Interim Report

Social Media Visualisation Tools and Techniques

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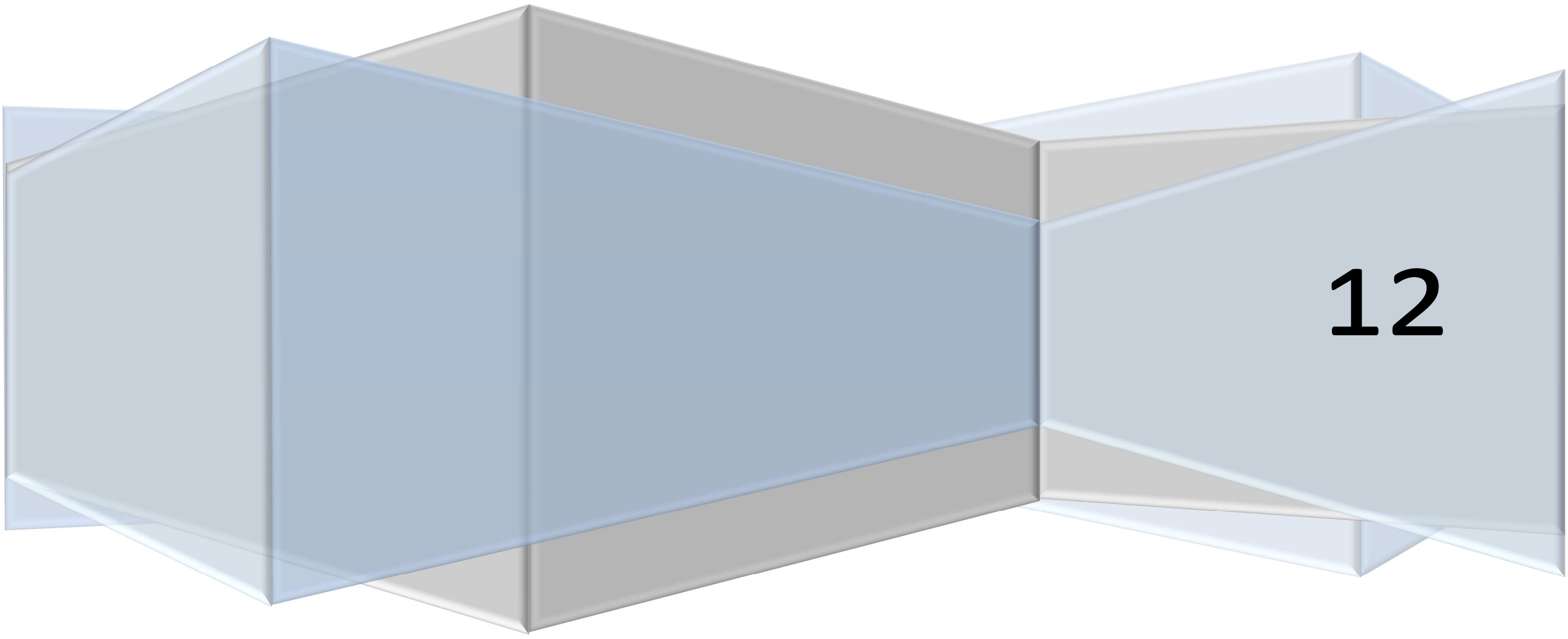
CM0343 – 40 Credits



Contents

Table of Figures

Introduction

This project is intended to work with the research that the Cardiff School of Computer Science and Informatics do alongside the School of Social Sciences at Cardiff University to create a toolkit of techniques that can be used in the harvesting, analysis and visualisation of social media content. I will be looking at content, such as that posted on social media services like Twitter and Facebook. The sort of material that I could be looking at could be issues relating to tension indicators, which may prove useful in defining geographical areas of unrest within specific demographics of the population. It could also involve looking at geo-location data that could be used to track movements and thoughts of groups of people or even individuals. This project intends to provide a software infrastructure for supporting data collection and analysis (covering both data analytics and visualisation) from real time online sources.

It is intended that Social Science researchers would be able to use these tools for visualising and analysing social media content. These tools could aid them in choosing appropriate techniques and ways to represent data for the task they are carrying out. This being the case it is imperative that the toolkit that is to be implemented is easy to use and understand by those who may not necessarily have a background in technology.

Tools implemented within the project could ideally be integrated into the larger COSMOS (Cardiff Online Social Media Observatory) initiative and could help highlight the advantages and disadvantages of existing visualisation toolkits which could be used by Social Science researchers.

This project will involve studying what types of visualisations are currently 'state of the art' and how these visualisations can be used effectively to aid with the research being carried out by an individual. The project needs different types of analysis techniques to be considered and in doing so determine their suitability and capabilities for use within the COSMOS initiative.

There will hopefully be some scope within the project to investigate a selection of these visualisation and analysis techniques further and to develop software that would allow these techniques to be harnessed within the proposed system.

The problem I intend to focus on the most, is that of which visualisation techniques can be used effectively on social media data to aid in research and what ways of representing the data is most effective for people to be able to analyse. In looking at this problem I will take a few case studies of where Social Science Researchers may need to be able to visually represent social media data and I will try to provide a solution that would meet their needs in terms of the visualisations and also analysis that could be made from the given solution.

This problem will require me to look at existing visualisation services that are already available for people to use and to assess how they work effectively and also where their pitfalls are. From this I will then be able to build up a better idea of the types of features that could be implemented as part of a toolkit of visualisation techniques. I will also have to work closely with different API's that are provided by Twitter, Google and other Companies to allow me to access the data or services that they provide.

Background Research

To assist in solving this problem of the visualisation of social media I will need to take advantages of technologies that are already in use (but that are being currently used in different applications), these include:

- Twitters API – for retrieving tweets from the Twitter social network
- Alchemy API – for determining the sentiment of specific tweets or using a keyword
- Google Maps API – to allow for the mapping of tweets for visualisation

I have also had to look at what information visualisation means as this is a key concept within my project.

As I will be using social media data from Twitter I've had to look at the legal issues and privacy policies surrounding the use of Twitter for such a service. To gain an insight into the types of services that are currently available, I have also viewed many web services that provide some form of visualisation of tweets in a social media context. I have summarised a few of these in this report in order to highlight some of the features that one may expect to find in such services as the one I am developing.

In conducting my background research I have also created some case studies with likely scenarios where I think my intended application could be used and the types of features it might include for the users in their situations.

