David J. Barnes

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Research Interests:

Robotics, robot ethics, bio-inspired robotics, computer architecture, machine and computer vision, hyperspectral imaging, OpenCV, database design, real-time data collection systems, geometric methods for robot trajectory planning, sensors and actuators, and microprocessor-based applications.

Current Projects:

Optimizing Joint Placement for Bipedal Locomotion and Control
The Peter Rush Project exists to further enhance my understanding of bipedal locomotion. Specifically designing mechanics, interfaces, and algorithms to overcome the inherent challenges found in biped development; dynamic load balancing, actuator network communication, volatile terrain navigation, and power consumption. The skeletal system is constructed from aluminum 6061 and houses a series of linear actuators. Each actuator has a custom low power dissipation motor controller network node that independently communicates with neighboring sensors and reports geometric positioning data back to a central control unit.

Object Tracking and Image Separation Based on Color, Pattern, and Shape
Barn Tech is an embedded system that adheres to the principal that the best user interface to a system is neither seen nor heard. The system contains various sensor arrays, a dual-axis stepper motor powered camera track, Sony LANC (zoom, focus, and standby capabilities), and C#/C++ object detection software / hardware (OpenCV & EmguCV). The system uses the various sensors, hardware, and software to determine horse and rider position. Using object detection, the system will constantly optimize angle, position, focus, and zoom parameters. Post-production is fully automated (extracted, converted, and uploaded) and available to paid Barn Tech members. A beta installation is scheduled for July 2010.

Using Air Muscles to Build Biologically Inspired Robots
Mimicking biological muscles with air pressure, silicone, and braided nylon is an efficient way to understand the muscular structure of humans and canines. This is a robust means of locomotion ideal for applications that demand the impulsive behavior of human-like muscles (jumping, quick muscle adjusting). Large amounts of air pressure can effectively be controlled through a series of air values and solenoids creating a very human-like movement.

Biography:

I actively develop all infrastructure and technology for Resolution Media, as well as serve on the executive team. My latest project includes the creation of RM3, Resolution Media's proprietary global data warehouse, work-flow and analytics tool that automates many functions such as reporting and data collection.

Prior to Resolution Media, I worked for several software and e-commerce companies such as Firestar Interactive and Peerlis LLC. While at Firestar, as a Software Engineer, I was the lead architect on an affiliate platform, which integrated various channels of media, as well as automated reporting and billing. At PandaFish, a company I both founded and run, I am the lead technologist conducting independent research on bipedal robots, computer vision systems, real time data collection applications, and designing e-commerce algorithms.

I am currently a member of the Technology Executives Club and the Institute of Electrical and Electronics Engineers (IEEE). When I am not focused on work, I enjoy sailing, jazz music and robotics.

Professional Experience:

Director, Business Intelligence
Resolution Media (Jan 2006 - Present)

Leading the operations of a business intelligence team and reporting directly to the CEO of Resolution Media. Position consists of advancing the development of Resolution Media's business intelligence strategies, designing and maintaining global reporting and ERP (RM3), increasing internal efficiencies through automation, and participating on the executive team. Senior architect of RM3, Resolution Media's global digital media solution. RM3 is an n-tier application with remote clusters residing in Chicago, NY, and London. It was designed to handle the load of thousands of concurrent users and consumes over 10MM new records of data nightly via it's custom ETL (written in C++). The RM3 reporting engines were designed from the ground up and are accustom to aggregating over 200,000 records at run-time (T-SQL, C#, AJAX, C++, and .Net drawing geometry objects).

Relevant technologies: .Net 2.0, C#, C++, AJAX, SQL Server 2005, Perl, FLEX 3

Senior Software Engineer
Firestar Interactive (2005 - 2007)

Served as lead architect and technical mentor for internal developers and specialized in the creation of advanced system architectures. Designed hardware and software kiosk applications that integrated with client web site and off-line database; which could be controlled remotely by an administrator. Responsible for business analysis, proposal generation, and development of hardware and software platforms. Authored the FSI internal CRM which allowed Firestar Interactive to scale it's client roster by aggregating all client data into a central repository (Included: billing, internal time management, kiosk data, survey results, campaign data, auto web site form generation, lead gen, web analytics, and email campaign data).

Relevant technologies: C#, .Net 1.0, Novel and Windows networking, IIS, Apache, Perl, SQL Server 2000

Software Engineer
Peerlis (2003 - 2005)

Directed and trained a team of junior engineers in .Net, C#, PHP, SQL Server and Perl. Co-authored the development of a COM-based content management system written in C# and Oracle and trained clients and customers. Deployment, quality assurance documentation, and full e-commerce platform specialist.

Relevant technologies: ASP, C#, .Net, VB, COM, DCOM, Perl, PHP, MySQL, Javascript, IIS

Charity & Volunteer Work

Fate Monkey Inc: As co-found and partner of Fate Monkey Inc, our goal is to raise money for orphanages in Africa by creating and coordinating local and regional events. The 2009 event (Snuggie Pub Crawl) raised over $20,000 for charity while filling the bellies of ~2,000 participants with hops and barley. (Contact: Michael Gallagher +1 312-813-5555)

Coal Gram Inc: As partner and active member of Coal Gram Inc, we donate the proceeds of our silly holiday gift items to the Arbor Day Foundation; a group that inspires people to plant, nurture, and celebrate trees. (Contact: Donnie Franzen +1 630-464-7168)

Chicago Cares: Active participant in biannual Chicago Cares events. Chicago Cares is a community outreach program that focuses on the most pressing needs in education, hunger, health and wellness, senior services, and environment and rehabilitation. (Contact: Sarah Greene +1 312-980-1643)

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