PaperCloud
Second Iteration Report

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Executive Summary

PaperCloud is an internet application on the world wide web, built for the purpose of organizing words from different researchers' publications into a word cloud. The publications come exclusively from IEEE and ACM. This application will allow for the generation of 2 types of clouds and as such, two types of searches for each cloud. The first is to enter the full name of the researcher. PaperCloud will then generate a word cloud (if the input is valid) based on all the MaxWord most common words from the researcher's papers. The second search option allows the user to enter a keyword phrase which will result in a wordcloud consisting of the MaxWords most common words from all the documents searchable (from the two publications mentioned) containing the keywords. PaperCloud offers certain other features to simplify further searches and word cloud generations which are described in the rest of this document.

1 Introduction

1.1 Purpose

The purpose of this document is to clearly describe every aspect of the second group project for the CSCI-310 course taken at the University of Southern California in the Spring semester of the year 2015. The intended audiences of this software requirements specification document includes, but is not limited to: the members of group six whose names are listed on the front page of this document and by whom this document is prepared, the professor of the course Dr. William G. Halfond, and the teaching assistant Sonal Mahajan. Other possible audiences include: students who are at the time of this publication taking the course in which this project is assigned or any future students of this course who may read this document should it become available to them by the course instructor Dr. William G. Halfond or by any other means which cannot be predicted at this time. This software development project will hereafter be referred to as PaperCloud. It is intended for any user with an internet connection-either through a mobile or stationary platform.

1.2 Overview

This document is to present the management and development structure of the second iteration of software under construction. The different processes are explained in detail in the following sections. Furthermore, the project serves as guide on how to build software using the SCRUM and Extreme Programming practices of the Agile collection of processes.

The content regards the two Agile collection development processes described above. Section 2 elaborates on our use of SCRUM which includes our project management plan and organization. Section 3 and 4 details our requirements, design, and implementation planning. Section 5 describes the review process in which we reevaluate the effectiveness of our strategy and implementation. The Appendix includes some artifacts and further details on our development process as a whole.

1.3 References

[1] Cunningham, Ward. “Extreme Programming”. O’Reilly Media. July 2003.

[2] Wells, Don. “Extreme Programming”. October 10,2013. April 5, 2015.http://www.extremeprogramming.org/.

1.4 Terminology

Term	Definition
IEEE	Institute of Electrical and Electronics Engineers
ACM	Association of Computing Machinery
Development team	All of the individuals whose names appear on the cover of this document. These persons have collectively put this document together and will collectively implement the software product described in subsequent sections.
XP	Extreme Programming
Asana	Online planning and time tracking software
arXiv	Application provided by Cornell university that helps with searching for research papers across a wide range of subjects.
Gmail	Email messaging software from Google Inc. Used for communication purposes by development team
Clients/Customers	Professor William G. Halfond and Sonal Mahajan

1.5 Scope

PaperCloud is a web based application for generating a horizontally positioned text word cloud generated from the most commonly occurring words from a collection of research papers. There are two search options each correlating to two different clouds that can be generated. In the first option, the cloud is generated based on the first and last name search for a particular author. The second search option allows the user to enter a keyword phrase which results in a word cloud generated based on words from all articles that contain the keyword phrase.

PaperCloud will be hosted and available to the World Wide Web and will require no user registration or membership. To access the PaperCloud service, a user only needs an internet connection and one of the commonly used web browsers.

1.6 Documents

We used certain third party software products to assists with project management and implementation. Information for access to these products can be found below. Asana is used to keep project backlogs and iteration related scheduling and task completion details for each sprint. Each member of the development team will chose tasks from the sprint log to complete and can interact with other members and update information about task progress on Asana.

For full access to SCRUM meeting notes refer to the Group 6 discussion board on the course BlackBoard link under the "Iteration 2 Team Activity Log" thread. For a quick reference, refer to the appendix Section 6.1.

For full access to Asana, the clients are suggested to refer to their University of Southern California Gmail account where they will find an invitation to view PaperCloud's Asana account.

For full access to source code, please refer to the project's public Github page at https://github.com/C-Lyrics/PaperCloud

2 SCRUM Management

2.1 Process Introduction

The primary purpose of using Scrum is to work together to develop the product required from the client. In doing so, we broke up the requirements created in the back log. This way, we were able to prioritize tasks for the sprint log to better understand which tasks needed to be completed before others. By building the product in smaller broken down pieces, the development team was able to give feedback and changes if necessary.

The Scrum process is comprised of three different procedures: pre-game, mid-game, and post-game. The pre-game process involves engaging in planning and high-level design. This included elicitation of the requirements from the client, and the Scrum sprint cycle. This is comprised of the delegation of the three main roles, such as Scrum master, Product owner, and team, and organizing meeting times with the development team. After clarifying the requirements, the development team created the product backlog and sprint log. Every member present at each meeting that occurred answered the workday questions to make sure the everyone was on track for task completion. The mid-game process involves developing, wrapping, reviewing, and adjusting. This is primarily abiding by the sprint logs that were created from the backlogs. We developed and wrapped code, reviewed code by pair programming, and make adjustments accordingly. The post-game process involved closure of the first iteration, which includes the sprint review and sprint retrospective.

2.2 Organisation Planning

2.2.1 Roles

The group divided the roles in the following manner:

- SCRUM Master: Sébastien
- Product Owners: Sonal Mahajan
- Customers: Sonal Mahajan, William Halfond
- Development Team: Sebastien, Mark, Milad, Justine, Jeff, Kelsey

Sebastien was chosen by consensus to be our SCRUM master for iteration 2 because he would be available to attend all meetings and he has had prior experience using SCRUM techniques.

2.2.2 Teams

The teams are allocated as the following:

- Frontend: Sebastien, Kelsey, Justine
- Backend: Mark, Milad, Jeff

These teams were chosen based on the team allocations we used in the previous iteration, as well as each group member's individual coding knowledge and experience. We felt that the division of frontend and backend made sense as we could assign requirements for implementation on the frontend Javascript and HTML code and the backend PHP code. However, in order to promote collective code ownership, all team members partially contributed to the work for both the frontend and the backend.

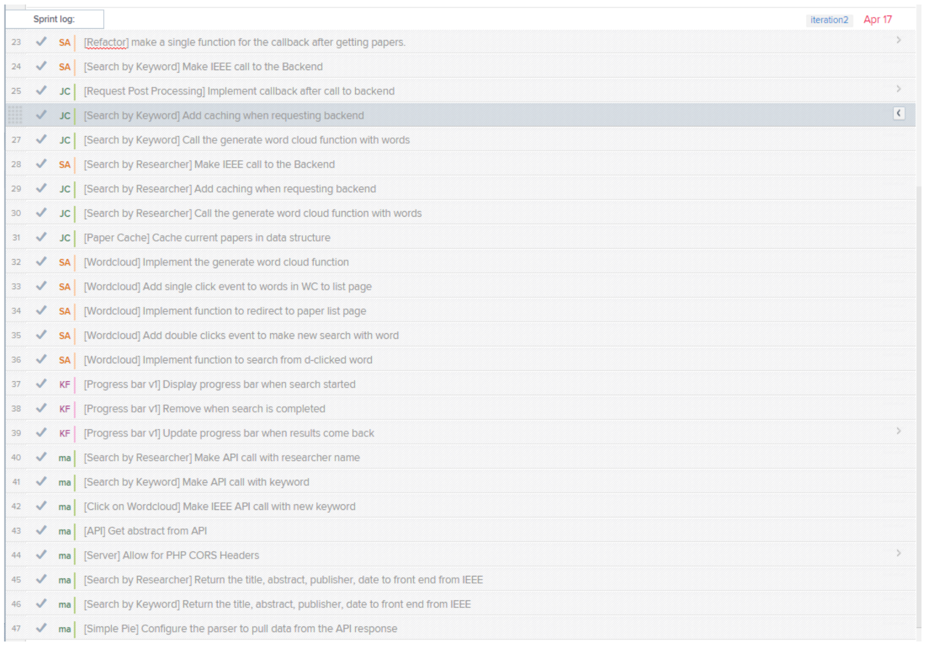
2.2.3 Product Backlog and Sprint Logs

Asana was used to create a product backlog of project requirements that were determined based on meetings with the customer. From this product backlog, we narrowed the list down to a sprint log for our second iteration of code based on the customer's prioritization of each of the requirements on the product backlog and our projected ability to complete these items during the second sprint. The sprint log was further broken down into implementable tasks that were outlined on Asana, which allowed us to track the development progress of our second sprint.