Information Visualisation

Information visualisation is the representation of abstract data from a desired source. The abstract data can include numerical and non-numerical data. Information visualisation stems from looking at human computer interaction (HCI) and also computer graphics. Information visualisation takes that "visual representations and interaction techniques take advantage of the human eye's broad bandwidth pathway into the mind to allow users to see, explore, and understand large amounts of information at once. Information visualization focused on the creation of approaches for conveying abstract information in intuitive ways." [1]

Methods and Techniques in information visualisation include:

- Heat Maps – A graphical representation of data where values are represented as colours
- Graph Drawing – the derivation of 2D graphs from some sources of data/information (this could be social networks)
- Tree Mapping – a method of displaying data using nested rectangles
- Hyperbolic Tree – information is displayed as a tree structure, but has the benefit of having more 'space' than for example a binary tree

Indeed any way of displaying data in a visual way can be deemed as information visualisation. Information visualisation becomes most useful when dealing with data mining as the vast quantities of data that you can have can then be easily represented by a user for a more meaningful purpose.

In this project we can take advantage of information visualisation as human perceptual skills are very good at taking in; trends, clusters, maps and colours. Humans have an ability to store images very fast.

Twitter API

The Twitter API only allows clients to make a limited number of requests for tweets to it in a given hour. This policy affects the APIs in different ways.

As I will be using the Twitter API on a non-commercial basis then I will be limited to making 150 requests a day using the service. I would have to investigate further into how I could increase the limits that exist if this project became a more commercial venture or became integrated as part of the university's COSMOS initiative.

PHP Web Application

PHP

PHP is an open source server side scripting language which is useful for web development and can be embedded in HTML. It is unlike other client side code as the code is executed on the server which creates HTML code which is then dispatched to the client. PHP is very well documented and as it is open source there should be no problem fixing any problems that appear whilst coding. There will also be no cost involved in developing the project. [2]

PHP will work well with the JavaScript needed for the Twitter API that I am most likely to use and it is very common and used in almost all websites. PHP can do anything that a 'Common Gateway Interface' does, including; creating dynamic page content, sending and receiving cookies and gathering form data. But there are many other functions of PHP, these include command-line scripting, server side scripting and creating desktop applications. [3]

PHP Twitter API

I have considered using a PHP Twitter API for this project as there are a large number of APIs provided by Twitter to choose from. The different APIs that are available are all readily available and well documented on the Twitter developer's page [4]. All the APIs that are published are open source and are well supported with regards to the Twitter platform.

Legal Issues and Twitter

As I plan to use Twitter as my social media platform for my project I have reviewed the Terms of Service and also the Terms of Use of the API for Twitter.

From their Terms of Service (TOS):

'You are responsible for your use of the Services, for any Content you post to the Services, and for any consequences thereof. The Content you submit, post, or display will be able to be viewed by other users of the Services and through third party services and websites (go to the account settings page to control who sees your Content). You should only provide Content that you are comfortable sharing with others under these Terms.' [5]

This suggests that there are no issues surrounding whether or not the data that is posted on Twitter is viewable by anyone, and that anything an individual user posts can be viewed by others. This means that there is the ability to view the information on Twitter, but there are still issues of the use of content within my project.

From Twitters Privacy Policy:

'Any information that you provide to Twitter is subject to our Privacy Policy, which governs our collection and use of your information. You understand that through your use of the Services you consent to the collection and use (as set forth in the Privacy Policy) of this information, including the transfer of this information to the United States and/or other countries for storage, processing and use by Twitter.' [6]

This implies that Twitter retains the right to distribute all of the posted content and use it as they will. Individual users can however choose whether or not to display your location and even to remove all location data from past Twitter use if so desired.

The terms and conditions for such content use as I would be intending from my project, are covered in the terms and conditions for API use. [7]

- *'You may use the Twitter API and Twitter Content in connection with the products or services you provide (your "**Service**") to search, display, analyse, retrieve, view, and submit information to or on Twitter. You may use the Twitter name or logos and other brand elements that Twitter makes available in order to identify the source of Twitter Content ("Twitter Marks") subject to these Rules.'*
- *'Your use of the Twitter API and Twitter Content are subject to certain limitations on access, calls, and use as set forth in the Rules, on dev.Twitter.com, or as otherwise provided to you by Twitter. If Twitter believes that you have attempted to exceed or circumvent these limitations, your ability to use the Twitter API and Twitter Content may be temporarily or permanently blocked. Twitter may monitor your use of the Twitter API to improve the Twitter service and to ensure your compliance with these Rules'*

In conclusion, with regards to the project I am working on, according to the terms and conditions set out on Twitter and also the limitations on the Twitter API there should be no problem with harvesting tweets in order to provide an application that aids in the visualisation of the information for researchers.

Google Maps API

As this is a visualisation project, one way I have thought to visualise the data that is retrieved from Twitter would be to map the location of where tweets were posted from.

The most apparent and appropriate way of doing this in my opinion would be to display the results on some form of map. Whilst looking at a ways of visualising data using its location and mapping it I have considered that a heat map may be another useful technique that could be employed. A heat map is a map where areas on the map are coloured to tell you information about that area. A similar map is used by the police on their crime mapping and has points with numbers to show the amount of crime in that area.

To perform my mapping I have decided to look at the Google maps APIs as they have well documented free code which could be useful within the system, the large range of APIs that Google offer include:

JavaScript Maps API

The JavaScript API is on its third version and is used by companies including the New York Times. If this API is implemented correctly it allows the user to move around the map using the mouse and keyboard to zoom in and out of the map to get a better view. There is a limit of 25,000 map loads a day. It is possible to change the style of the map produced and it is also possible to overlay the map with information, this will be useful within my project. However, this API does require a good knowledge in programming with JavaScript. [8]

