Proposal for Research and Education Projects
BHAVI 2016 Summer Education Program

Jason Liu

7/1/2016

1 Primary Research Project

Project Title: Using MySQL with MeanStack in an Alternate Implementation of PDS

Project Authors: Jason Liu, Daniel Yang, Adam Craig, Dr. Carl Taswell, MD, PhD

For researchers, primary research is only the first stepping stone to proving or disproving a theory. One successful experiment proves little to nothing in the grand scheme of the scientific community. However, the weakness of a single experiment is covered by the power of the meta-analysis, usually completed by a third party. Meta-analysis requires researchers to analyze results from muliple primary articles and assess whether or not the result is accurate, show if the hypothesis presented are proven or disproven, and provide a degree of error. However, despite the necessity of meta-analyses, it continues to be time consuming and ineffective at connecting with all points of data. The miniscule amount of secondary articles pale in comparison to the literal thousands of primary articles which are published each day. In order to take advantage of all the new information which is provided and to create more effective secondary analyses, a semantic web solution provides the necessary tools in order to take full statistical advantage that meta-analysis offers.

In order to support PORTAL registries and DOORS directories, a database is necessary in order to support the data. In order to take full advantage of a tried and true framework, Meanstack serves as the ideal system. However, the 'M,' standing for MongoDB is a NoSQL database. Although NoSQL may offer certain benefits, t a relational database may continue to be the reliable solution for the semantic web.

The implementation of a database in a semantic web solution must:

- be a network of registries and directories for resource metadata organized by content rather than technological format
- encourage interoperability and compatibility with other specialized communities (ie connecting clinical neuroscience with cognitive neuroscience)

- be of hybridized architecture able to handle XML Schemas, RDF triples and OWL ontologies in order to bridge the transition between semantic web and original web smoothly.
- have logical hierarchical authorities and generally understood identifiers to prevent conflictictions with names when identifying resources
- have the potential for greater expansion and adoption by the global scientific and public community.

In order to achieve these goals, numerous tools are necessary. At the core of the project, MySQL will be the primary server implementation. MySQL will be the relational database alternative for the current noSQL solution in Meanstack (MongoDB, Express, AngularJS, NodeJS). By taking advantage of this system, the project can take full advantage of all four tools under one language. However, in order to replace MongoDB with MySQL, some ORM (Object Relational Mapper) will be needed, possibly Telerik, Sequelize, etc. An ORM will also be needed to convert previous data from MicrosoftSQL to MySQL. Following primary tools, secondary tools are a necessity. Due to the nature of the project falling under multiple sections and individuals, communication with either Google Hangouts, Skype, or GoToMeetings will be used.

Timeline:

- Week 1-2: Create read/write MySQL database from MicrosoftSQL
- Week 3-4: Set up PORTAL system for database
- Week 5-6: Set up DOORS system for database
- Week 7-8: Connect with other modules
- Week 9-10: Test reliability, accuracy, full extent of analysis

2 Secondary Research Project

Project Title: Using MEAN Stack to Develop a Web App that Performs Meta-Analysis

Project Authors: Daniel Yang, Jason Liu, Adam Craig, Dr. Carl Taswell, MD, PhD

The project plans to use MEAN stack to develop a website that uses meta-analysis to reach an answer to an user inputted question after searching through all the relevant articles in a database (in this project MySQL). After reaching a general consensus, the algorithm will return the solution as a simplified paragraph that the user can read. The goal of this project is to enable researchers to be able to create reliable meta analyses without the typical time consumption and inaccuracy. My role is to simply work toward and help achieve the primary goal of the project. My primary works with my secondary project in the manner that it combines to create the front and backend of the semantic web projecet.

3 Software Education Project

- SQL: Used for personal projects through c9.io
- HTML5, CSS3 and JavaScript: Used for Web App Development (class) and personal projects
- XML: Used for Android projects through AndroidStudio in Mobile App Development (class) and personal projects

4 References

1. Barrasa Rodriguez, J., Corcho, . and Gmez-Prez, A. R2O, an extensible and semantically based database-to-ontology mapping language Springer-Verlag, 2004
2. Berners-Lee, T., Hendler, J., Lassila, O. and others The semantic web Scientific american, New York, NY, USA:, 2001, Vol. 284(5), pp. 28-37
3. Dickey, J. Write modern web apps with the MEAN stack: Mongo, Express, AngularJS, and Node. js Pearson Education, 2014
4. MySQL, A. MySQL 2001
5. Pan, Z. and Heflin, J. Dldb: Extending relational databases to support semantic web queries DTIC Document, DTIC Document, 2004
6. Spanos, D.-E., Stavrou, P. and Mitrou, N. Bringing relational databases into the semantic web: A survey Semantic Web, IOS Press, 2012, Vol. 3(2), pp. 169-209
7. Stojanovic, L., Stojanovic, N. and Volz, R. Migrating data-intensive web sites into the semantic web Proceedings of the 2002 ACM symposium on Applied computing 2002, pp. 1100-1107
8. Suehring, S. MySQL bible John Wiley and Sons, Inc., 2002
9. Taswell, C. DOORS to the semantic web and grid with a PORTAL for biomedical computing IEEE Transactions on Information Technology in Biomedicine, IEEE, 2008, Vol. 12(2), pp. 191-204
10. Taswell, C. Portals and doors for the semantic web and grid Google Patents, 2010
11. Taswell, C. A distributed infrastructure for metadata about metadata: The HDMM architectural style and PORTAL-DOORS system Future Internet, Molecular Diversity Preservation International, 2010, Vol. 2(2), pp. 156-189