- Product Backlog
  - Search by keyword (ACM and IEEE publications only)
  - Search by researcher (ACM and IEEE publications only)
  - Autocomplete for searching by researcher
  - Ability to see history of searches
  - Click on word in search history generates word cloud from that word
  - Display word cloud with common words from top N pages
  - User selects how many papers included in top N, we decide how to order the top N (ex. alphabetical or temporal)
  - Progress bar for progress of generating word cloud
  - Click on word in cloud lets you make new search with that word
  - Click on word in cloud lets you see all research papers with that word in it and how frequently the word appears in each one
  - Click on Conference or Journal name creates list of all papers from that journal or conference.
  - Display list of research papers that contain selected word in them with their authors listed next to them in
    format
  - Click research paper title takes you to a page with a link to download the paper
  - Click author name in research paper list takes you to word cloud generation of common words from that author's research papers
  - Select research papers to export references in .txt and .pdf format
  - Ability to get BIBTEX reference of each research paper upon hover/ button press
  - Navigation buttons between all pages
- Sprint Backlog: We have discussed with the customer the tasks to be included for our sprint backlog. We requested a prioritized list of requirements for the second iteration, and were able to create the sprint backlog laid out below at our first scrum meeting for iteration 2 on April 5th.
  - Search by keyword (IEEE publications only)
  - Search by researcher (IEEE publications only)

- Display word cloud from top N research papers (user can't pick N)
- Progress bar for word cloud generation
- For the progress bar requirement, we decided that this iteration we will not focus on implementing a bar that increments regularly, as expected from the requirements, but we will instead deliver a progress bar that implements in larger chunks based on key events.
- Click on word in cloud lets you make new search with that word

We expanded on these tasks, as shown in our asana task log. In addition, each sub-task was assigned to a team member.



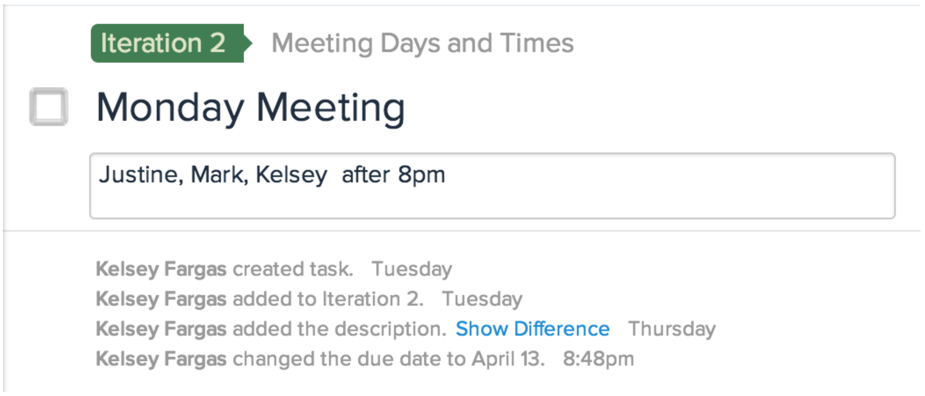
Sprint log: iteration2 Apr 17

23	✓	SA	[Refactor] make a single function for the callback after getting papers.
24	✓	SA	[Search by Keyword] Make IEEE call to the Backend
25	✓	JC	[Request Post Processing] Implement callback after call to backend
	✓	JC	[Search by Keyword] Add caching when requesting backend
27	✓	JC	[Search by Keyword] Call the generate word cloud function with words
28	✓	SA	[Search by Researcher] Make IEEE call to the Backend
29	✓	JC	[Search by Researcher] Add caching when requesting backend
30	✓	JC	[Search by Researcher] Call the generate word cloud function with words
31	✓	JC	[Paper Cache] Cache current papers in data structure
32	✓	SA	[Wordcloud] Implement the generate word cloud function
33	✓	SA	[Wordcloud] Add single click event to words in WC to list page
34	✓	SA	[Wordcloud] Implement function to redirect to paper list page
35	✓	SA	[Wordcloud] Add double clicks event to make new search with word
36	✓	SA	[Wordcloud] Implement function to search from d-clicked word
37	✓	KF	[Progress bar v1] Display progress bar when search started
38	✓	KF	[Progress bar v1] Remove when search is completed
39	✓	KF	[Progress bar v1] Update progress bar when results come back
40	✓	ma	[Search by Researcher] Make API call with researcher name
41	✓	ma	[Search by Keyword] Make API call with keyword
42	✓	ma	[Click on Wordcloud] Make IEEE API call with new keyword
43	✓	ma	[API] Get abstract from API
44	✓	ma	[Server] Allow for PHP CORS Headers
45	✓	ma	[Search by Researcher] Return the title, abstract, publisher, date to front end from IEEE
46	✓	ma	[Search by Keyword] Return the title, abstract, publisher, date to front end from IEEE
47	✓	ma	[Simple Pie] Configure the parser to pull data from the API response

Figure 1: The Sprintlog for Iteration 2

2.3 Meetings

Our team had a sprint planning meeting on Sunday April 5th in which we set up various future group meeting times for the weeks of our implementation phase. These meeting times are documented in Asana. All team members then signed up to participate in four to five meetings based on their availabilities. In this process, we were able to have rotating teams to allow for variance in our pair programming practices while keeping in line with having the team meet every day. If members of the team could not meet in person, we had set up meetings that would be online to continue our daily meeting schedule.



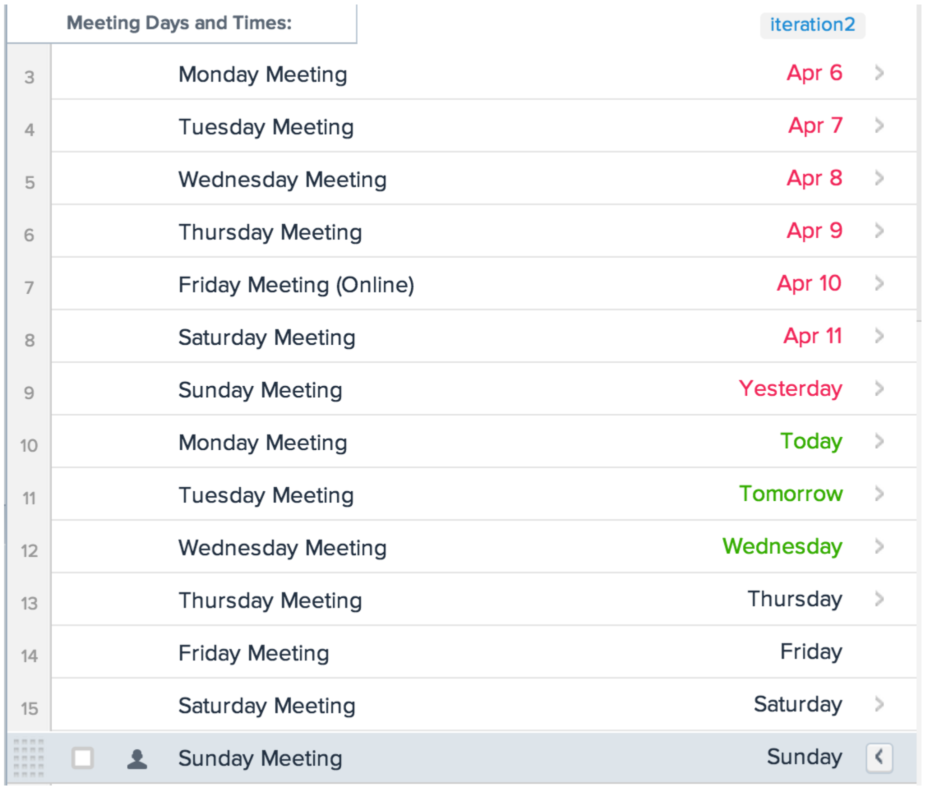
Iteration 2 Meeting Days and Times

Monday Meeting

Justine, Mark, Kelsey after 8pm

Kelsey Fargas created task. Tuesday
Kelsey Fargas added to Iteration 2. Tuesday
Kelsey Fargas added the description. Show Difference Thursday
Kelsey Fargas changed the due date to April 13. 8:48pm