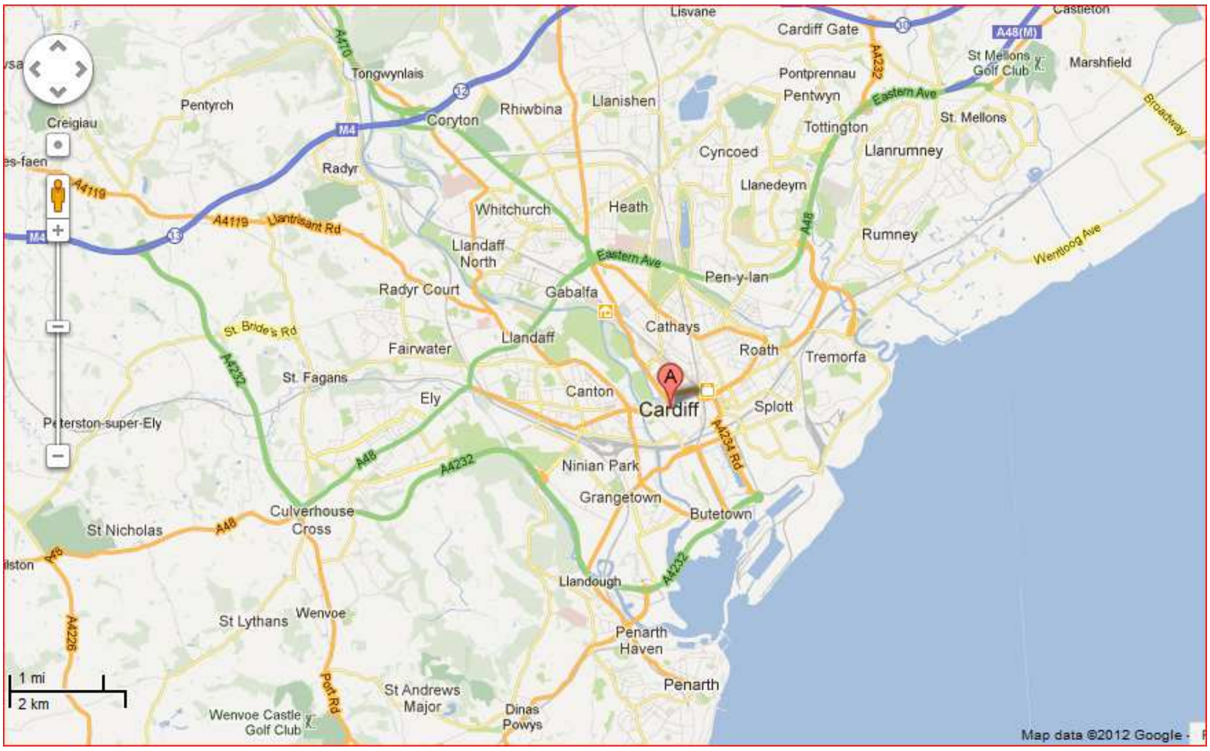


Figure 1 - JavaScript Maps Example (Source: maps.google.com)

Flash Maps API

The Flash API is an established member of the Google APIs family, it is very similar to the JavaScript API but it uses Adobe's Flash. It displays the map dynamically so the user can move the map around using the mouse using slightly different controls to the JavaScript API. It has several similar features to the JavaScript API and it is also possible to use flash content with the maps. The limitation is that as Flash is not supported on Apple mobile operating systems, people may not be able to use it if they were using a tablet computer for example. Google are slowly phasing out the Flash Maps as they prefer developers now to be using their JavaScript Maps API. [9]

Static Maps API

The ‘Image API’ is quite basic compared with the other APIs and allows you to get an image of the location. You can specify the parameters of the image including the resolution longitude and latitude of the image as well as the resolution. JavaScript is not needed to get these images however, the images are not dynamic and cannot be scrolled using a mouse. This means that if I was to implement this API, I would have to do all the overlaying myself and I would have to implement more features so that the user can navigate the map. There is a limit of 1000 image requests per user per day which may be a problem if the user had to request a new image every time they want to move around the map. [10]

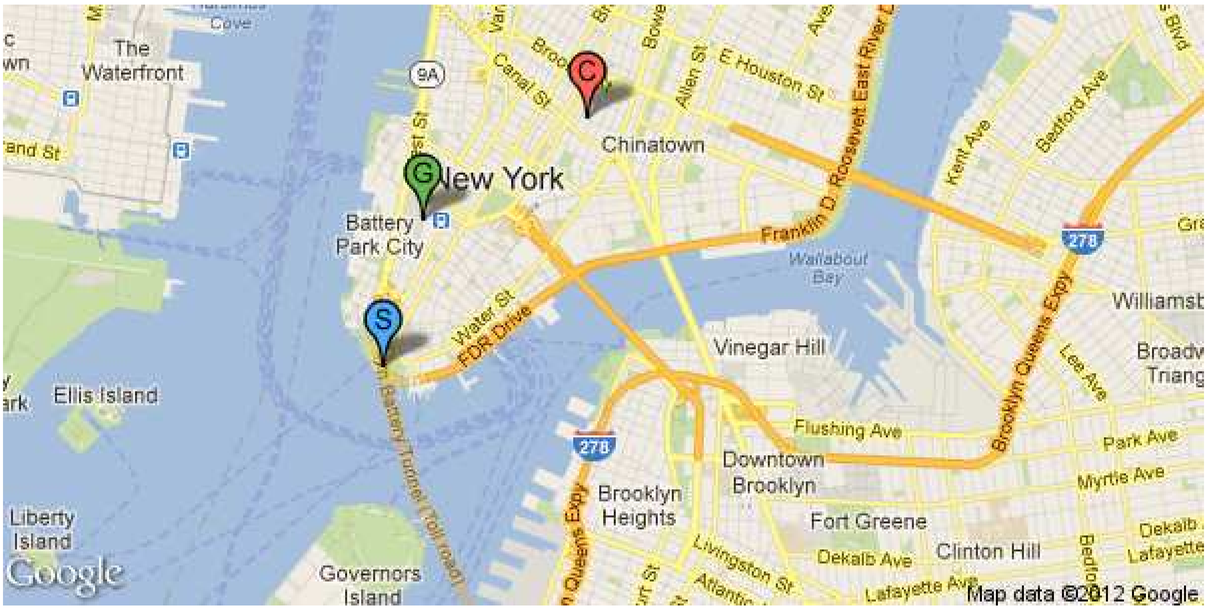


Figure 2 - Static Maps Example (Source: https://developers.google.com/maps/documentation/staticmaps/#quick_example)

Case Studies

I have built up some case studies to aid in my own understanding of the problem that has been presented to me. These scenarios also helped me work out some different solutions to the problem and as to how these could be used in the research field and the context for which types of visualisations could be useful in different situations.

The intended users of this system are researchers in the Social Sciences area, however there could also be scope for researchers in other fields to use the system. The reasoning for the system would be to allow these researchers to better analyse and visualise the content that is posted on social media websites, the visualisations would hopefully be useful as part of their research and could be used in the documentation of their findings. Below are a few scenarios where I think the system could be useful.

Scenario 1

A group of social science researchers are looking into how many tweets on a certain word the residents of the UK are making in the run up to the elections. They want to be able to easily compare the amount being said about a specific political party on a week by week basis during the months leading up to the election.

This would allow them to analyse the times at which more people were active in tweeting and whether or not this activity showed any correlation with other electioneering events. For example, 'had more people been tweeting around the time of televised debates?' and also were there differences between people tweeting about different political parties at different times.

An intention of the system would be to provide a visualisation, in the form of a graph that would map the volume of tweets that contained a specific keyword against the date and time they were tweeted. These would then be aggregated to form a week by week view of the number of tweets being made.

Scenario 2

Researchers may wish to look at areas of a country to see where the most social media activity about a chosen subject lies.

