TEAM NASA REFLECTION REPORT

Team NASA, CMU SV Practicum Fall 2013

Fall 2013 Graduate Practicum

12/6/13

Objective:
This document is a reflection on the project and the process we followed during the 3 months practicum as a team. Here, we provide a brief description of the issues faced by our team, the solutions we devised and our recommendations. Our goal is provide a retrospective report that would help us add value to this project and take away some learnings from this experience.

Background:
We were given a task to build a recommendation engine on top of the human-trust software which was the research work done by last year's NASA practicum Team. The engine will provide recommendations of existing reusable artifacts, workflows and models based on scientists domain relevance and social connections. It was a great opportunity to work with NASA, It was also the first research project with a real client for most of us.

What we really achieved?
Since this was a research project we anticipated change in scope as we continued in the semester. We started off slow due to hiccups in retrieving last year's team work and had trouble in running the code and database. We lost valuable time and were lagging behind the schedule for the first 2 iterations. We also faced challenges in retrieving user data from NEX which could have been used to train the recommendation engine.

We overcame these challenges by rethinking our approach. Following the idea proposed by our Advisor, we planned to build a model which will recommend the likelihood of co-authorship among scientist primarily using the human trust and relevant factors, instead of recommending software, models and workflows.

Once the decision was made we started working on it using DBLP as our primary source of data. We made up for the time lost at the beginning of the semester very quickly and had new features to show to our client every week, we learned lot of new technologies in this course such as machine learning concepts, Java development and python. We also learned ways to handle client interaction and deliver on time, incorporating our client's feedback weekly.

In the end we were able to successfully deliver a proof of concept model which can be integrated with NASA's tools and will work as a standalone service. We tested this model against the real data and it showed promising results.

Team Interaction:

We made a good practicum team and hardly faced any issues in interacting with each other. we made sure we meet at least twice a week and made use of Google hangouts to follow modified scrum practices. Since we had different backgrounds it helped us in cracking problems. For instance, Shuai was also taking a machine learning course which made him a great asset to work on machine learning part of the project, Venkatesh with his development background contributed as our key problem solver, Pujita made sure that we are following software engineering practices and was documenting all the major decisions, Neeraj led the team as a project manager and made sure things are on track and were being reported to our advisor, handled client interaction and other logistics.

While meetings within our team at the beginning of each iteration were usually brainstorming sessions, they helped us prepare a plan/model which we would propose during the weekly meetings with our Client/Sponsor. The interaction in those settings was much more formal. For each sponsor meeting we made presentation slides with following agenda:

- Previous state
- Progress made during the week
- Challenges faced
- Future action items for the week

We also had weekly internal meetings with our advisor to discuss technical details, implementation issues and translated ideas into model/features.

At the end of each meeting, we clearly defined the tasks that have to be finished within a deadline and also assigned responsibilities. This gave each member an important role in the project and assured the tasks were completed in time.

Our Team members were available for most of the days, even during the days career fairs and other activities were being held at the Pittsburgh campus. But it is safe to estimate that throughout the semester, the team should plan ahead to accommodate a few days for interviews and conferences.

Tools:
We made use of a lot of tools during the course of this project.
1) Box - This was our primary storage for sharing team documentation and papers. Apart from few sync issues this tool worked pretty good.

2) Git repository - Git came out as a very important tool since we were following agile process it was critical for us to work on our respective branches before committing the code.

3)Google docs and hangout for the teams internal interactions. We made good use of google docs for making all presentations and documents (even this doc is being made on google doc!)

4)Pivotal tracker and ASANA - These tools were important to follow software engineering practices. We used both of them extensively for making stories, tracking our velocity and assigning tasks among the team members.

5) Eclipse - This was our primary IDE tool for all the development work done on Java

6) Sublime Text 2- The primary IDE for all our Python Development.

7) Java play! - This was the MVC framework we used to implement various REST services that we provide for future work. This was a good bet because all our backend was in Java.

External Factors:

- We faced a Government shutdown, which was an unlikely event. Since we had a govt sponsor, NASA shut down for couple of weeks but we were still able to interact with our client over the phone.

- The one major challenge was retrieving data from last year's team, we had to go back and forth with last year's team members to get hold of complete database. Due to lack of some documentation it was challenging for us to make the code up and running.

- We were expected to migrate and make use of SAP HANA in-memory database but we soon realized that the machine learning algorithms we need does not come under CMU license and we wasted some effort there. However, we have documented our learning's and reference materials which will add value in case this migration is implemented in future.

Recommendations:

Apart from the solutions we used, here are a few words of advice for the next year's practicum teams.

- Follow Agile software engineering practices, they come really handy.
- Don't Procrastinate :)
- Document all decisions
- It is important to clearly understand the scope of your project with your advisor at the beginning of the semester.
- Formal approach for client interaction (agenda, slides & meeting minutes for every meeting)

Conclusion:

In this document, we have outlined the issues we faced during the 15 weeks of working on the NASA practicum. From our experience of working with the tools and processes, we have shared our learnings and provided some advice for the future teams who would be working with the same client. Highlighting what we thought were the best practices, we also shared in this document the things we would like to improve on.