Figure 2: An example of meeting



Meeting Days and Times: iteration2

3	Monday Meeting	Apr 6
4	Tuesday Meeting	Apr 7
5	Wednesday Meeting	Apr 8
6	Thursday Meeting	Apr 9
7	Friday Meeting (Online)	Apr 10
8	Saturday Meeting	Apr 11
9	Sunday Meeting	Yesterday
10	Monday Meeting	Today
11	Tuesday Meeting	Tomorrow
12	Wednesday Meeting	Wednesday
13	Thursday Meeting	Thursday
14	Friday Meeting	Friday
15	Saturday Meeting	Saturday
	Sunday Meeting	Sunday

Figure 3: The list of the meeting dates

3 Extreme Programming Practices

Extreme programming (XP) is an agile software engineering methodology which enforces several practices. It is a natural companion to the SCRUM process, as both of them are iterative and organized in sprints.

In addition to extending Agile practices to the extreme, XP also promotes its own values and assumptions. The values include:

- **Communication**: Communication is essential for adjusting to feedback and implementing constant changes. Honest, regular communication should not only happen amongst developers, but also amongst their customers.
- **Feedback**: Feedback is the response from the customer to clarify what is required and wanted. By asking questions and making adjustments accordingly, the development team will be able to ensure that the code complies with the customer's specifications.
- **Simplicity**: The development team should only focus on what really needs to be built and only solve the current problems of the day.
- **Courage**: In this case, courage means making difficult decisions when necessary. It could be easy to disregard an issue because addressing it would make several people unhappy. Courage implies speaking up and pointing out difficulties.

Extreme programming not only assumes that each stakeholder will incorporate the mentioned values, but also makes the following assumptions:

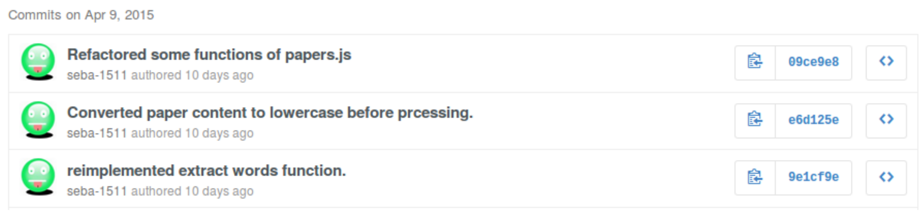
- **Enough Time and Resources**: Instead of rushing through the coding process, XP enables developers to work at their normal paces. By working in very short cycles, it reduces the length of time between actions and their effects. It also adjusts the project to fit the available resources.
- **Constant Cost of Change**: XP ensures a constant change of cost. This means that implementing a functionality now versus in a year will take the same amount of effort. By making this assumption, it allows developers to focus on current tasks without worrying about future features.
- **Developper Effectiveness**: Extreme programming assumes that in order to have great software, the developers should be great as well.
- **Freedom to Experiment**: Every team member (including managers, developers, and customers) should have the opportunity to experiment. This means asking question such as “Is there a better way to solve this problem ?” and keeping an open mind towards the answers.

3.1 Coding Practices

3.1.1 Simple Code and Design

Simple code and design were practiced to make our code more efficient and straightforward. The development started by defining what frameworks to use and choosing the ones that are most flexible with respect to change of direction for long term purposes. AngularJS and Slim were chosen for this reason. The development team also implemented features using libraries and reused code, taking out unnecessary functionalities when needed. This is shown in the comparison of code from C-Lyrics - the team's previous project - and PaperCloud, as well as the use of jqcloud2. Another example of following the simple code and design was in the implementation of the backend; we did not even check if our approach was compatible with ACM's digital library and only focused on IEEE.

3.1.2 Refactor Mercilessly


Commits on Apr 9, 2015

Refactored some functions of papers.js
seba-1511 authored 10 days ago — 09ce9e8

Converted paper content to lowercase before prcessing.
seba-1511 authored 10 days ago — e6d125e

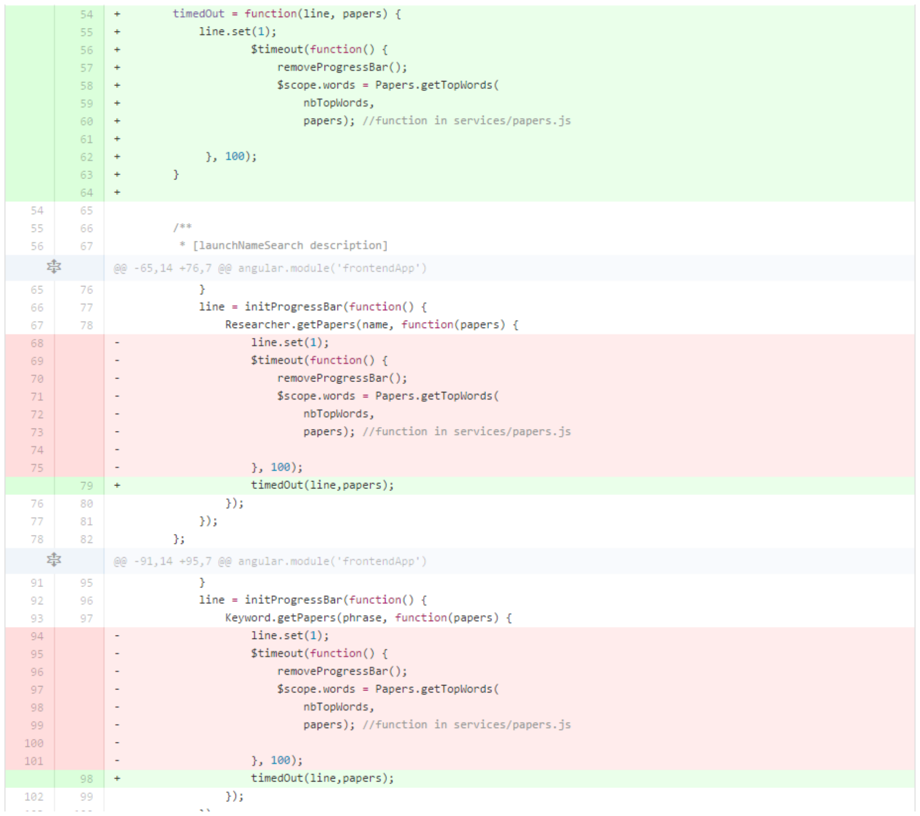
reimplemented extract words function.
seba-1511 authored 10 days ago — 9e1cf9e

Figure 4: Example of commits for refactoring

The purpose of refactoring is to have better, more readable as well as more efficient code. This is a crucial step in order to obtain readable code and reduce the cost of change. The developing team refactored their code as soon as changes were needed or repetitions could be avoided. The goal was to improve code's readability, document some of the main functions, and remove superficial or unused functionalities. Refactoring can be seen all along the git log commits.