For example there could be a group of researchers wishing to view which areas of Wales are most active in voicing their thoughts when areas of the country have been flooded. This would allow the researchers to maybe gain an insight into which areas of the country have been affected most by the flooding from the numbers of people that are tweeting from similar locations. It would also allow researchers to perhaps gauge some of the different effects the flooding is having on people in different areas from what they are actually saying in their tweets.

An intention of the system would be to allow the user to map where the tweets are being sent from. By aggregating the number of tweets that are made in a country you could then start to build up a form of 'heat map' as your visualisation to give you a better representation of where tweets are being sent from and also the volumes of tweets at certain places. It would be hoped that the system could also provide the content of the tweet that the poster has made and map these accurately to their locations.

Scenario 3

Researchers may wish to see the connectivity of different group of people and indeed different individuals who may have the same interests or be talking about similar subjects on social networks. This could allow them to analyse interactions between individuals and groups of people on specific topic areas.

For example there could be a group of researchers wishing to view the connections between different individuals on Twitter in order for them to see who is connected in terms of a specific keyword. There would be a need to have a good visualisation that showed these links between different Twitter accounts so that researchers could get an in-depth insight into who is connected to who on different subjects. Analysis could then focus on the trends of people who are talking about different issues and whether or not there were groups of people that were always active for certain fields of interest.

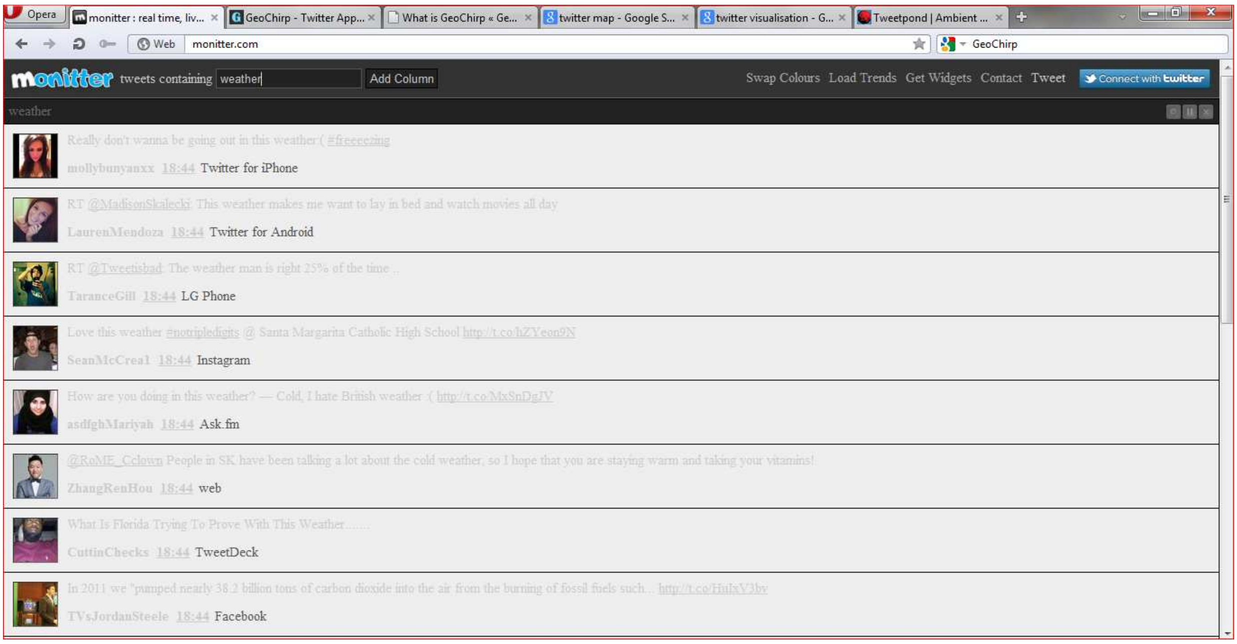
The system would aim to provide a visualisation including the tweeters username with all the relevant links from them displayed in a clear manner that was easy to understand. It would probably be most beneficial to display those users with the most connections at the centre of the visualisation with those less connected on the periphery. Hopefully by displaying the data in this way it would be easier to see where sub groups were forming.

Similar Services

Monitter

Features: *[11]*

- Differentiate what platform each tweet was posted from (mobile, iPhone, web)
- Outputs the Twitter username, image of user, tweet, time tweeted and platform
- Ability to search multiple queries with a neat output by displaying extra queries in a separate column
- Ability to search for multiple keywords within tweets
- Can specify a location/radius for tweets to be searched within



Really don't wanna be going out in this weather:(#freeeezing
mollybunyanxx 18:44 Twitter for iPhone

RT @MadisonSkalecki: This weather makes me want to lay in bed and watch movies all day
LaurenMendoza 18:44 Twitter for Android

RT @Tweetisbad: The weather man is right 25% of the time ..
TaranceGill 18:44 LG Phone

Love this weather #notripledigits @ Santa Margarita Catholic High School http://t.co/hZYeon9N
SeanMcCreal 18:44 Instagram

How are you doing in this weather? — Cold, I hate British weather :(http://t.co/MxSnDgJV
asdfghMariyah 18:44 Ask.fm

@RoME_Cclown People in SK have been talking a lot about the cold weather, so I hope that you are staying warm and taking your vitamins!
ZhangRenHou 18:44 web

What Is Florida Trying To Prove With This Weather.......
CuttinChecks 18:44 TweetDeck

In 2011 we "pumped nearly 38.2 billion tons of carbon dioxide into the air from the burning of fossil fuels such... http://t.co/HnIxV3bv
TVsJordanSteele 18:44 Facebook

Figure 3 - Monitter System (Source: http://monitter.com/)

