Shweta Purushe

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Education

Ph.D. Biomedical Engineering and Biotechnology

Thesis Title :'Tight coupling of web based analysis and visualization for large biological datasets'

University of Massachusetts, Lowell, Department of Computer Science (Dec. 2009-Dec. 2015)

GPA: 3.86

M.Sc. (Masters of Science) Microbiology

Thesis Title: 'Purification and Characterization of Dextranase and its potential use in the crystallization of sugar'

University of Pune, Pune, Department of Microbiology (2006-2008)

B.Sc. (Bachelors of Science) Microbiology

University of Pune, Pune, Department of Microbiology (2003-2006)

Work Experience

Weave Visual Analytics -- Software developer. Lowell, MA USA (Feb 2016 - August 2016)

A. Development of visualization tools for Weave 2.0
B. Design and implementation of a framework for customized dashboards using Weave
    - ELM, Kingdom of Saudi Arabia : Dashboard for navigation and querying geographical and national indicator hierarchies
    - Martin's Point Health Care (MPHC) : Dashboard for rapid report generation of an internal health risk score model system calculating indicator scores for a MPHC member's health care utilization

Tools

Programming Languages	Java
Scripting Languages	JavaScript, ActionScript, Perl
Libraries and Frameworks	JavaScript: Angular (1.x), ReactJS, D3 ActionScript: Flex

IDEs	Eclipse, Webstorm
Build Tools	Gulp, Webpack, Babel
Source Code management	Git, GitHub
Statistical tools	R, Weka, and Mathematica

Knowledge of

Databases	MySQL
Operating Systems	Mac OSX, Windows XP

Projects

1. The Weave Analyst

The goal of the Weave Analyst is

A. To serve as Proof of Concept (POC) of a web-based analytic platform that enhances the power of visualization libraries through external computational engines
B. To serve as an open source, analytic and visualization peer to Weave (Web- based Analytic and Visualization Environment www.iweave.com).
C. To provide an alternative analytic pipeline of interactive visualizations in Weave to R users via a simple R package (weaveR, http://shwetapurushe.github.io/weaveR/)

Design and implementation included the following:

- Development of a JavaScript web application using the Angular (https://angularjs.org/) framework
- Deployment, installation, build system and code repository maintenance for the above application
- Development of an API for server-side communication with external computational engines for example R, STATA, Python
- Development of support for supporting multiple data sources
- Integration with Weave through the open source Weave JavaScript API
- Evaluation of data architecture and performance evaluation for computations in R
- Light-weight reporting visualizations in D3
- Development and preliminary implementation of metadata standards for data and computations
- Proof of concept of analytic pipeline construction, its execution and provenance management

The source code for this project is present at https://github.com/WeaveTeam/WeaveAnalyst

Documentation, instructional videos and additional material is present at
http://info.oicweave.org/projects/weave/wiki/Weave_Analyst

A working prototype of this software is present at
http://demo.iweave.com/weave-stable/aws

2. WEb-based Analytic and Visualization Environment (Weave 1.9)

   A. Development of analytic tools in Weave

      Design and Implementation included
      - Development of an 'R Script Editor' for execution and integration of R computations and visualizing results in Weave.
      - Ability to view and store intermediate computational results in Weave
      - Support generation of R plots in Weave

   B. Development of analytic support for visualizations in Weave
      - Utilizing R computations to enable data analysis in Radviz, for example layout of dimension anchors according to the Class Discrimination Algorithm
      - Using R computations for missing data imputation using different algorithms

The source code for this project is present at
https://github.com/WeaveTeam/Weave

Documentation, installation requirements additional material is present at
http://info.oicweave.org/projects/weave/wiki

A working demo of this software is present at
http://www.iweave.com/

3. weaveR
   A. The Weave platform ported as a visualization widget to R using the 'htmlwidgets' framework.
   B. This is an open source R package that allows R users to deploy Weave as a webapp from within the R console.
   C. Data and computation results in the R project can be visualized in Weave.

The source code for this project is present at
http://shwetapurushe.github.io/weaveR/

4. Analyst Workstation for CDC/ASTHO/SKC/RI

   A. The goal of this project was to develop and open source visual analytic platform for epidemiological data analysis.
   B. The development of the Weave Analyst was guided through 'Agile' process of development by the Department of Public Health, Seattle King County (SKC), the Center of Disease Control and Prevention, Atlanta (CDC) and the Rhode Island Data Hub (RI).

