ENG4000: Team and Project Summary

Creating a database solution for the UNESCO Chair Research #IndigenousESD

Due on Tuesday, September 18 2018

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Summary of Project Objectives

UNESCO's Sustainable Development Goal 4 (SDG4) for Agenda 2030 aims to eliminate disparities in education and ensure equal access to all levels of education for the vulnerable. Of particular note is outcome 4.5, which focuses on eliminating gender disparities in education for persons with disabilities, indigenous peoples and children in vulnerable situations.

UNESCO global research involves 130 institutions from 40 countries. This means that a lot of data is being collected from various parts of the world, and it is crucial to have the data saved in one place available for access by everyone. But at the moment this data is spread out in personal Outlook mailboxes and spreadsheets.

Therefore, a solution is required to extract and store UNESCO research data in a database, which can be subsequently processed and used to monitor progress towards accomplishing milestones set by the SDG4.

Immediate Broader Project Stakeholders

UNESCO:
They are the immediate stakeholders, and they have the most positive interest in the project. This project is being developed in an effort to produce an improved platform to aid UNESCO in their educational research.

Non-governmental Organizations (NGOs):
There are many NGOs worldwide whose missions align with UNESCO's SDG4. Similarly to UNESCO, they work towards improving the rights of indigenous populations and have an interest in higher quality education. A successful project outcome may also benefit third party NGOs if it is freely distributed or licensed by UNESCO.

Our Team:
As the developers of the proposed project, we are also heavily invested in its success. Experience gained over the course of the project's development, as well as a positive working relationship with UNESCO both represent significant benefits to each member of the team.

Team Capacity

Andrew Ferreira

Andrew has accumulated a fair amount of academic and industrial experience relevant to this project. In addition to having studied relational database theory and schema design in class, he has also worked extensively with Microsoft SQL Server Database Management System during his 12 months as an intern at Bestech. He is confident that he can aid in the design of a correct and efficient database schema that meets the needs of the client. He has also garnered experience in both front and back-end software development. Andrew is motivated to learn the process of engineering a new solution from scratch with the help and direction of an external client, which is something he has not yet experienced while working in industry. Andrew has worked well in the past with Dan and Eric, and is confident that Asma, Shahriar and George will make for equally valuable team members. There is a high likelihood that Andrew will remain a software developer for the duration of the project, however he possesses organizational skills to make a competent project manager should the need arise.

Dan Sheng

Dan's background is largely focused on software development, with many personal projects that involve scraping, processing, storing, and displaying information. During his ongoing internship with the Canadian Tire Corporation, he has gained experience in the agile software methodology, adapting to a fast pace work environment, familiarizing himself with new technologies, and constructing proofs-of-concept (POCs) for systems monitoring and application deployment. With data collection becoming a larger part of the software industry, he is interested in tackling the problem with the goal of improving his skills in software development. Furthermore, his interest comes from first-hand experience in the education system alongside Canadian Aboriginals in northern British Columbia. Understanding the struggles that arise from remote distances and lacking infrastructure, he seeks to aid UNESCO in bridging these gaps as well as others in their SDG4 mission. Dan has prior experience working with Andrew and Eric in building, documenting, and testing software systems, and is eager to start working with the other members for a chance to share knowledge amongst different engineering majors. He is willing to take on the role of investigating and testing POCs for the project, as well as help construct the software architecture, design and implement processing logic, perform code reviews for fellow team members, and develop a testing suite.

Shahriar Dhrubo

Shahriar is coming from a computer engineering background. Over the past 4 years, he has gained both academic and industrial experience in software development and architecture. He has successfully completed the database courses offered at York University as well as applied the skills learned while working on E-commerce software support where knowledge in database systems was crucial. He is expected to help the team design the right database architecture and develop the front end UI. Born and raised in the city of Dhaka in Bangladesh, Shahriar has witnessed the harsh impacts that illiteracy has brought to his country. It has always been clear to him that many major problems in the word are caused by a lack of education and how essential it is to spread education to all corners of the world. Shahriar has never worked with any of the members in this group, but he is very confident that all members will be able to collaborate with each other for this incredible cause. He intends to take the role of a back end and front end developer and be a project manager for the last half of the project.

Eric Dao

Eric's main expertise is software development, as he has 4 years of experience programming in Java and has recently finished a 16-month internship at IBM where he was exposed to enterprise level code and software architecture. During his time at IBM, he followed the Agile software development life cycle. Eric attended daily scrums, had the opportunity to be a full stack developer where he developed a new UI view, and performed automated testing. His personal motivation for this project is to develop a solution that will provide UNESCO with the tools necessary to overcome their issue in research data management, so that they can direct their focus on improving the lives of Indigenous people through education. Eric has had the pleasure of working with Dan and Andrew for numerous courses, leading to great success. For the other members, Asma, Shahriar and George, he is excited to get to work with them as they appear to be passionate individuals. Most likely the role Eric will take is that of a full stack developer, working on both the front-end for the UI and the back-end for developing the database and being able to parse and manage the data.