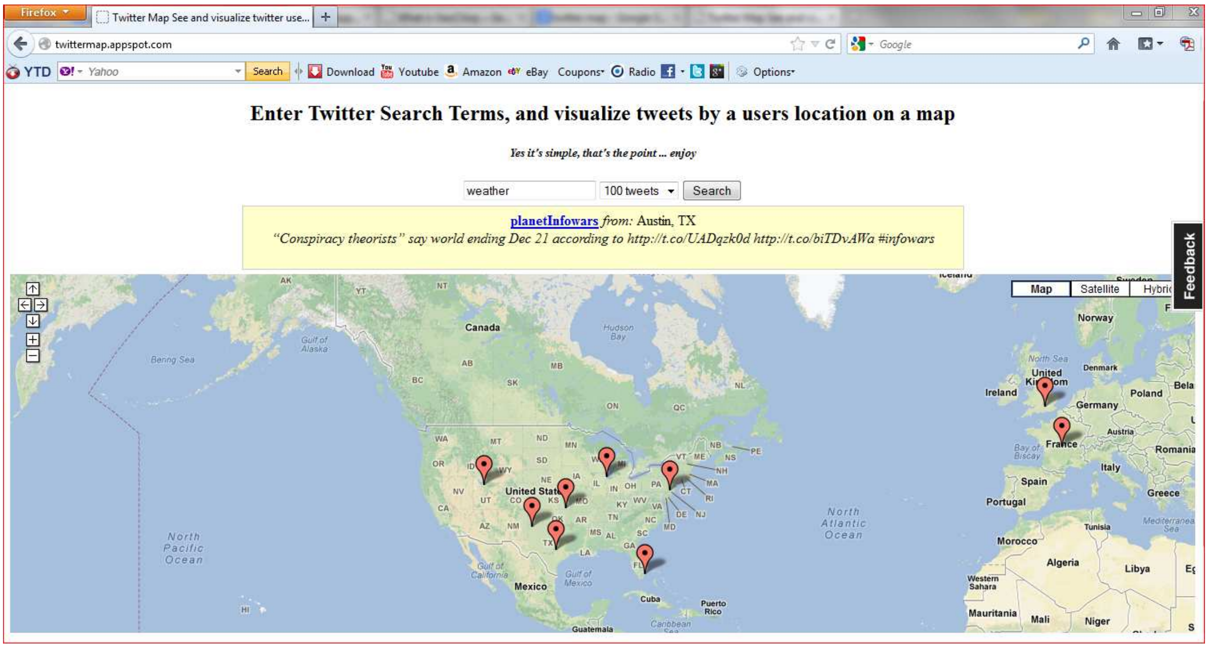
Similarities/Differences to features of my intended system:

- Collection of tweets in real-time environment would be similar, however in my intended system these would then be stored in a database in order for further processing
- My initial system will not be able to differentiate the platform that the tweet was sent from
- Output of Twitter Username, tweet contents and time of tweet would be similar, to my intended system.
- My system would also collect the geo-location of each tweet

Twittermap

Features: *[12]*

- Search for term by keyword
- Select number of tweets to be retrieved
- Maps the locations of user tweeting about the keyword
- Original tweet is shown if a marker is clicked
- Easy to navigate around the map



Enter Twitter Search Terms, and visualize tweets by a users location on a map

Yes it's simple, that's the point ... enjoy

weather | 100 tweets | Search

planetInfowars *from:* Austin, TX
"Conspiracy theorists" say world ending Dec 21 according to http://t.co/UADqzk0d http://t.co/biTDvAWa #infowars

Figure 4 – Twittermap (Source: http://Twittermap.appspot.com/)

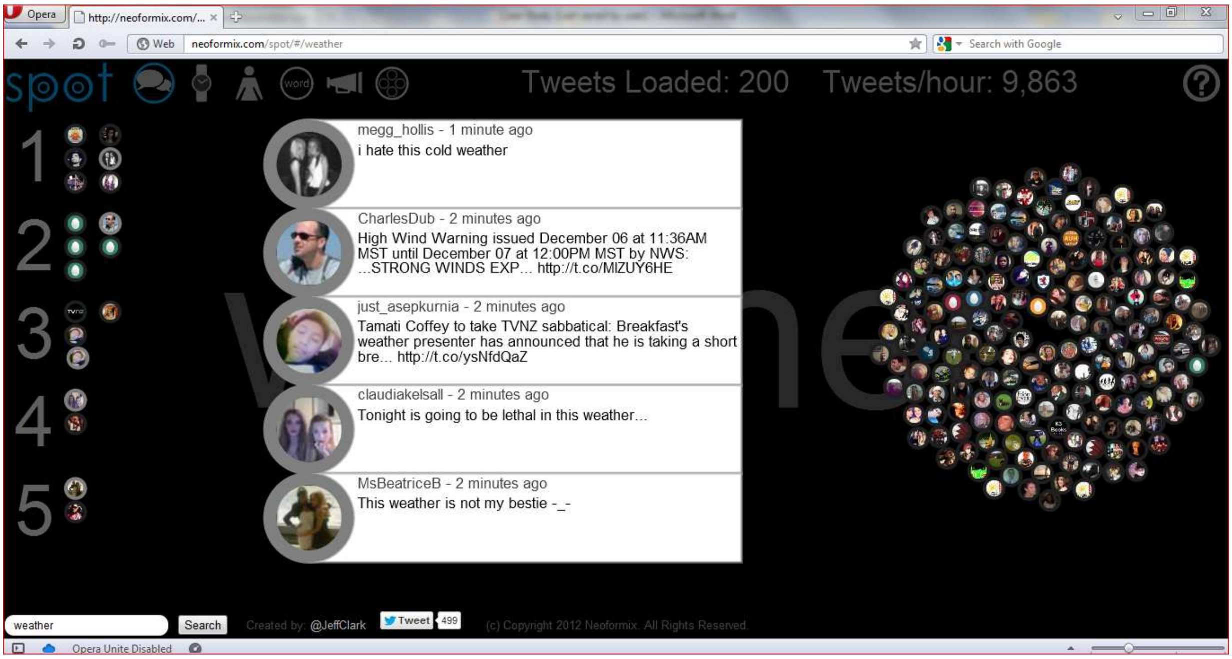
Similarities/Differences to features of my intended system:

- Plotting of tweets on a map will be similar, however an intention of my system would be to display the tweet content when you hover over the marker, rather than when you click on it.
- Map is easy to navigate which is something I would hope to keep in mind within my system
- My system would not allow you to define the number of tweets to collect but would also map 'historic' tweets that are contained in the database

Spot

Features: *[13]*

- Ability to search using a keyword
- The organizations of particles into 6 groups showing the following:
    - Groups of tweets that share common words
    - Timeline with tweets
    - Users that tweet the most
    - Common words that are used the most
    - The platform that was used to create the tweets
    - Groups of people or organisations that have created similar tweets
- Display the last 200 tweets for the keyword



megg_hollis - 1 minute ago
i hate this cold weather

CharlesDub - 2 minutes ago
High Wind Warning issued December 06 at 11:36AM MST until December 07 at 12:00PM MST by NWS: ...STRONG WINDS EXP... http://t.co/MIZUY6HE

just_asepkurnia - 2 minutes ago
Tamati Coffey to take TVNZ sabbatical: Breakfast's weather presenter has announced that he is taking a short bre... http://t.co/ysNfdQaZ

claudiakelsall - 2 minutes ago
Tonight is going to be lethal in this weather...

