Dax Westerman

Work Experience

Principal Application Developer / Research Assistant

Center for Improving the Public's Health Using Informatics
Department of Biomedical Informatics
Vanderbilt Medical Center - Nashville, TN
November 2011 to Present

Health Services Research and Development
Tennessee Valley Health Services, Veterans Administration - Nashville, TN
November 2011 to Present

Following are projects where I work currently as or was principal in development/design:

- A pipeline which intakes scanned or faxed clinical notes within an emergent setting (external transfer to ER) and reduces to structured output into an EHR model using OCR (e.g., table) techniques, extracting relevant clinical and temporal information through ensemble NLP methods, providing just-in-time access to data otherwise unavailable to institutional automated clinical decision support.
- Novel detection algorithm of table-like structures in clinical notes using NLP, column/row word placement, and finite state machine feature generation. Use to improve performance in ABI/TBI detection in semi-structured clinical notes from 64% to 90%.
- Leveraged Weka machine learning framework to extend multi-search functionality to multiple machine learning classifiers (Random Forest, J48, Logistic Regression, Naïve Bayes, Isolation Forest) coupled with Cost Matrix generation, such that given an evaluation for the best classifier can be determined for a given classification model over a clinical corpus.
- A clinical decision support portal to aid in the early detection of cirrhotic patients. This tool extracts data reads / write to the VA's HER (VistA) to provide workflow-specific views into the patient medical record (e.g., labs, meds, clinical notes, etc.) to support disease-specific chart review. Clinicians are notified using native notification mechanisms in clinical note system post classification of patients using machine learning. Provides direct ordering capability to streamline workflow, providing evidence-based guidance for order set curated by domain experts.
- A pathology review portal and clinical decision support tool that permits the import of genetic lab reports that permits review for detection of cancer. Framework that extracts computable data from unstructured text using a custom knowledge library. Clinical indications, targeted genes, and karyotype are sent to 3rd party CDS engine to produce recommendations.
- A statistical tool, similar in concept to statistical SciPy packages, OCEANS (Observational Cohort Event Analysis and Notification System) designed to provide domain-specific machine-learning methods for population health analytics.
- Research portal to present a graphical overview of site/regional/national comparative overview for a research cohort to reinforce adherence to guidelines for acute kidney injury. Custom graphics library developed using D3.js to present cumulative and month-level O/E comparisons, process-control chart view, risk-adjusted sequential probability ratio test, and overall patient panel with model features.
- Development of C#.NET adapters within the PopMedNet framework under the national patient-centered SCAlable National Network for Effectiveness Research (pSCANNER) project. The

PopMedNet portal provide a workflow for distributed analytics among various privately held patient data repositories, such as the VA. Leveraged R as the engine for distributed analysis and local logistic regression.

- A tool to load-balance analytic requests across multiple in-house resources, DAN (Distributed Analytics Network) provides academic groups a measure of parallel processing to incoming requests from the pSCANNER network. Offers an API to broker nodes wherein queuing algorithms can evaluate performance at the node level for its children against the analytics request to help determine the most appropriate child node to service the request. Additional current roles within the center include:
- Technical adviser and ETL / tool developer for a VA / Department of Defense initiative to collaborate on sharing EMR data within a common data model
- Technical adviser to core Natural Language Processing (NLP) group for infrastructure and design, including current efforts into exploring word2vec within a clinical note workspace
- In-house software and hardware Infrastructure in support of analytics and big data initiatives

Senior Developer

PerfectServe, LLC - Knoxville, TN
July 2007 to November 2011

- Senior Developer on 24/7 clinical communications system that routes calls, messages and notifications via a rule- based mechanism, leveraging information about recipient (e.g. schedule, notification preferences, etc.) to ensure message delivery. Lead on web and external services development. Co-authored client service application suite for in-house call center. Team lead and architect over public web offerings. Reported directly to Director of Product Development and CTO. Consistently received exemplary reviews for expertise and work ethic.
- Customer Web Portal - Web portal permitting client access to scheduling, direct communication, message tracking and other features of the core platform. Primary developer and architect of web portal. Leveraged jQuery and Ajax to enhance customer experience. This product is used by entire customer base as a core part of their daily workflows within the platform. Mission-critical application.
- Core Application Suite - Suite of 10+ core applications used by in-house client services group to support configuration and maintenance of customer configurations within the platform. Assisted in architecture and helped lead development.
- Database Synchronization Software - Multi-threaded many-to-many database replication service and administration toolset, currently processing over two million transactions per day. This is a core part of the current business.
- Reporting Services - Aggregated reports from multiple sources (e.g. custom, SSRS, etc.) via windows service and administration tools to delivery via fax or email. Primary report delivery mechanism for current platform.
- Service Layer - Middle-tier and client layer abstracting access to data layer for access via the web, mobile applications and API interfaces.