   Design and Implementation overlap with the Weave Analyst with the following additional goals

   - Categorical and time data filters
   - D3 interactive geographical filters
   - Additional support for epidemiological routines, for example prevention of record identification, remapping data etc.

5. Google Summer of Code (GSOC) 2013

   'Design and implementation of computational support for large datasets in Weave using the R project'

   This project included design and implementation of the following

   - Exploration of different data architecture pipelines for robust data analysis
   - Investigation of packages for parallelism in R and preliminary implementation
   - Implementation of a storage and retrieval system for computational results

6. Google Summer of Code (GSOC) 2014

   Development of an analytic framework for multivariate 'omics' datasets in the Analyst's WorkStation using Bioconductor

   This project included design and implementation of the following

   - Development of an API for analytic support in Weave using computations in BioConductor and Python
   - Server side computational model for analyzing large 'omics' datasets
   - Experimentation with running several clustering algorithms in BioConductor with features developed in GSOC 2013 project

Research Experience

Research Assistant (Spring 2013 till Fall 2015)

Duties
1. Project manager and team developer of the Weave Analyst
- Weekly conference calls and client meetings
- Creation and management of goals, tasks and deadlines
- Source code management
- Daily scrums
- Releases/Installations and Documentation

2. Team developer of Weave
Implementation of visualization and analytic tools in Weave

Experience
- Implementation of an API for Weave to communicate with external statistical packages and libraries (R/ Perl/Python/ STATA/ BioConductor)
- Design and implementation of an API to connect Weave Analyst to external visualization libraries such as D3.
- Experimenting with alternative data architectures for faster computations in R
- Improving R computation performance in Weave Analyst through parallel computing and appropriate data structures

Teaching Experience

Department of Computer Science
Data Visualization (Spring 2010)

Department of Biological Sciences
Life Science 1 (Fall 2010, Spring 2011, Fall 2011)
Life Science 2 (Spring 2012)
Plant Biology (Fall 2012)

Publications

1. Kamayou.F, Granz.H, Tuccar.M, Purushe.S, Grinstein.G, Paciello.M, Coleman.G. **"**Implementing Accessibility In a Widely Distributed Web Based Visualization and Analysis Platform – Weave**"**, *Annual International Technology and Persons with Disabilities Conference 2015*

2. Anbalagan.S, Grinstein. G, Purushe.S, "Personal Informatics: Weave your Numbers**",** *Contemporary Computing and Informatics (IC3I), 2014 International Conference*

3. Granz.H, Tuccar.M, Purushe.S, Grinstein.G, "Implementing disability accommodations in a widely distributed web based visualization and analysis platform – Weave**",** Proceedings of the 7th international conference on Universal Access in Human-Computer Interaction: design methods, tools, and interaction techniques for inclusion – Volume Part I, 07/2013

4. **Visualizing Health: Enhancing Public Health through Weave Data Analysis and Visualization**

   Crawford.C, Smyser.M, Grinstein.G, Ribble.J, Park.S, Chapman.R, Purushe.S, Ryan.P, Kamayou.F, Galkina.E

   Public Health's Wicked Problems: Can InfoVis Save Lives? In conjunction with IEEE VIS 2013
   (IEEE Visual Analytics Science and Technology, Information Visualization, Scientific Visualization)

5. **Biocatalytic potential of an alkalophilic and thermophilic dextranase as a remedial measure for dextran removal during sugar manufacture**

   Purushe.S, Prakash.D, Nawani.N, Dhakephalkar.P, Kapadnis.K
   Bioresource Technology 01/2012; 115:2-7.

6. **Development of an Interactive Ramachandran Plot in Weave**

   Purushe.S, Anbalagan.S, Grinstein.G
   Information Visualisation (IV), 2011 15th International Conference: 08/2011

7. **Interactive Animated Visualizations of Breast, Ovarian Cancer and Other Health Indicator Data Using Weave, an Interactive Web – Based Analysis and Visualization Environment**

   Purushe.S, Grinstein.G, Smrtic.M, Lyons.H
   Information Visualisation (IV), 2011 15th International Conference: 08/2011

References

Dr. Georges Grinstein,
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