3.1.3 Coding Standards

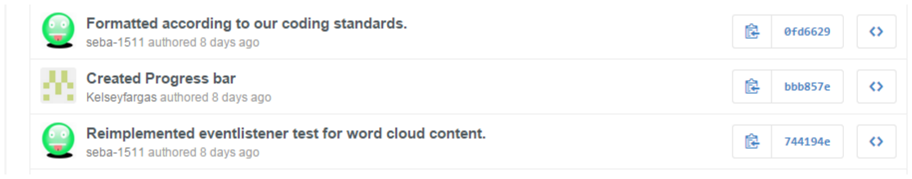
Coding standards are required to enable readability and communication through code. By having everyone writing code in the same manner, the team ensures that any developer will have some degree of familiarity with the whole codebase. The developers used custom code formatting templates to ensure homogeneity over the entire code. The code is openly available on GitHub as mentioned in Section 1.6, and the formatting templates are available at https://github.com/seba-1511/st_settings.



```
+       timedOut = function(line, papers) {
+           line.set(1);
+                   $timeout(function() {
+                       removeProgressBar();
+                       $scope.words = Papers.getTopWords(
+                           nbTopWords,
+                           papers); //function in services/papers.js
+
+            }, 100);
+       }
+

        /**
         * [launchNameSearch description]
@@ -65,14 +76,7 @@ angular.module('frontendApp')
            }
            line = initProgressBar(function() {
                Researcher.getPapers(name, function(papers) {
-                   line.set(1);
-                   $timeout(function() {
-                       removeProgressBar();
-                       $scope.words = Papers.getTopWords(
-                           nbTopWords,
-                           papers); //function in services/papers.js
-
-                   }, 100);
+                   timedOut(line,papers);
                });
            });
        };
@@ -91,14 +95,7 @@ angular.module('frontendApp')
            }
            line = initProgressBar(function() {
                Keyword.getPapers(phrase, function(papers) {
-                   line.set(1);
-                   $timeout(function() {
-                       removeProgressBar();
-                       $scope.words = Papers.getTopWords(
-                           nbTopWords,
-                           papers); //function in services/papers.js
-
-                   }, 100);
+                   timedOut(line,papers);
                });
```

Figure 5: Diff of a refactoring commit

Specifically we agreed to follow the JavaScript AirBnB guidelines (available at: https://github.com/airbnb/javascript) but slightly customized them to fit our team better. For example, we tried whenever possible to keep all variable declarations at the beginning of a function, and to minimize the number of var statements. For both PHP and JavaScript, we used the DocBlocker plugin for SublimeText 2 in order to keep the same amount of information between both ends.



Formatted according to our coding standards.
seba-1511 authored 8 days ago 0fd6629

Created Progress bar
Kelseyfargas authored 8 days ago bbb857e

Reimplemented eventlistener test for word cloud content.
seba-1511 authored 8 days ago 744194e

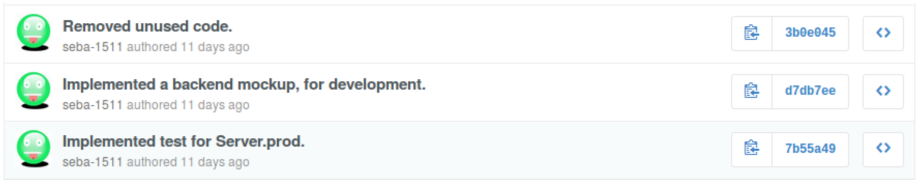
Figure 6: Refactoring to respect coding standards

3.1.4 Common Metaphor

The idea behind having a common metaphor is to describe the project as it evolves. It allows the development team to share a vocabulary that will define well-understood relationships. For this project, the development team used a previous project as a metaphor. While not being the most creative, this was highly useful as every team member was able to clearly visualize the different parts of the application and how they related to each other. The specific project was the creation of a lyrics retrieval website which offered a lot of similar functionalities to the current project.

3.2 Developer Practices

3.2.1 Test Driven Development



Removed unused code.
seba-1511 authored 11 days ago 3b0e045

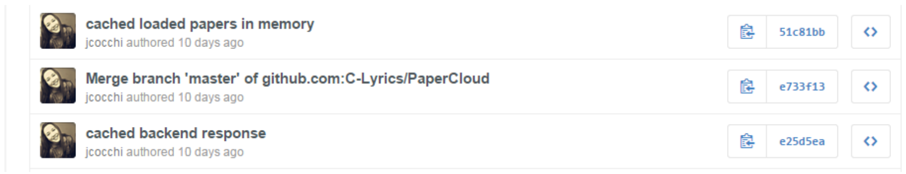
Implemented a backend mockup, for development.
seba-1511 authored 11 days ago d7db7ee

Implemented test for Server.prod.
seba-1511 authored 11 days ago 7b55a49

Figure 7: First the test, then the implementation

Before implementing any functionality, we first wrote unit tests for functional requirements or end-to-end tests for visual requirements. This practice is underlined in our GitHub commit history. Due to the absence of a customer in our team, we do not consider these tests as acceptance tests. However, the visual tests were developed using the same framework and methodology that the customer would be using for acceptance testing.

3.2.2 Pair Programming


cached loaded papers in memory
jcocchi authored 10 days ago
51c81bb

Merge branch 'master' of github.com:C-Lyrics/PaperCloud
jcocchi authored 10 days ago
e733f13

cached backend response
jcocchi authored 10 days ago
e25d5ea

Figure 8: Commits of Justine and Sébastien pair programming

Pair programming is the process of programming in pairs with separate roles: driver and observer. The driver writes code actively, while the observer passively guides and discusses the code being written with the driver. During all of our team meetings, we made sure that at least two team members were engaging in pair programming. This practice provides two significant benefits: uniformization of code throughout the project and collective code ownership.

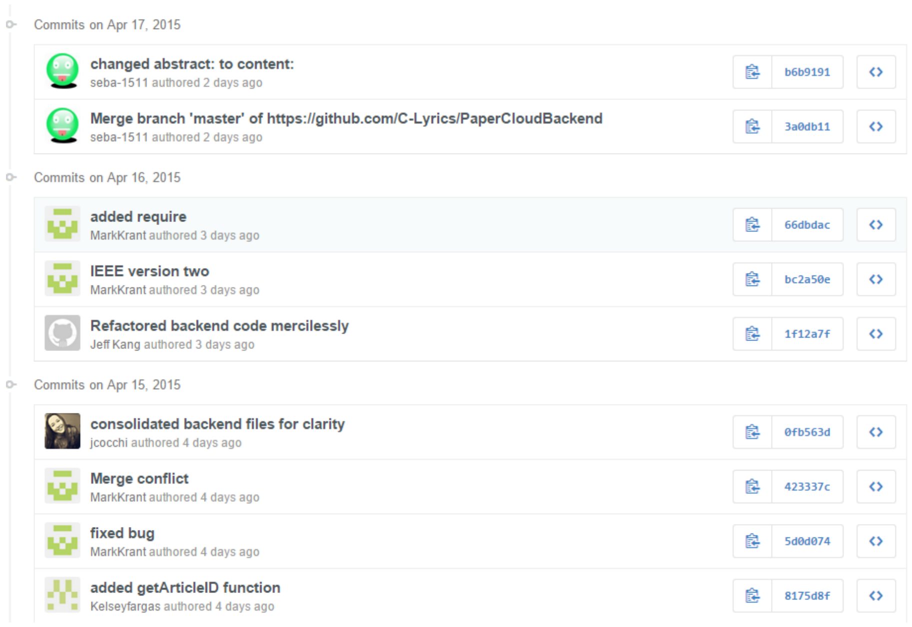
3.2.3 Collective Code Ownership

Collective code ownership was created by having all members of the development team commit to both the frontend and backend repositories. This means that all team members are partially responsible for all aspects of the final product. Following this practice ensured that steady progress could be made on the project despite some team members being absent each meeting, and it also helped to create a more cohesive team dynamic.

