

Peter Amstutz

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Objective

To provide customer value by developing innovative software that advances the state of the art in information technology.

Education

University of Massachusetts, Amherst
Class of 2004, 2002

Master of Science in Computer Science

- Research assistant in the Center for Intelligent Information Retrieval (CIIR); worked in the area of topic clustering for information summarization.

Bachelor of Science in Computer Science

- Participated in Research Experience for Undergraduates (REU) program; worked in the Multi-Agent Systems Lab (MASL) and Wearable Computing group; conducted independent research leading to the Virtual Object System (VOS) project (discussed below).

Professional Experience

Senior Computer Scientist
Technology Solutions Experts, Inc
Natick, MA
January 2008 – Current

As senior computer scientist, I have been primarily responsible for the research and development of new products, and the development of innovative features for existing products. My experience includes all parts of the software lifecycle, from meeting with customers to perform scoping, requirements gathering, and planning, to design, implementation, testing, release, and maintenance. In this role I have worked as part of a team of engineers and analysts, mentored junior developers, and worked to formalize company-wide development processes based on best practices. Major projects in this role include:

- Key developer of the **Infantry Warrior Simulation (IWARS)**. IWARS is a verified and validated (V&V) force-on-force combat simulation accredited for use by the U.S. Army, Marine Corps, and international partners. IWARS is a desktop application written in C# and C++. I contributed to all areas, most notably design of underlying “switchboard” component architecture and 3D visualization using OpenGL and Open Scene Graph.
- Created **TSE Triode**, a database, query language, and inferencing engine for working Resource Definition Framework (RDF) triples. This is a C++ library implementing an embedded logic programming language, supporting both forward-chained RETE and backward-chained solution search. Triode is used in the Geode and RPGS products.
- Created **TSE Geode**, an application for creating terrain files suitable for use in games and simulations from Geographic Information System (GIS) data, including elevation maps, imagery, and vector features. This is a desktop application written in C++ with the GUI written in C#.
- Created the **Reasoning, Planning, and Goal Seeking (RPGS)** cognitive architecture for intelligent agents. This is an “artificial general intelligence” architecture for autonomous agents to reason about the world. This concept was prototyped using the Prolog logic programming language, later replaced with the Triode product. I integrated RPGS with IWARS to achieve reasoned, coordinated behavior of agents in simulated combat situations.
- Created **Natick Measure 2**, an analysis package for calculating anthropometric measurements (i.e. human proportions) from high resolution 3D laser scans. This is a desktop application written in C# and Python, and utilized a data flow architecture to distribute processing steps across multiple threads to maximize utilization of multi-core CPUs.

Software Engineer
General Dynamics Information Technology
Natick, MA
March 2005 – January 2008

- Software engineer on the IWARS project.
- Technology Solutions Experts, Inc. was formed in 2008 by former employees of General Dynamics. TSE took over the IWARS project.

Contractor
Braintree Rehabilitation Hospital
Braintree, MA
January 2012 – January 2013

- Developed custom solution for tracking compliance with Medicare regulations for patient therapy hours
- Collected requirements, conducted database table design, developed SQL queries, and implemented forms and reports using Microsoft Access.
- Part time contract work performed after hours

University Information Systems
University of Massachusetts, Amherst
May 2001 – August 2001

- Customized Multi-Router Traffic Grapher (MRTG) for client using Perl. MRTG is a Perl application that uses the Simple Network Management Protocol (SNMP) to retrieve status from routers and switches and create a web page with a time series plot.

Technical Skills

Programming languages	C, C++, C#, Python, Java, SQL, Prolog, Lisp, Javascript, Perl, shell scripting
Operating systems	Microsoft Windows, Linux, Apple OS X, Google Android
Development environments	Visual Studio, Eclipse, Emacs
GUI/Graphics technologies	Qt, WxWidgets, Windows Forms, Windows Presentation Foundation (WPF)
Networking	Sockets, TCP, UDP, multicast, IPv4 network configuration
Web technologies	HTML, HTTP, CSS, XML, Apache, Tomcat, Websockets, RDF, OpenSSL
3D Technologies	OpenGL, WebGL, Open Scene Graph, Blender, 3D Studio Max
Build systems	Mercurial (hg), git, Subversion (svn), CVS, make, cmake, automake
Databases	SQLite, MySQL
Open Source	Experience participating in Open Source communities, communicating with project leaders, making bug reports, helping with other community members, and contributing code; including Open Scene Graph, Blender, Delta 3D, Mozilla
Geographic Information Systems	Understanding of key GIS concepts including spatial reference systems, datums, geodetic coordinates, projections, GeoTIFF, GML, GDAL

Other Experience

- Developer of the Virtual Object System (VOS), an open source distributed object system for virtual reality. Lead an Open Source project for six years (2000-2006) with a goal to build infrastructure and applications supporting a peer-to-peer 3D virtual environment. Original project was written in Java, later moving to C++. This project attracted a community of interest, gained contributions from outside developers, and was used in several outside projects. Key experience I gained through this project include 3D graphics, socket programming, writing an HTTP server, publish/subscribe systems, multithreaded programming, developing an object-relational mapper to store “virtual objects” in a MySQL database, and techniques to bind C++ code to scripting languages (Perl). Principal development was conducted on Linux, however I gained experience in cross-platform development through porting to Microsoft Windows and OS X.
- Developer of the “gnome-swallow” applet for GNOME 2, distributed as part of Debian, Fedora, Gentoo, FreeBSD
- Developer of the “joy2key” application for the X Window System, distributed as part of Debian, Arch, Mint
- Debian Linux administration experience running both a personal server and Linux desktop for over 10 years.

Publications

Daniel Rice, Medhat Korna, Peter Amstutz, Dale Malabarba: Reasoning, Planning, and Goal Seeking for Small Combat Unit Modeling and Simulation. HCI (29) 2013: 596-600

James Allan, Stephen M. Harding, David Fisher, Alvaro Bolivar, Sergio Guzman-Lara, Peter Amstutz: Taking Topic Detection From Evaluation to Practice. HICSS 2005

Peter Amstutz, Andrew H. Fagg: Real Time Visualization of Robot State with Mobile Virtual Reality. ICRA 2002: 241-247

References available upon request.