MsBeatriceB - 2 minutes ago
This weather is not my bestie -_-

Figure 5 - Spot System (Source: http://neoformix.com/spot/#/Twitter+Visualization)

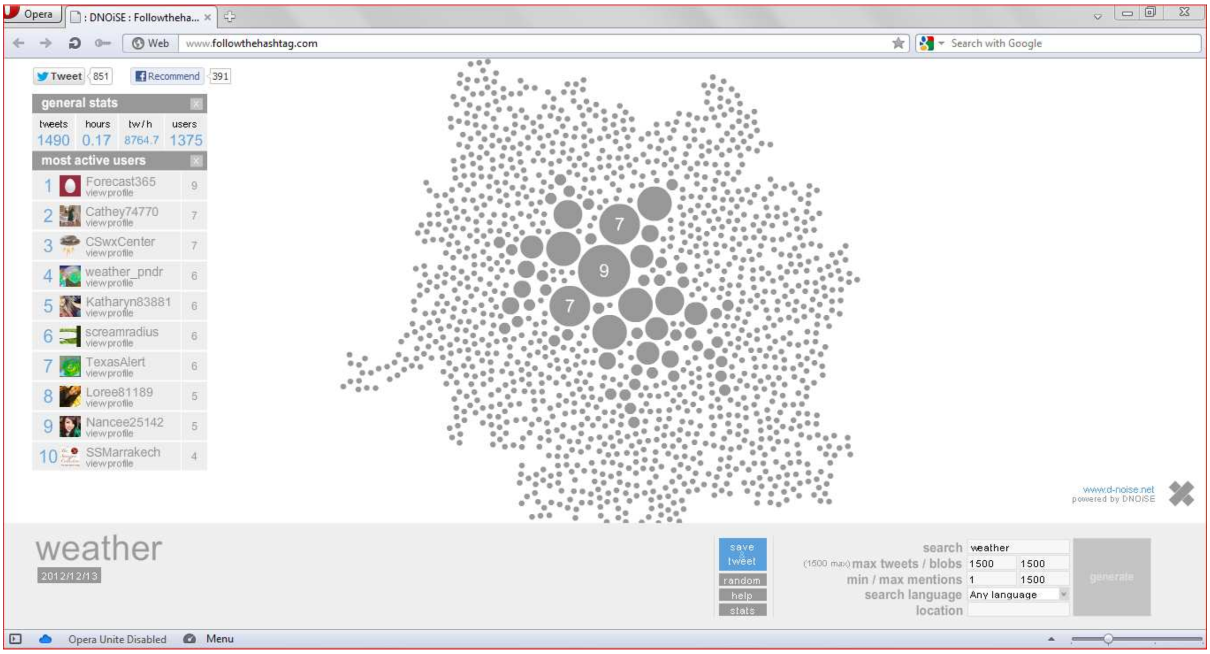
Similarities/Differences to features of my intended system:

- Not many similarities to my intended system as the objectives and outcomes of the Spot system are working within a different scope and context as to how I would be using my system
- Some similarities as to the way groups of tweeters would be identified according to the keyword they have used in their tweets

Follow the HashTag

Features: *[14]*

- Ability to search using a keyword
- Retrieves tweets from users based on the keyword
- Displays each tweet as a dot
- If a user has tweeted on that keyword more often, then a larger dot (circle) is displayed
- Allows you to choose the language of the tweets you wish to search in
- Allows you to specify a location for the tweets



general stats

tweets	hours	tw/h	users
1490	0.17	8764.7	1375

most active users

1	Forecast365 view profile	9
2	Cathey74770 view profile	7
3	CSwxCenter view profile	7
4	weather_pndr view profile	6
5	Katharyn83881 view profile	6
6	screamradius view profile	6
7	TexasAlert view profile	6
8	Loree81189 view profile	5
9	Nancee25142 view profile	5
10	SSMarrakech view profile	4

weather
2012/12/13

search: weather
(1500 max) max tweets / blobs: 1500 1500
min / max mentions: 1 1500
search language: Any language
location:

Figure 6 - Followthehashtag System (Source: http://www.followthehashtag.com/)

Approach

Problem Solution

It is my aim to solve this problem within the context of being able to provide Social Science Researchers with an easy to use and simple to understand toolkit that allows them to harvest social media data, store the data that is then relevant to them and finally allow some way for them to represent the data more visually than it is in its raw form. It would be my hope that the toolkit could then provide these researchers with an appropriate means to analyse their data in a more effective manner.

In hoping to solve my given problem of providing a toolkit of techniques for social media visualisation I have decided that I am going to create an online web based application. I have chosen this approach as it is what the majority of similar services I have viewed seem to have adopted and also because the technologies that I will need to be using work well in an online environment.

As a result of my decision to use an online service I will then be taking advantage of Twitter's PHP API to allow me to retrieve tweets from the social media service, I will then be importing the tweets into a database so that I can perform my analysis and apply my chosen visualisation techniques to them.

I have decided that I will provide a range of visualisation techniques to the users of the system and that I will be concentrating mainly on:

- Mapping tweets and providing a form of heat map to show the density of tweets in certain locations
- User links tool that will provide an overview of the links between users depending on who they are following and who follows them, looking at links between people who are tweeting about similar things
- Visualising the trends of tweets over time, looking at the differences in amounts of tweets at given moments

I have decided to use an SQL database to store the tweets that have been searched for as this will provide the best ease of interaction between the different APIs and will hopefully allow me the necessary levels of flexibility that I will need to implement the features of this project. I have given a design of my intended database based on the research of the information that is provided by Twitter (see page 18).

To help me produce a map for the toolkit I will be using Google's Maps API and from my background research, after considering each of the possible APIs Google make available, I found the JavaScript and Flash APIs were very similar and so if one was to be chosen I decided that it would be the JavaScript version as it had more features than the Flash API and also due to Google starting to phase out the Flash API. The JavaScript API was also dynamic unlike its counterpart and had an overlay function which would be very useful to me when it came to displaying information on the map. The Google maps API will allow me to retrieve the relevant tweets from my database and then display them using their longitude and latitude values.

To provide a heat map function I would have to look at creating my own JavaScript code that worked alongside the maps API which would count the number of tweets that had been plotted in a certain area and then, apply an overlay of colouring to the map depending on the calculation. I will need to provide different colours that I want to be used according to the tweet density. The density calculations will have to be dynamic as with different searches there will be different numbers of tweets returned.

To provide the ability to use links between users and groups of people talking about different keywords, I hope to use NodeXL, provided by the Social Media Research Foundation. This is a tool that works within Microsoft Excel and allows the user to enter a keyword term or a Twitter username to see groups of connectivity from them. I will need to find a way of ideally integrating NodeXL into my web service.