In particular we followed this methodology by allowing access to both repositories to all team members and avoiding restrictions on what developers should work on. In order to take advantage of the strengths of each team members, we also matched experienced ones to pair program with novice ones. The result was that every team member felt comfortable with every part of the program, despite not necessarily being an expert about it.

3.2.4 Continuous Integration and Testing

To apply continuous integration, our team set up a GitHub account and TravisCI. This allowed us to consistently make sure that we all shared the same code base, and it allowed us to monitor which commits broke our tests. Those tests are mostly unit and acceptance tests, and a minor part of them is testing



Commits on Apr 17, 2015

Commit	Author	SHA
changed abstract: to content:	seba-1511 authored 2 days ago	b6b9191
Merge branch 'master' of https://github.com/C-Lyrics/PaperCloudBackend	seba-1511 authored 2 days ago	3a0db11

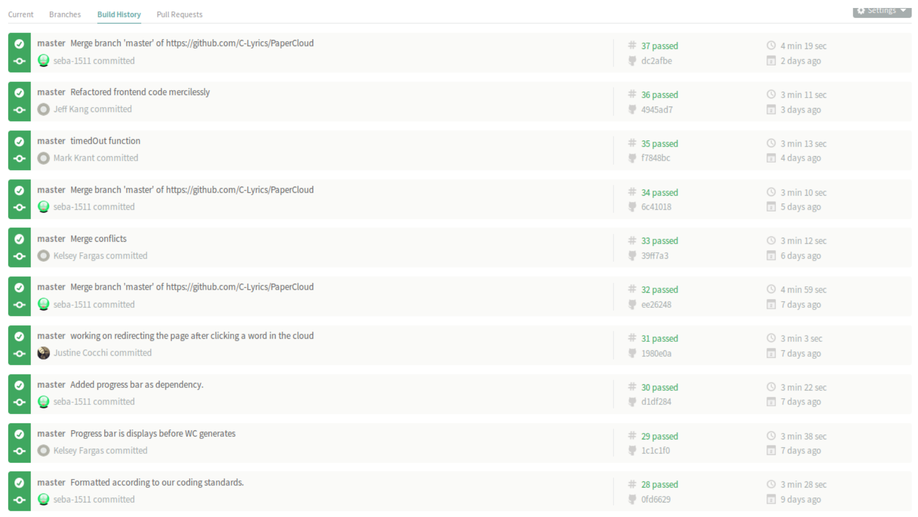
Commits on Apr 16, 2015

Commit	Author	SHA
added require	MarkKrant authored 3 days ago	66dbdac
IEEE version two	MarkKrant authored 3 days ago	bc2a50e
Refactored backend code mercilessly	Jeff Kang authored 3 days ago	1f12a7f

Commits on Apr 15, 2015

Commit	Author	SHA
consolidated backend files for clarity	jcocchi authored 4 days ago	0fb563d
Merge conflict	MarkKrant authored 4 days ago	423337c
fixed bug	MarkKrant authored 4 days ago	5d0d074
added getArticleID function	Kelseyfargas authored 4 days ago	8175d8f

Figure 9: The whole team pushed to the repositories

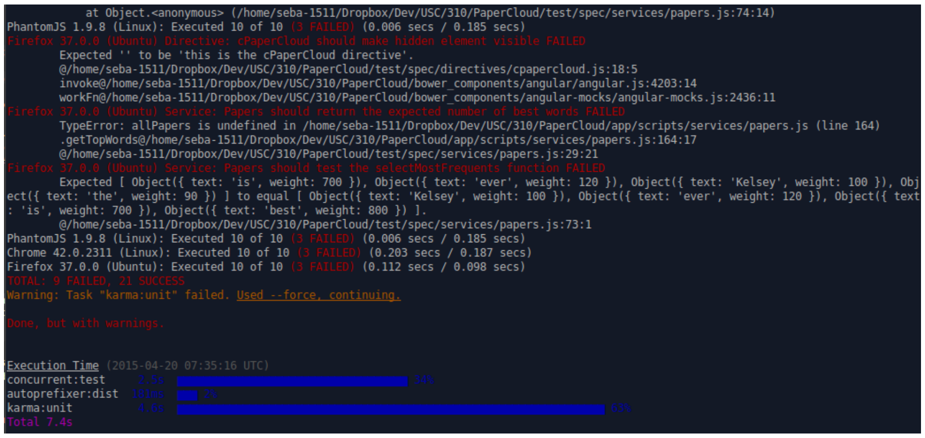


Branch	Commit message	Committer	Build	Commit	Duration	When
master	Merge branch 'master' of https://github.com/C-Lyrics/PaperCloud	seba-1511 committed	37 passed	dc2afbe	4 min 19 sec	2 days ago
master	Refactored frontend code mercilessly	Jeff Kang committed	36 passed	4945ad7	3 min 11 sec	3 days ago
master	timedOut function	Mark Krant committed	35 passed	f7848bc	3 min 13 sec	4 days ago
master	Merge branch 'master' of https://github.com/C-Lyrics/PaperCloud	seba-1511 committed	34 passed	6c41018	3 min 10 sec	5 days ago
master	Merge conflicts	Kelsey Fargas committed	33 passed	39ff7a3	3 min 12 sec	6 days ago
master	Merge branch 'master' of https://github.com/C-Lyrics/PaperCloud	seba-1511 committed	32 passed	ee26248	4 min 59 sec	7 days ago
master	working on redirecting the page after clicking a word in the cloud	Justine Cocchi committed	31 passed	1980e0a	3 min 3 sec	7 days ago
master	Added progress bar as dependency.	seba-1511 committed	30 passed	d1df284	3 min 22 sec	7 days ago
master	Progress bar is displays before WC generates	Kelsey Fargas committed	29 passed	1c1c1f0	3 min 38 sec	7 days ago
master	Formatted according to our coding standards.	seba-1511 committed	28 passed	0fd6629	3 min 28 sec	9 days ago

Figure 10: Travis-CI build and test history

the integration. That is because both backend and frontend are completely independent, and they only require a predefined API structure.

By using TravisCI we also automated the execution of tests across repositories. As a matter of fact the provided service is to run all tests of a given codebase as soon as a new version has been pushed to the repository. A list of all executed tests can be found below, as is one example of the resulting report.

