Andrew Top, Software Engineer

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SUMMARY

Ever since I was a child I've been absorbed in computer science. I enjoy designing and evolving large software systems. I have experience in a wide variety of problem domains, but I am particularly passionate about 2d/3d graphics, embedded systems, and developer tools. I enjoy exploring a hard problem and the satisfaction that comes with solving it.

EXPERIENCE

YouTube - Staff Software Engineer   2012-11-05 — 2020-01-17
https://youtube.com

- Tech lead for Cobalt (cobalt.dev), the browser/application platform behind the YouTube on TV app.
- Joined the team as the graphics lead, implementing a subset of the GLES graphics API for PlayStation 3, PlayStation 4 and WiiU in terms of their respective proprietary graphics APIs.
- Designed the Cobalt graphics rendering stack, enabling improved animation framerate versus Chrome on embedded devices (e.g. game consoles, embedded TV device chipsets, Raspberry Pis).
- Designed high-level layout of major browser components, including layout, JavaScript engine, the Web API (including DOM), networking engine and graphics.
- Designed and implemented a cross-platform low-latency web-based solution to viewing YouTube 3D 360 spherical videos on TVs and VR headsets.
- Mentored and lead many team members over the course of 7 years.
- Designed systems for monitoring and analyzing performance issues.
- Collaborated with TV and device makers to promote adoption of Cobalt across the industry.

TurtleSeg - Software Engineer   2009-06-01 — 2012-09-01
https://www.turtleseg.org

- TurtleSeg started as my M.Sc. project at Simon Fraser University, and was later acquired by Oxipita Inc. TurtleSeg is a tool for performing interactive 3D image segmentation, with emphasis on a built in active learning feature.
- Architected, implemented, and packaged the software tool.
- Implemented algorithms which convert volumetric 3D image data and user input into 3D surface meshes.
- Integrated with the medical image analysis software libraries ITK and VTK.
- Designed and implemented TurtleSeg's website, turtleseg.org.
- Wrote a manual for using the software, including video tutorials.

Next Level Games Inc. - Software Developer
https://nextlevelgames.com   2007-05-01 — 2009-05-01

- Worked on multiple games including Punch Out!! (Wii), Super Mario Strikers (GameCube), Ticket To Ride (Xbox 360) and Spider-Man: Friend or Foe (PS2, Xbox 360, Wii).
- Dramatically improved the framerate in Punch-Out!! by utilizing the Wii's locked cache resources.
- Augmented silhouette algorithm to greatly improve appearance of cartoon character rendering in Punch-Out!!.
- Designed and implemented a networking library on top of the Wii's networking API in order to provide non-blocking asynchronous calls.
- Architected the gameplay structures and networking system in the Xbox Live Arcade game, Ticket to Ride. The game's networking model was client-server based, with support for server migration if the host drops.

NVIDIA - Software Engineer Intern   2006-05-01 — 2006-08-01
https://nvidia.com/

- Worked on features for NVIDIA's GoForce mobile chip firmware.
- Implemented power-saving functionality by disabling chip features while they are not being used.
- Optimized time-to-splash screen by recording and playing back standard bootup flow.

Personal Projects
https://andrewtop.com

- Respire (2020): A modular build system with a Python front-end.
- Linfinity (2008): An infinitely recursive 3D scene graph system enabling the construction of 3D fractals that are rendered in real-time.
- Virtual Foosball (2006): A networked 3D foosball computer game.
- Marching Tetrahedrons (2004): Implements the marching tetrahedrons algorithm to convert 3D density fields into isosurfaces.
- Software 3D Renderer (2003): A software 3D rendering pipeline written from scratch that is capable of rasterizing Quake 2 models.

PUBLICATIONS	**(Patent) Spherical video in a web browser, United States Patent and Trademark Office** 2019-05-21

(Patent) Spherical video in a web browser, United States Patent and Trademark Office   2019-05-21
https://patents.google.com/patent/US10296592B2

(Patent) Method and apparatus for detecting anatomical elements, United States Patent and Trademark Office 2018-04-10
https://patents.google.com/patent/US9940545B2

(Patent) Methods and systems for interactive 3D image segmentation, United States Patent and Trademark Office
https://patents.google.com/patent/US9317927B2   2016-04-19

M.Sc. Thesis: Automated confidence-based user guidance for increasing efficiency in interactive 3D image segmentation, Simon Fraser University   2012-01-25
http://summit.sfu.ca/item/12668

Active Learning for Interactive 3D Image Segmentation, Medical Image Computing and Computer-Assisted Intervention (MICCAI), volume 6893, pages 603-610   2011-01-01
https://link.springer.com/chapter/10.1007/978-3-642-23626-6_74

Spotlight: Automated Confidence-based User Guidance for Increasing Efficiency in Interactive 3D Image Segmentation, Medical Image Computing and Computer-Assisted Intervention Workshop on Medical Computer Vision (MICCAI MCV), pages 204-213   2010-01-01
https://link.springer.com/chapter/10.1007/978-3-642-18421-5_20

Dynamic 3D Scene Graphs, gamedev.net   2008-12-10
https://www.gamedev.net/tutorials/_/technical/graphics-programming-and-theory/dynamic-3d-scene-graphs-r2590/

AWARDS   **Innovation in Technology Award, Western Association of Graduate Schools (WAGS)**   2013-03-13

- This award is given for the development of innovative technology in a thesis or dissertation and its utilization for the creative solution of a major problem.

EDUCATION   **Simon Fraser University (BC, Canada)**   2009-06-01 — 2012-09-01
Master - Computer Science (Medical Image Analysis), Supervisors: Ghassan Hamarneh and Rafeef Abugharbieh, GPA: 4.3/4.3

University of Waterloo (Ontario, Canada) 2002-09-01 — 2007-04-01
Bachelor - Math, GPA: 88% (CS/Math courses)

SKILLS   **Languages:** C++, C, JavaScript, Python, Julia, MATLAB

Technologies: 2d/3d graphics, Web Browsers, Continuous Integration/Deployment, Build Systems, Cross-Platform Abstractions, Performance Profiling, Embedded Devices

Tools: Git, Docker, CMake, Gyp, Ninja, BuildBot

Libraries: OpenGL, Vulkan, V8 JavaScript engine, Googletest, ITK, VTK

INTERESTS   Snowboarding, Swimming, Hiking, Computer/console games

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