To provide a way of visualising tweets over time I hope to use a graph which I am hoping to create again using JavaScript and Google's visualisation API's as these works well with the SQL database that I am going to use. In order to be able to gather the relevant data I will need to find appropriate SQL commands and then be able to gather the returned data and import it in a correct format to the JavaScript methods to create the graph.

Database Design

As I will be using an SQL database for the background workings of storing tweets and their information on my website, I have created a brief overview of how I think the design of my database will need to be in order for me to access the information I need to implement the features of my project.

Tweets (id,username,created_at,text,source,lat,long,keyword,date)

The primary key for the database will be the id number which will be created with every tweet and will be unique to each tweet that is downloaded from Twitter using the API.

As there are no specific users accessing the system through individual accounts then the username will be populated with the same username for every tweet for the initial development of this software.

It is my hope that I will be able to implement all the different visualisation techniques of the project from this single table in the database, from my extensive background research of the technologies I will be using, it looks as though they will all be able to interact with the SQL database.

Conclusions

Results

I have already started development on the retrieval of tweets using the Twitter API and am currently able to store the tweets containing, the date the request was made, the text that was written within the tweet, the latitude and longitude of where the tweet was posted from and also the keyword that was used in Twitters API to download the tweets.

I have been able to provide a simple user interface on a web page that allows them to submit a search term and send a request for the tweets to be downloaded. (Appendix, Figures 7)

From here I have then been able to retrieve the number of tweets that are in the database relating to that keyword and the sentiment of the tweets currently on Twitter from that keyword, using in part the Alchemy API to provide analysis of this and return a result. An example result is:

- *OK By accessing AlchemyAPI or using information generated by AlchemyAPI, you are agreeing to be bound by the AlchemyAPI Terms of Use: http://www.alchemyapi.com/company/terms.htmlhttps://Twitter.com/search?q=weather&src=typd englishpositive 0.101999 1*

From this I will need to work further to make it more intelligible to the user of the system but I am confident that this will be a good feature as it is already running well within the system.

Another result I have achieved from my aims is the initial workings of a map that can display the location of tweets. Although at this early stage there is still more development needed, I have been pleased to see the progress that has occurred using the Google Maps API, and by the time of the final report I am confident that with some tinkering of the settings and by implementing my own portions of code alongside it, I will have a fully functioning mapping tool that will help with the visualisation of the content of Twitter. Again in implementing this I have kept a clean user interface (Appendix, Figure 8)

I am underway on implementing my JavaScript code to provide a heat map feature however it has taken slightly more time than I had anticipated in getting it to determine the right density settings to use and then applying the correct colouring to the areas. This feature I will continue to work on through the development of my project.

With regards to my initial time plan, (see Appendix) I am ahead of myself with the progress of the project as I have not only managed to get some of the APIs working, as I detailed but I have been able to implement them within the web service. This will now stand me in a good position as I enter the later stages of my development and will also allow me to expand some ideas and further enhance others.

Future Work

In continuing my development of the solution for this project, I will further work on my heat map for the tweet map I have created and I am going to look further into different techniques that I can use to visualise data within the database of collected tweets.

I am also going to be working on seeing how the connectivity of users can be integrated within the system and the value this could be to users of the system.

Future work that could also be carried out on the system would be to develop user accounts for people wanting to use this service, this is partially beyond the scope of what I am hoping to achieve in this project and there would also have to be discussion within COSMOS as to how they wanted this implemented if indeed they did. There may be some benefits of user accounts, such as each user being able to store their own data, but this would need greater work on a more extensive database if it was to be implemented.

I have provided an updated time plan of work that I will carry out on this project as through development of some parts of the system I am now able to see what features are taking more time than others and also what priorities now lie within creating a solution to this project. (See Appendix)

Glossary / Table of Abbreviations

Term	Definition
API	Application Programming Interface – A protocol that allows different software components to interact with each other
Common Gateway Interface	A method for a web server to delegate the generation of web files (e.g. HTML) to executable files
COSMOS	Cardiff Online Social Media Observatory
Flash	(Adobe) Flash – A multimedia platform to add interactivity to web pages
HCI	Human Computer Interface – The planning of designs of interaction between users and computers
HTML	Hyper Text Markup Language – The main programming language that is used to display web pages in a browser
JavaScript	A scripting programming language that is used in creating dynamic websites
NodeXL	Network analysis and visualisation tool
PHP	Hypertext Preprocessor – Open Source programming language used to develop dynamic webpages
SQL	Structured Query Language – A programming language used for managing data in relational databases
TOS	Terms of Service