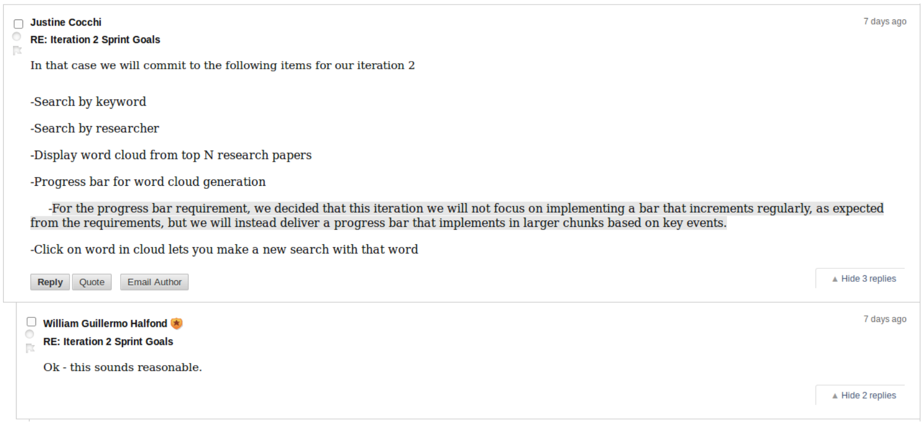


```
            at Object.<anonymous> (/home/seba-1511/Dropbox/Dev/USC/310/PaperCloud/test/spec/services/papers.js:74:14)
PhantomJS 1.9.8 (Linux): Executed 10 of 10 (3 FAILED) (0.006 secs / 0.185 secs)
Firefox 37.0.0 (Ubuntu) Directive: cPaperCloud should make hidden element visible FAILED
        Expected '' to be 'this is the cPaperCloud directive'.
        @/home/seba-1511/Dropbox/Dev/USC/310/PaperCloud/test/spec/directives/cpapercloud.js:18:5
        invoke@/home/seba-1511/Dropbox/Dev/USC/310/PaperCloud/bower_components/angular/angular.js:4203:14
        workFn@/home/seba-1511/Dropbox/Dev/USC/310/PaperCloud/bower_components/angular-mocks/angular-mocks.js:2436:11
Firefox 37.0.0 (Ubuntu) Service: Papers should return the expected number of best words FAILED
        TypeError: allPapers is undefined in /home/seba-1511/Dropbox/Dev/USC/310/PaperCloud/app/scripts/services/papers.js (line 164)
        .getTopWords@/home/seba-1511/Dropbox/Dev/USC/310/PaperCloud/app/scripts/services/papers.js:164:17
        @/home/seba-1511/Dropbox/Dev/USC/310/PaperCloud/test/spec/services/papers.js:29:21
Firefox 37.0.0 (Ubuntu) Service: Papers should test the selectMostFrequents function FAILED
        Expected [ Object({ text: 'is', weight: 700 }), Object({ text: 'ever', weight: 120 }), Object({ text: 'Kelsey', weight: 100 }), Obj
ect({ text: 'the', weight: 90 }) ] to equal [ Object({ text: 'Kelsey', weight: 100 }), Object({ text: 'ever', weight: 120 }), Object({ text
: 'is', weight: 700 }), Object({ text: 'best', weight: 800 }) ].
        @/home/seba-1511/Dropbox/Dev/USC/310/PaperCloud/test/spec/services/papers.js:73:1
PhantomJS 1.9.8 (Linux): Executed 10 of 10 (3 FAILED) (0.006 secs / 0.185 secs)
Chrome 42.0.2311 (Linux): Executed 10 of 10 (3 FAILED) (0.203 secs / 0.187 secs)
Firefox 37.0.0 (Ubuntu): Executed 10 of 10 (3 FAILED) (0.112 secs / 0.098 secs)
TOTAL: 9 FAILED, 21 SUCCESS
Warning: Task "karma:unit" failed. Used --force, continuing.

Done, but with warnings.


Execution Time (2015-04-20 07:35:16 UTC)
concurrent:test      2.5s  ████████████████████████████ 34%
autoprefixer:dist  181ms  ██ 2%
karma:unit           4.6s  ████████████████████████████████████████████████████ 63%
Total 7.4s
```

Figure 11: Example of testing output

3.3 Business Practices

3.3.1 Customer Team Member



Justine Cocchi 7 days ago
RE: Iteration 2 Sprint Goals

In that case we will commit to the following items for our iteration 2

-Search by keyword

-Search by researcher

-Display word cloud from top N research papers

-Progress bar for word cloud generation

-For the progress bar requirement, we decided that this iteration we will not focus on implementing a bar that increments regularly, as expected from the requirements, but we will instead deliver a progress bar that implements in larger chunks based on key events.

-Click on word in cloud lets you make a new search with that word

William Guillermo Halfond 7 days ago
RE: Iteration 2 Sprint Goals

Ok - this sounds reasonable.

Figure 12: A conversation with the client

One of the main obstacles of adhering to Extreme programming practices was that it was not possible to have the customer as a team member due to the special circumstances of the project being completed in a class environment. Instead of working closely with the customer during our meetings, the team focused on separate meetings with the customer and inferred preferences from conversations through Blackboard and in-person meetings.

3.3.3 Regular Releases

After this first iteration, the team can now submit a fully working and tested system. This will hopefully be the case for next iterations, which will allow for regular releases. As outlined in the iteration review, we overestimated our capacities with respect to our sprint log. However, after the final refactoring, the requirements we decided to tackle are fully completed, and modifying the implemented functions will only occur if new functionalities are to be added that conflict with pre-existing functionalities.

3.3.4 Sustainable Pace

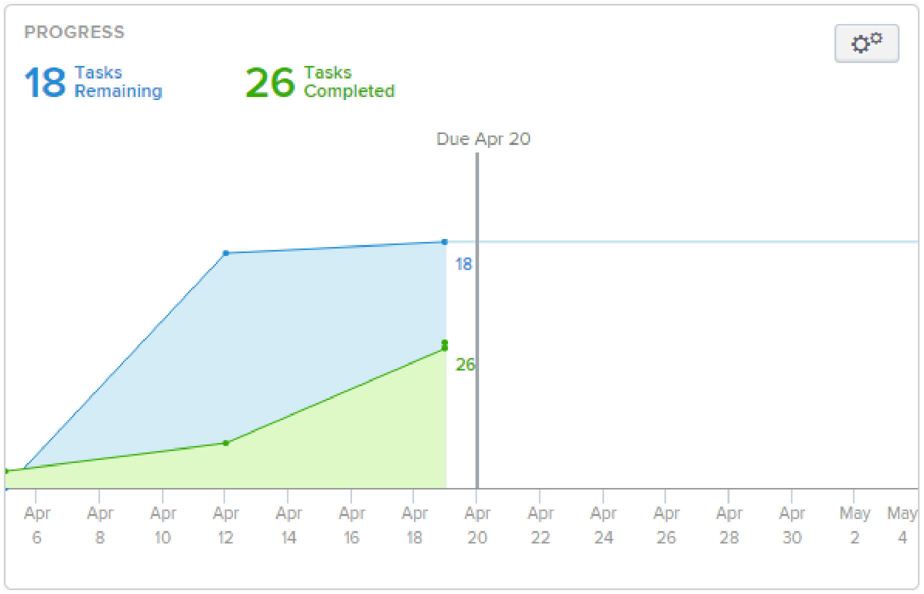


Figure 13: Our special "burnup" chart

The team held meetings every day during this sprint for an average time of 2 hours each meeting. Because of this, we did not necessarily have to “rush” or overwork ourselves. This is represented in GitHub’s contribution graph in the figure below, which proves our steady pace. By superimposing both contributions graph, we obtain an almost constant one proving that we did work on very steady pace for the whole sprint.

In addition, the burndown chart - which is actually a burnup chart - shows that we were able to make constant progress over the span of the sprint. A note of caution with this chart: it includes all tasks related to the sprint, including notes and meeting times. As we did not "check them off" for practical purposes, it might seem like the sprint log tasks were not completed whereas we actually finished all of them.