Senior Software Consultant / Business Consultant

DALCO, LLC - Alpharetta, GA
November 2005 to July 2007

Contracted to clients to create design and implement software and business solutions. Consistently brought client projects in on time and at or under budget. Highly positive reviews by managing partners. Following are the major projects accomplished as a consultant for this firm.

- Business Continuity / Disaster Recovery Planning - Blount Memorial Hospital Maryville, TN, as well as Accredo Health Group, Memphis, TN.
- Change Control Portal - Developed workflow and interface for internal change control for IT department of the investment firm Ron Blue and Company, Atlanta. ASP.NET and SQL Server.
- Reservation Scheduling and Management Portal - Public portal for Lighthouse Family Retreats. Created database and web portal to manage scheduling, reporting and communications. ASP.NET, SQL Server and Reporting Services.
- Medical Record Integration - Transformed MAR and other patient information via feed from McKesson product into Intranet application for Blount memorial Hospital. JSP, XSLT and XML.
- Accounting, Inventory and Reporting System - Developed El.NET and Job.NET for AST, a manufacturer and provider of machine coatings. These two applications permitted tracking of orders, shipments, inventory and payment for their entire business. WinForms using .NET 2.0. Converted legacy Macola database to SQL 2000. .NET WinForms, Remoting, SQL Server and Reporting Services.
- Telecom Cost Reduction - Developed tool to inventory and compare for cost reduction internal cell phone usage within regions of AT&T. Tool provided overall cost savings to company by cataloging usage and performing analysis optimizing internal use with best plans. .NET, WinForms, and Reporting Services.
- Reporting - Provided custom reporting for several clients against SQL Server, Pick and Macola databases.

Consultant / Owner

Nascent Vision, LLC - Alpharetta, GA
January 2002 to November 2005

Personal firm for independent work as technical consultant.

- Remote Server Monitoring Tool - Developed a remote monitoring tool to permit an off-site administrator to have a 24/7 view of the health of a Windows server. VC++ 6.0, socket programming, and MS SQL Server.
- Database - Several projects involving design, data mart construction, and reporting with MS SQL Server.
- Portal Development - Developed intranet and internet portals to support small business and entrepreneurs. ASP, ASP.NET, and MS SQL Server.

Software Consultant

Alcoa, LLC - Knoxville, TN
July 2005 to October 2005

Contracted to initiate development and provide technical leadership for ACES, an Alcoa initiative to standardize and automate aluminum casting and production. The initiative involved architecting and developing software to control the global workflow of aluminum production.

- Helped architect system for globally-accessed platform using VB.NET and T-SQL. Redesigned and normalized existing database schema. MS SQL Server. Employed Enterprise Library for .NET to leverage Microsoft Best Practices. Worked closely with industry specialists to ensure quality of deliverables. Moved to new position when project relocated overseas.

Senior Developer

RealTime Gaming - Atlanta, GA
May 2003 to July 2005

Worked on internal support and client game software for on-line gaming industry. Position involved heavy database expertise, owing to intricate and mission-critical nature of an on-line casino.

- Administration Portal - Worked in portal that provided real-time configuration and reporting tools to individual casino owners. Developed prototype JavaScript library for cross-browser client-side DHTML and service layer remote calls. ASP, JavaScript, ASP.NET, C#, T-SQL, VC++ and COM.
- Database - Assisted in development of database to support Intranet and gaming clients, supporting schema and stored procedure design. Helped develop deployment mechanism for SQL server updates to ensure guaranteed deployment across 30+ servers. T-SQL.
- Fraud/Hacking Detection - Implemented fraud detection for both W eb and client applications to prevent money laundering and the use of bots within games as well as stall hacking attempts. VC++, COM and TSQL.
- Transaction Processing Interfaces - Developed interfaces to process payments. XML, VC++, COM and T-SQL.
- Tier III Support - Provided support for issues involving core aspects of the system.

Software Architect / Team Lead (Founding Member)

Prizm Technology, Inc - Alpharetta, GA
January 2002 to May 2003

Founding member of start-up company located in Bradenton, FL. Flagship product was Top-Up, a kiosk for purchasing pre-paid cell phone minutes, bill pay, pre-paid long distance and other services. Architected system and directed development remotely from Alpharetta, GA. The company was purchased by CoinStar for inclusion into their own kiosk offering.

