
- **A. Doumanoglou**, N. Vretos, P. Daras, "[Action Recognition From Videos using Sparse Trajectories](#)", 7th International Conference on Imaging for Crime Detection and Prevention (ICDP-16), Madrid, 23-25 November, 2016
- N. Zioulis, D. Alexiadis, **A. Doumanoglou**, G. Louizis, K. Apostolakis, D. Zarpalas, P. Daras, "[3D Tele-Immersion Platform For Interactive Immersive Experiences Between Remote Users](#)", IEEE International Conference on Image Processing, ICIP 2016, Sept 25-28, Phoenix, Arizona, USA
- 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

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