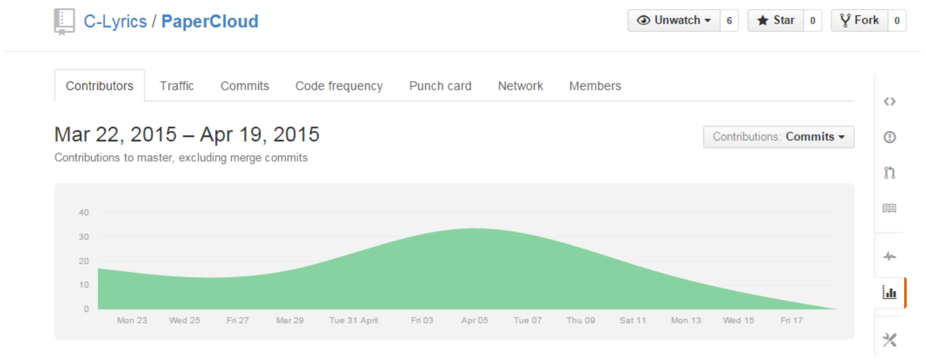


Figure 14: Summary of contributions to the frontend repository

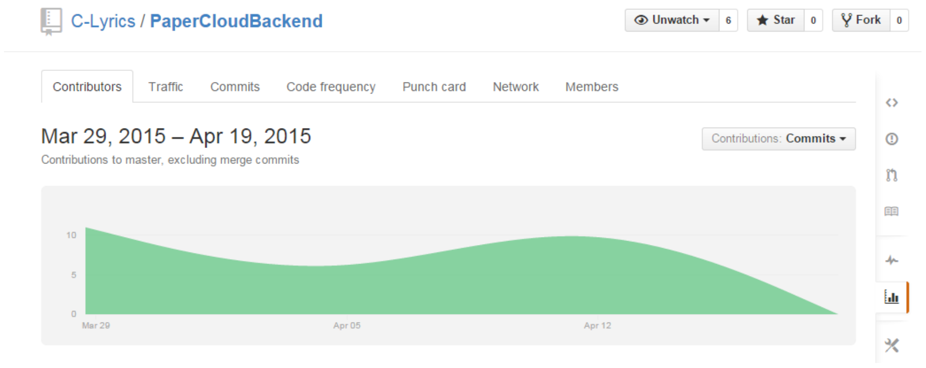


Figure 15: Summary of contributions to the backend repository

4 Artifacts

4.1 Story Cards

Although the customer was not involved with writing the story cards as required by the official process, the following cards have been created from the project requirements addressed in this iteration. If story cards were used as a strategy for requirements engineering, the customer would have arranged these in order of importance for prioritization.

Users should be able to search by keyword for articles Users should be able to search by researcher name for articles A wordcloud should appear after a search has been completed Clicking on a word in the wordcloud should perform a new search with that keyword A progress bar should show what progress is of the word cloud being generated

4.2 The Bullpen

In order to simulate an effective bullpen, our team booked rooms in Leavey library for our meetings. In accordance with bullpen strategies, these rooms are isolated, and team members have laptop computers to move around freely and engage in pair programming. We were not, however, able to have the customer in the room with us to ask clarifying questions.

5 Iteration Review

5.1 Sprint Review

Our sprint review took place at a meeting on April 17th with two development team members present as well as the customer. We discussed the completed items on our product and sprint backlogs, aspects of our project that need improvement to add to the product backlog for the next sprint, and the timeline for future progress with this project.

5.1.1 Completed Product Backlog Items

Below is a list of completed product backlog items. We implemented an extra item from the backlog that we had not originally committed to on our sprint backlog in section 2.2.3, click on word in cloud lets you see all research papers with that word in it and how frequently the word appears in each one, because we had extra time during the sprint.

- Search by keyword (IEEE publications only)

- Search by researcher (IEEE publications only)
- Display word cloud with common words from top N pages (user can't pick N)
- Progress bar for progress of generating word cloud (large increments, not smooth progress)
- Click on word in cloud lets you make new search with that word
- Click on word in cloud lets you see all research papers with that word in it and how frequently the word appears in each one

5.1.2 Completed Sprint Backlog Items

Below is a list of completed sprint backlog items, including items that were added during the sprint because we had extra time. We were able to complete all items from our sprint backlog.

- Search by Researcher (IEEE publications only)
  - Implement researcher search function
  - Make API call with researcher name
  - Parse PDF's with PHP
  - Get the abstract from IEEE API
- Search by keyword (IEEE publications only)
  - Implement keyword search function
  - Make API call with keyword
  - Parse PDF's with PHP
  - Get the abstract from IEEE API
- Display word cloud from top N research papers
  - Implement the generate WC function
- Progress bar for word cloud generation
  - Display progress bar when search started
  - Update when results come back
  - Removed when search is completed
- Click on word in cloud lets you make new search with that word
  - Implement double click event to make a new search with the word
  - Implement function to search from double clicked word
- Click on word in cloud lets you see all research papers with that word in it and how frequently the word appears in each one
  - Implement single click event to words in WC
  - Implement function to redirect to paper list

5.1.3 Timeline

Based on the current state of the product backlog, the development team is ahead of schedule. They were able to not only finish their sprint backlog, but also complete an item that was not initially committed to. Next sprint, the development team plans to continue adding functionality to the system and fix the errors that were pointed out by the customer during the sprint review.

5.1.4 Customer Feedback

Below is a list of feedback the customer gave the development team during the sprint review.

- The whole page should fit on the screen without having to scroll down to see the bottom
- There is a little dash underneath the line that spans the top of the page that should be removed
- Progress bar should update linearly rather than in large chunks as it does now
- User is unable to make a second search without refreshing the page
- After pressing the home button the user is not able to make a new search
- The progress bar does not show up when making a new search from a word in the cloud by double clicking it
- A high priority task for next iteration is adding functionality to the listing page of researchers including being able to go to the link to download the paper and having the information for each paper formatted properly
- Word cloud itself is not very pretty and seems to only have two sizes and colors instead of a broader range
- Add navigation buttons to go from the listing page back to the word cloud page

5.2 Sprint Retrospective

The development team's sprint retrospective took place at a development team meeting on April 19th at 6:00pm with all members present.

5.2.1 Identify What Went Well

The development team was successfully able to have at least three members meet every day. This allowed the development team to make steady progress towards completion of this sprint's goal. The team worked well together and was able to split up jobs based on each team member's strengths to optimize time. Additionally, everyone worked on both the back end and front end for better understanding of the program and collective code ownership. This sprint, the development team adhered to more XP practices and was consequently much more efficient in completing sprint backlog items.

5.2.2 Identify What Needs Improvement

The development team will focus on writing better acceptance and integration tests to improve both next sprint's process and its product. While the team got a lot more backlog items done this sprint than the last sprint, the quality of some of the completed work was low. As mentioned in section 5.1.4, the customer found many faults with the implemented product and fixing them will be a top priority for the next sprint, alongside implementing new functionality.

5.2.3 Plan to Improve Process Next Sprint

The development team plans to continue test driven development to increase the quality of the delivered product. Instead of writing a couple tests to satisfy the requirement of doing tests first, the team will focus on writing useful tests that will help to catch errors, even if that means spending more time on testing. This will create the possibility of being able to complete as many backlog items as were completed during this sprint, but the team feels that quality of the work is more important than completing a large quantity of requirements.

5.3 Scrum Meetings Review

All scrum meeting minutes can be found with timestamps on the online blackboard forum for team 6 in the "Iteration 2 Team Activity Log" thread. Additionally, all of the meeting minutes are listed in the Appendix in section 6.1 for the stakeholders' convenience.

5.4 Customer Integration Review

The development team met with the customer, Professor William G. Halfond, to ensure that neither the priority for the requirements nor the requirements themselves had changed for the project. The development team used this information to build the updated product backlog and then select items to move to this sprint's backlog. The sprint backlog was checked with the customers to ensure that they agree that the decided tasks were reasonable for this sprint.

Ideally, the team would have met with both Professor Halfond and Sonal Mahajan to verify requirements and check progress throughout the sprint, but Sonal was unavailable to meet. To make up for this, the team posted some questions and clarifications on the Blackboard thread to ensure that Sonal could give input as well as Professor Halfond.

In addition to several meetings during the sprint, the development team also met with Professor Halfond for the sprint review, as documented in full in section 5.1 and all of its subsections.