- System Architect - Developed end-to-end solution for client interaction with kiosk, software management, and back office support. ASP.NET, VC++, C#, COM, JavaScript, Web Services and T-SQL.
- Team Lead - Led team of three other developers for client, back office and kiosk interface (e.g. credit card reader) development.
- Lead Back - Office Developer -Developed the service layer and supporting database for entire kiosk network. C#, COM, Web Services and T-SQL Position ended upon sale of company to CoinStar.

Senior Developer / Team Lead

Elcotel Telecommunications - Alpharetta, GA
October 1999 to January 2002

Lead developer on project to leverage space on public pay phones for delivery of advertising and public service information.

- Content Management Workflow - Helped design and implement workflow around the request, development and delivery of custom content for clients. ASP.NET, VC++, COM and T-SQL.
- Content Delivery and Scheduling - Architected and led development on custom content delivery system. Payphones in the field called in at pre-arranged times to requesting a new content

manifest. This system provided the workflow to aggregate content based on geography, imprint focus, demographics, etc., to create a content package on a per- phone basis for display that cycle. ASP.NET, VC++, COM and TSQL.

- Embedded Content Display - Assisted development on the WinCE-based computer embedded in the next generation payphones. Worked on system that communicated with back office to receive content. VC++ and TCP/IP.

Developer / Team Lead

Lucent Technologies - Atlanta, GA
June 1998 to October 1999

Developer on AllView project, supporting schematic development and archival for telephony switch installation for the Southeast region of Lucent.

- AllView - An online portal to manage design and installation of telecom switches for Lucent's Southeast region. Worked on team to maintain Intranet portal and database.
- Team Lead - Worked as Team Lead over Web and application development internal to AllView group. Worked with management to formulate requirements and assembled and worked with teams. Consistent exemplary reviews by management.
- External Reporting - Developed and maintained external reporting feeds for management and audit teams for telecom installation for Southeast region.
- Interim Director - Worked as Interim Director over 30+ people when previous director resigned. Returned to software development upon locating permanent replacement with new opportunity.

Research Assistant / Lab Instructor

University of Tennessee - Knoxville, TN
August 1997 to May 1998

- Researcher and Research Assistant - Developed ICAT (Interactive Cluster Analysis Toolkit) for Foundation for Australian Resources to be employed in detection of cancer in mammography images and help diagnose diabetes in diabetic retinopathy. Worked on-site with direction from thesis director, Dr. Michael Berry, and remotely with direction from Australian director for duration of project. C++, Unix and Quantitative Image Analysis.
- Lab Instructor - Taught lab for computational mathematics class, teaching software development techniques as applied to discrete mathematics. Worked instructor for various classes within the Department of Mathematics.

Education

Biomedical Informatics Vanderbilt University

M.S. in Computer Science University of Tennessee - Knoxville, TN

B.S. in Mathematics University of Tennessee - Knoxville, TN

Technical Skills

Languages

Java, Python, C#, C++, T-SQL, HTML, CSS, JavaScript, R

Frameworks

JQuery, AngularJS, NodeJS, ASP.NET, WinForms, MVC, WCF, Web Services, ASP, PHP

Domains

VistA (EHR), Data Analytics, Data Science, Algorithm Development

Publications and Presentations

Garvin JH, Ducom J, Matheny M, Miller A, Westerman D, Reale C, Slagle J, Kelly N, Beebe R, Koola J, Groessl EJ, Patterson ES, Weinger M, Perkins AM, Ho SB. Descriptive Usability Study of CirrODS: Clinical Decision and Workflow Support Tool for Management of Patients With Cirrhosis. JMIR Med Inform. 2019 Jul 3;7(3):e13627. doi: 10.2196/13627. PMID: 31271153; PMCID: PMC6636234.

Westerman D, Fitz-Henry F, Levy M, et al. Integrating Cancer Genomic Data into Decision Support at the VA: Hematologic Oncology as a Use Case. AMIA Annual Fall Meeting 2018.

Ohno-Machado L, Agha Z, Bell DS, et al. pSCANNER: patient-centered Scalable National Network for Effectiveness Research. J. Am. Med. Inform. Assoc. 2014;21:621–626.

Westerman D, Matheny M, et al. A Real-time Electronic Dashboard for Geriatric Care: An On-Line Informatics Tool Facilitating Distance Collaboration of Geriatric Scholar Quality Improvement. Gerontological Society of America (GSA) Annual Meeting 2013. Presentation.

Westerman DM. The Design and Application of ICAT: Interactive Cluster Analysis Toolkit. 2017 [cited 2017 Oct 1]; Available from: http://dx.doi.org/ .

Berry MW, Westerman DM. Cluster form analysis techniques for diabetic retinopathy. 2017 [cited 2017 Oct 1]; Available from: http://dx.doi.org/.