Appendix

Interface Mock-Ups

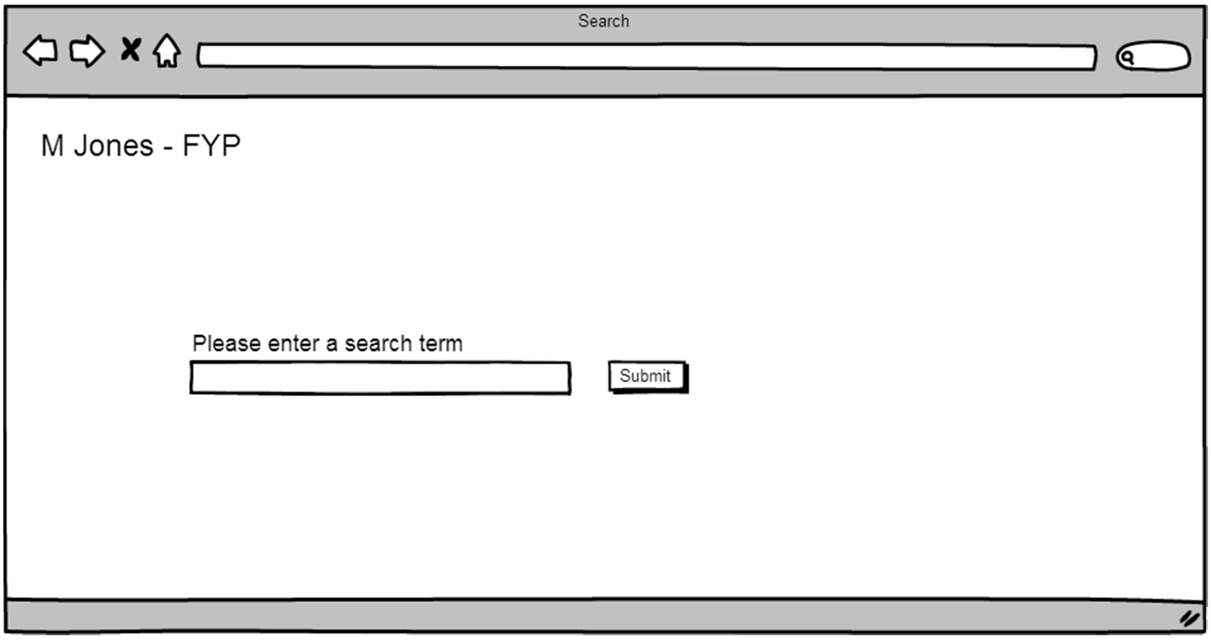


Figure 7 - Search Page

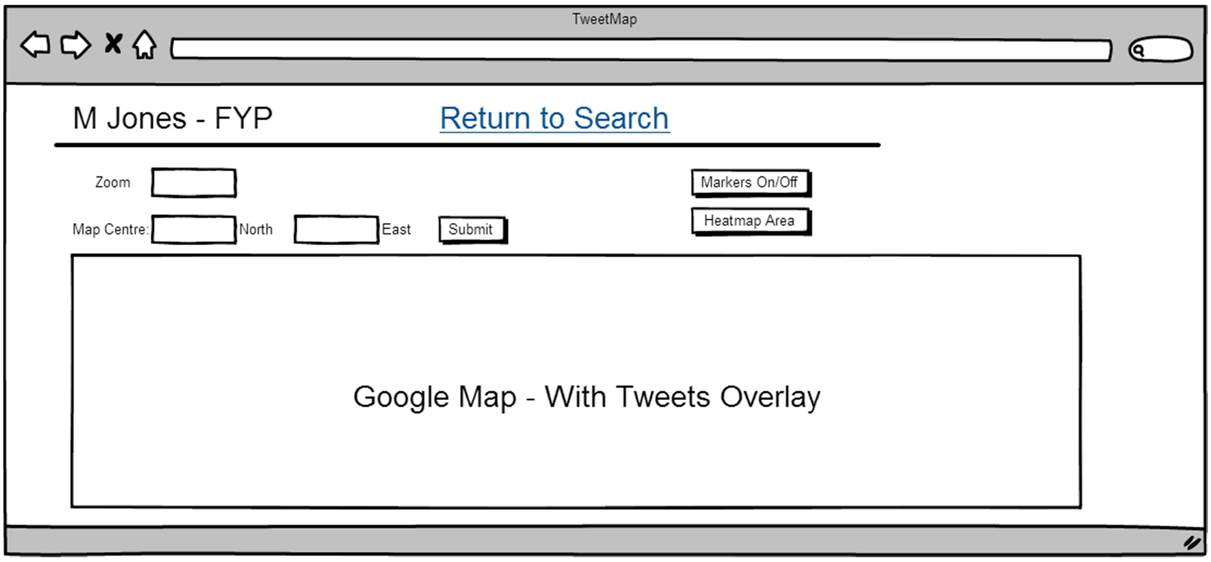


Figure 8 - Tweet Mapping Page

To create my mock-up interfaces I have used ‘Balsamiq Mockups Tools’, Available: http://balsamiqgdrive.appspot.com/

Original Time plan/Work Plan

Week Beginning	Task	Notes
08/10/12	Meetings with supervisor	Meet with supervisor to get a better overview of the project and to start to build up some aims and objectives
15/10/12	Initial Plan Write Up	Write up the initial plan of the project with aims and objectives and a work plan
19/10/12	**Initial Plan**	**Submission Deadline**
22/10/12	Background Research	Research into the work that has already been carried out with COSMOS and how this project relates to their research
29/10/12	Background Research	Research into systems that are currently available for analysing and visualising data from social media. Look at advantages and disadvantages of such systems
5/11/12	API Work for Social Media	Look at how I could use the API's provided by social media providers to harness their data
12/11/12	API for Google Visualisation	Look at how I can use the API's provided by Google to provide basic visualisation techniques
19/11/12	Problem Solution	Start to build up a picture of my solution to the given problem
26/11/12	Problem Solution	Refine how I am going to solve the task, taking into account work already performed with COSMOS
3/12/12	Interim report summarisation	Start to summarise my findings and gather all information I wish to include in my interim report
10/12/12	Interim report write up	Write up the interim report to the specifications require
14/12/12	**Interim Report**	**Submission Deadline**
17/12/12	**XMAS**	
24/12/12	**XMAS**	

31/12/12	**XMAS**	
7/1/13	**Revision Week**	**Limited Scope for work here**
14/1/13	**EXAMS**	**Limited scope for work here**
21/1/13	**EXAMS**	**Limited scope for work here**
28/1/13	Implementation	Implementation of retrieval of information from social media services
4/2/13	Implementation	Work on developing system to provide thumbnails of visualisation techniques
11/2/13	Implementation	Work on developing system to provide thumbnails of visualisation techniques
18/2/13	Implementation	
25/2/13	Solution Refinements/Extra Features	Any features above and beyond the specification, also refine what is already working within the system
4/3/13	Solution Refinements	Refining the current developed system to make sure things work as intended and are stable
11/3/13	Overrun Period	Time to use if earlier implementation stages have overrun
18/3/13	Evaluation of Work	Start to evaluate what I have achieved throughout the project
25/3/13	**Easter**	
1/4/13	**Easter**	
8/4/13	**Easter**	
15/4/13	Evaluation/Final Report Write Up	Gather all information needed for the final report of the project
25/4/13	Final Report Write Up	To author report on project
29/4/13	Final Report Write Up	To author report on project
3/5/13	**Final Report**	**Submission Deadline**
5/5/13		
13/5/13	**Exams**	

Updated Time plan/Work plan

14/12/12	**Interim Report**	**Submission Deadline**
17/12/12	**XMAS**	
24/12/12	**XMAS**	
31/12/12	**XMAS**	
7/1/13	**Revision Week**	**Limited Scope for work here**
14/1/13	**EXAMS**	**Limited scope for work here**
21/1/13	**EXAMS**	**Limited scope for work here**
28/1/13	Implementation	JavaScript method for creating and overlaying heat map
4/2/13	Implementation	Implementation of NodeXL (or similar) for analysing links between groups of Twitter users
11/2/13	Implementation	Work on Interface and HCI
18/2/13	Implementation	
25/2/13	Solution Refinements/Extra Features	Any features above and beyond the specification, also refine what is already working within the system
4/3/13	Solution Refinements	Refining the current developed system to make sure things work as intended and are stable
11/3/13	Overrun Period	Time to use if earlier implementation stages have overrun
18/3/13	Evaluation of Work	Start to evaluate what I have achieved throughout the project
25/3/13	**Easter**	
1/4/13	**Easter**	
8/4/13	**Easter**	
15/4/13	Evaluation/Final Report Write Up	Gather all information needed for the final report of the project
25/4/13	Final Report Write Up	To author report on project
29/4/13	Final Report Write Up	To author report on project
3/5/13	**Final Report**	**Submission Deadline**
5/5/13		
13/5/13	**Exams**	

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