6 Appendices

6.1 SCRUM Meeting Minutes

- Iteration 2: Scrum Meeting 1, April 8, 2015 (6:30pm - 7:45pm)
  - Seb
    - Q1: Last time we set the meeting times.
    - Q2: I will work on integrating the several parts of the application together. Specifically, I want to have the word cloud displayed with mock-up data.
    - Q3: No problem as of right now, everything is rocking.
  - Kelsey
    - Q1: Last time I worked on setting meeting times.
    - Q2: I will work on refactoring code, completing functions, and adding mock up code for testing functionality. Specifically, I will work on the function that assigns links to the words in the word cloud.
    - Q3: I am still becoming more familiar with the code and the way it is organized.
  - Mark
    - Q1: Last time I worked on setting meeting times.
    - Q2: This time I will be working on making the back end compatible with the front end.
    - Q3: I have problems with the simple pie parser, but I will resolve it soon.
- Iteration 2: Scrum Meeting 2, April 9, 2015 (6:30pm - 9:00pm)
  - Seb
    - Q1: Last time I integrating the several parts of the application together.
    - Q2: This time, I will work on post processing the request to the back end and pair programming for paper caching with Justine.
    - Q3: The problems is that regular expression is difficult to do well.
  - Kelsey

        * Q1: Last time I worked on refactoring code, completing functions, and adding mock up code for testing functionality
        * Q2: This time, I will work on creating a progress bar and having it show up.
        * Q3: I am having problems with creating and integrating the progress bar.
    - Mark
        * Q1: Last time I worked on making the back end compatible with the front end.
        * Q2: This time I work on searching by title for the back end.
        * Q3: I am still having problems with the simple pie parser.
    - Justine
        * Q1: Last time I helped make the schedule and the sprint backlog in the sprint planning meeting
        * Q2: This time I am working on paper caching and pair programming with Seb.
        * Q3: No problems yet.

- Iteration 2: Scrum Meeting 3, April 10, 2015 (3:30pm - 5:00pm) [Note: This meeting was held over the phone as opposed to previous meetings which were all in person]
    - Seb
        * Q1: Last time I worked with Justine and implemented a caching DS for papers with its tests, I tested and implemented the post processing of the response from the backend, and got a first nice visualization to work.
        * Q2: Today I will test and implement click events on the word cloud's words.
        * Q3: Angular has a directive for clicks and double clicks, so everything is chill.
    - Justine
        * Q1: Last time I pair programed with Seb to implement caching the papers and the corresponding tests for that.
        * Q2: This time I will research how to implement the progress bar.
        * Q3: No problems yet.
- Iteration 2: Scrum Meeting 4, April 11, 2015 (9:00am - 12:30pm)
    - Seb
        * Q1: Tried to implement click and double click function but it was not working.
        * Q2: Today I fixed some of the problems with the click and double click function and will continue fixing them. Pair program with Kelsey to complete progress bar.

    - Q3: Stuck on code above, the jqcloud doesn't support passing events to directives
  - Kelsey
    - Q1: Last time I worked on having a progress bar show up in the main page.
    - Q2: This time, I will work on removing the progress bar and creating tests for the progress bar.
    - Q3: I am having problems with finding ways to remove the progress bar.
  - Milad
    - Q1: Last time I was learning the technologies to use for development
    - Q2: I will start coding this week, all set up now.
    - Q3: Lacking fundamental understanding of the why and how the tools we are using are helpful or different. Not detrimental, but I can be more efficient when I get it.

- Iteration 2: Scrum Meeting 5, April 12, 2015 (9:00am - 12:30pm)
  - Seb
    - Q1: Last time I tried to fix some of the problems with the click and double click function and will continue fixing them. Pair program with Kelsey to complete progress bar.
    - Q2: Today I will write test for the listening page and implement a mock up of the listing page.
    - Q3: No problems as of right now.
  - Kelsey
    - Q1: Last time I worked on removing the progress bar and created tests for it.
    - Q2: This time, I will work on implementing the double click function for the word cloud.
    - Q3: I am having problems with checking if the double click function works. Will keep testing.
  - Justine
    - Q1: Last time I researched how to implement the progress bar.
    - Q2: This time, I will work on implementing the function to redirect to paper list page.
    - Q3: I am having problems with redirecting the listing the page from the word cloud.
  - Jeff
    - Q1: Last time I helped with the meeting times and schedule.
    - Q2: This time, I will pair program with Kelsey.
    - Q3: I have no problems.

  - Milad
    * Q1: Last time I was learning the technologies to use for development.
    * Q2: This time, I will work on getting the environment setup.
    * Q3: I am having problem installing bower packages.
- Iteration 2: Scrum Meeting 6, April 13, 2015 (8:00:pm-9:00pm)
  - Kelsey
    * Q1: Last time I worked on implementing the double click function for the word cloud.
    * Q2: This time, I will work on the documentation process.
    * Q3: I am not having any problems
  - Justine
    * Q1: Last time I worked on implementing the function to redirect to paper list page.
    * Q2: This time, I will work on the documentation process.
    * Q3: I do not have any problems.
  - Mark
    * Q1: I refactored some of the arxiv API code to meet new demands specified by Sebastien.
    * Q2: Working on integrating the IEEE api into the back end to access other documents.
    * Q3: No problem so far with IEEE, the api seems very functional, but still unsure on how to access ACM digital library.
- Iteration 2: Scrum Meeting 7, April 14, 2015 (9:00am - 12:30pm)
  - Seb
    * Q1:Last time I wrote tests for the listing page.
    * Q2: Today I will link the backend and the frontend with Mark, will try to fix the redirection to the listing page, and improve the display of the progressbar.
    * Q3: Redirecting to the listing page is a funny business with Angular. I don't understand why it does not work, yet.
  - Mark
    * Q1: I started parsing the IEEE API response.
    * Q2: Today I will link the frontend with the backend with Seb. Then I will work on IEEE parsing and finish it, pair programming with Jeff.
    * Q3: Linking the backend and the frontend might not be trivial.
  - Jeff
    * Q1: Last time I got the environment setup.
    * Q2: Today I will finish setting up my environment, and then pair program with Mark.

    - ∗ Q3: Setting up the environment might be problematic.
  - Milad
    - ∗ Q1: Last time I was setting up bower grunt and yo.
    - ∗ Q2: This time, I will try to find the problem of why you can't make a second search.
    - ∗ Q3: No problems, finally ready to implement stuff.

- Iteration 2: Scrum Meeting 8, April 15, 2015 (6:00pm-8:00pm)
  - Seb
    - ∗ Q1:Last time I linked the backend and the frontend with Mark, will try to fix the redirection to the listing page, and improve the display of the progress bar.
    - ∗ Q2: This time, I will work on a better progress bar.
    - ∗ Q3: I have no problems so far.
  - Mark
    - ∗ Q1: Last time, I linked the frontend with the backend with Seb. Then I will work on IEEE parsing and finish it, pair programming with Jeff.
    - ∗ Q2: This time, I will continue to link the frontend with the backend.
    - ∗ Q3: I have no problems so far.
  - Kelsey
    - ∗ Q1: Last time I worked on updating the document for this iteration.
    - ∗ Q2: This time, I will work on a getting method in backend for the articles ID.
    - ∗ Q3: I am not having any problems.
  - Justine
    - ∗ Q1: Last time I worked on updating the document for this iteration.
    - ∗ Q2: This time, I will work on refactoring the backend.
    - ∗ Q3: I do not have any problems.

- Iteration 2: Scrum Meeting 9, April 16, 2015 (6:30pm-8:30pm)
  - Mark
    - ∗ Q1: Last time, I continued to link the frontend with the backend.
    - ∗ Q2: This time, I am changing the back end to meet new requirements from the front end.
    - ∗ Q3: I am having parsing problems.
  - Kelsey
    - ∗ Q1: Last time I worked on a getting method in the backend for the articles ID.

    - Q2: This time, I will work on the documentation.
    - Q3: I am not having any problems.
- Justine
    - Q1: Last time I worked on refactoring the backend.
    - Q2: This time, I will work on the documentation.
    - Q3: I do not have any problems.
- Jeff
    - Q1: Last time I finished setting up my environment, and then pair programmed with Mark.
    - Q2: This time, I will work on refactoring the front end and back end, and working on documentation.
    - Q3: I do not have any problems.