Asma Hassan

Asma is an addition to the team as a software developer. She is bringing her technical skills to the team, that she has acquired from 3 years of undergraduate studies in Software Engineering and industrial experience during her internship. During her internship Asma has worked in a project to develop a dashboard for the DB2 verification testing team, which would make it easy for the team and management to track the state of DB2. In that project, data had to be inserted into the database and retrieved to display those on a website in a formatted manner. Asma has thoroughly enjoyed working on developing the dashboard and she is positive that she will enjoy working on this project as well. Due to her prior knowledge in such projects she will be involved in both front end and back end of the project. She will also act as the Project Manager during the first half of the project. Even though she hasn't formally managed such a big group as a Project Manager before but she has never hesitated in taking up a leadership role and she has always excelled at those roles. Besides her interest in the technical work, another motivation for Asma in joining the project was her belief in equal rights of quality education for everyone. Having been raised in a developing country, Asma has witnessed very low literacy rates due to the poor quality of education and discrimination against gender and race. She has been part of STEM4Girls campaigns, which promotes higher education in science, technology, engineering and math for girls. Therefore, it is important to her to be part of a great cause that involves providing quality education to those who are deprived of it. Combining these two reasons, Asma is very excited about the project. Asma has never worked with any of the members in the team but during her interactions with Eric, Shahriar, Dan, Andrew and George they have demonstrated themselves as passionate, skilled and cooperative individuals. Asma is confident they will work excellently as a team and looks forward to working with her new team in developing a substantial solution for UNESCO.

Team Strengths and Weaknesses

Our team possesses most of the attributes required to succeed in this project. We are comprised of four Software Engineers, one Computer Engineer and one Electrical Engineer. The demographic of our combined engineering disciplines is conducive to the success of a pure software solution. Given our team's experience in software development, we expect to excel in the design and implementation of our software, which includes client-side and server-side offerings, as well as a database schema design component. We also expect excellent testing of our solution, given the experience of one of our group members in industrial software testing.

There are three areas in which our team may require external support. The first of which is in the area of project management. Our team has little industrial experience in managing software projects. However, most, if not all, of our team members possess strong organizational and communication skills. As we learn the process of managing a software project, this perceived weakness may transform into a strength of our team.

We also have limited knowledge and experience in the "Requirement Elicitation" stage of engineering. The collection of abstract client needs and the subsequent translation to concrete requirements is a skill that develops from many years in industry, and we will likely be relying on our customers and advisers to guide us in this crucial step.

Finally, our team is inexperienced in software architecture. Typically, our developers have worked at a lower abstraction level than that of a software architect, and we will need to supplement this lack of experience with research into open-source code bases.

Market Review

The customer requires a database solution (preferably web-based) to store information from emails/calendars/reminders along with extracting lists from Microsoft Word/Excel for analysis and analyzing the data sets which are either qualitative or quantitative. By understanding these needs, there are existing products/services which offer the required functionality.

An example of an existing product in the current marketplace is TeamDesk, developed by Foresoft Corporation.[1] TeamDesk is a web-based database solution that builds a database from scratch, manages the database, reads the data from Excel and stores it into the database. Additionally, the user can perform data analysis and generate visual representations. It also offers unlimited storage, support and a free trial to get started.

Another similar product is Knack, developed by Knack.[2] It is a web-based database solution used to build a customizable web application which manages and analyzes data. Knack integrates automatically with existing calendar/email applications (Gmail, Outlook, Dropbox, Google maps) and provides real-time data insights, customer support and a free trial as well.

The products above are two of the many products which exist that provide a -web-based database solution with different designs, interfaces or functionality but all have the main purpose of manipulating a database to store, manage data and provide insights. But generally, these products are subscription based which does not satisfy one of the requirements of the customer, which is "If possible: use of open source solutions to avoid initial/ongoing cost". This means that the use of existing products are not suitable for the customer. Therefore, a customizable product created by our team would be best for the needs space of the customer.

In terms of the financial and societal metrics of existing solutions, ours is needed to save the customer subscription costs and to create an open source solution that encourages other people to further develop/improve the solution and add more functionality. Open source solutions are great for the customer as it makes it easier for development and use since there is available documentation and help from the open source community. Furthermore, as the customer is comprised of 130 institutions from over 40 countries, and that some of the countries involved will have limited access to internet/software, an open source solution simplifies contribution and involvement. There is no difference with regards to environmental metrics as all solutions will be software-based and the energy used to power a web application are relatively insignificant.

Historically, the product/service that would have served this purpose is Microsoft Word and Excel as a tool to use for storing, managing and analyzing data. Also, because Microsoft Office is so ubiquitous in industry, it would have been the best solution to serve this customer. But in terms of a scalability metric, Word and Excel are not viable solution paths as there may be too much records of data to maintain and update. Since Word and Excel require more manual effort to manipulate and access the data, an open source database solution appears to be the most suitable solution for the customer.

Project Management Strategy Explanation of strategy choice

The Waterfall project methodology was chosen for this project. While Agile methodology is commonly used for software projects (especially in the current IT industry), and some members of the group have industry experience using Agile, hurdles were encountered that ultimately led to the decision to choose Waterfall. First, we would have limited access to meetings with our primary stakeholders. UNESCO is a large non-profit organization and while there exists a representative on campus to guide the project, meetings are expected to be rare due to time constraints of both parties. As a result, eliciting requirements for Agile sprints will be more difficult to arrange and rarer than necessary, thus hindering the main objective of the methodology - creating and changing on demand. Secondly, all group members have experience with the Waterfall methodology from previous engineering courses. This removes the need for some group members to adapt to the changes required of the Agile methodology and will ensure that everyone is able to follow along with the project's current and future stages.

References

[1] (2018). Online database software for business | web based database | teamdesk, Foresoft Corp., [Online]. Available: `https://www.teamdesk.net/` (visited on 10/16/2018).

[2] (2018). Online database software for easy database creation, Knack, [Online]. Available: `https://www.knack.com/tour` (visited on 10/16/2018).