**Facebook: A Social Network Engine**

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**CIS/319: IT Management**

**Nov. 25th 2012**

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The Internet was designed to be a place where content such as thoughts, pictures and videos can be easily shared between people. The people that one shares with are often members of social networks, such as high school friends or peers in a club. This sharing has taken place on many systems such as bulletin board systems (BBS), image boards, forums and blogs. However none of these social systems have had the marketing success of Facebook.

**How Facebook Works**

To use Facebook a person, group or corporation registers an account and then specifies some basic profile information. Afterward the user can post status updates, upload videos and pictures, or “check-in” by posting their location.

In addition to their basic profile information, the user will also specify their social circles. Examples of social circles might be people that worked at Contoso, live in Seattle, or are friends of Bob. Through the use of these declared social circles, Facebook then finds content that the user’s “friends” have published. This content is dynamically presented as a personalized view (Bosworth & Cox, 2006, 200800403 70).

When selecting which content to show; the frequency is based on the affinity of the friend’s relationship. To measure the affinity of this relationship, the number of actions involving both users is counted; where a higher count signifies a higher affinity. Actions could include mentions in a post, “Liking” the friend’s content, or tagging a friend in a check-in (Bosworth & Cox, 2006, 20080040475). Not all relationships need to be calculated; in many scenarios the user will proactively declare relationships in terms of being family members or husband/wife (Facebook, 2007, 20080235353).

A common scenario where this can be seen is with a user that is part of a social circle consisting of three people: good friend, your mom and a random stranger. The affinity between the user and their mother would be high due to the declared relationship and the good friend through the number of shared posts. Therefore when determining the probability a friend’s status update should be shown to another user, a post from the mother or good friend should be shown more frequently than the random stranger.

**Changes Brought to the Users**

Facebook has brought about many changes to its user base. Some of these places include exposing private information to the public, enabling more targeted advertising, and improved authentication models.

**Private Information Made Public**

Facebook has historically been a place where people have accidently exposed private information to the public. Initially this was due to the lack of authorization restrictions to limit who could view the posted content. To correct this problem, privacy settings were created as a form of access control lists to the uploaded content, posts, or profile information (Facebook, 2007, 20090013413).

However it seems that a large many users have not fully understood how to use and properly apply these privacy settings. Loyola University released a collection of statistics that concluded Facebook is cited in twenty percent of divorce cases (Protalinski, 2011). Additionally there are many reported stories of people being fired due to posting inappropriate content.

**Targeted Adverting**

In a traditional targeted advertising system, ads are selected specifically for the user based on previous input they provided to questions. Instead of using this same model, Facebook decided to design their advertisement platform as a system which leveraged their existing social networking system. By leveraging the known affinities between different members, it is possible for Facebook to identify products that will be of interest to other people without their direct interaction with the system (Facebook, 2008, 20090119167).

These targeted advertisements impact the users by enabling them to more easily find products they want to purchase. The targeted advertisements, also enables the product producers to more cheaply and efficiently spend their advertisement budget. One such success story occurred to State Bicycle Co. which increased income 500 thousand/year (Facebook, 2012, Advertise on Facebook).

**Centralized Authentication**

A third area where this change can be seen is with Facebook’s OAuth provider. “OAuth 2.0 […] enables a third-party application to obtain limited access to an HTTP service, […] on behalf of a resource owner by orchestrating an approval interaction (Hardt, 2012).”

What this means is that a website such as Contoso.com can declare a trust to with Facebook.com. Once this trust is declared it becomes possible for Facebook to authenticate a user and then use that identity on costoso.com.

This improves the experience of sites across the Internet, for Facebook users. One such area is in the reduction of having to memorize additional user names and passwords. It also allows the user to authenticate to partially trusted domains and declare how much they trust the site. If the site is only partially trusted, perhaps they will only share their name. A more trusted site might be granted access to the user’s phone number or address.

**Future Uses and Enhancements**

As time progresses, more secondary systems will continue to be built to utilize the core social networking platform of Facebook. An example of such a secondary system would be incorporating social networking into search systems.

**Integration with Search Engines**

Similar to the advertising model, search engines can generate more targeted search results through the use of social networking. A search engine is responsible for grouping data into associated sets, and returning the overlap (Jing & Qing & Hung, 2009). This design is similar to the design of social circles and the affinity of friend’s relationships (Bosworth & Cox, 2006, 20080040475).

One scenario where the two technologies could be combined is in building smarter dynamic search histories. A search history is a collection of recently used search queries, these terms are later used to infer context while optimizing a search result. This can be seen in the example of searching on a developer’s laptop for “Java” returning programming language information, while a friend’s will suggest Starbuck’s.

**Increased Advertisement Scenarios**

Other advancements of this application will likely revolve around generating advertisement revenue. In January 2012, it was estimated that Facebook would generate 85 to 100 billion dollars in value through the IPO process (Pepitone, 2012). However, in March during the IPO the stock jumped straight up to forty-five dollars per share then almost immediately dropped in value hitting a low at twenty-three dollars (Investing Money, 2012).

This story is similar to Google post-IPO were the focus changed from building systems to improve the user experience to building a system to please the investors (Lurie, 2012). Whittaker, an ex-Google employee, shared the same opinion of the post-IPO tech giant and the undeniable pressure to only design systems that generate money (Whittaker, 2012).

Annotated References

Bosworth, A. & Cox, C., (2006). [Systems and methods for generating dynamic relationship-based content personalized for members of a web-based social network](http://appft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.html&r=1&p=1&f=G&l=50&d=PG01&S1=20080040370.PGNR.&OS=dn/20080040370&RS=DN/20080040370). Patent Number 20080040370.

In this patent Facebook details a model for dynamically generating content by based on declared relationships between members.

Bosworth, A. & Cox, C. (2006). [Systems and methods for measuring user affinity in a social network environment](http://appft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.html&r=1&p=1&f=G&l=50&d=PG01&S1=20080040475.PGNR.&OS=dn/20080040475&RS=DN/20080040475). Patent Number 20080040475.

In this patent Facebook details a model for measuring the how involved a member is in a group.

Facebook (2012). [Advertise on Facebook](https://www.facebook.com/advertising/success-stories/state-bicycle). Retrieved from facebook.com

This post covers an advertising success story of State Bicycle Company. Statistics of increased traffic and revenue are provided.

Facebook (2008). [Social Advertisements and Other Informational Messages on a Social Networking Website, and Advertising Model for Same](http://appft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.html&r=1&p=1&f=G&l=50&d=PG01&S1=20090119167.PGNR.&OS=dn/20090119167&RS=DN/20090119167). Patent Number 20090119167.

In this patent Facebook details a method for targeting advertisements to one’s peers based on the affinity of their social circles.

Facebook (2007). [System and method for confirming an association in a web-based social network](http://appft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.html&r=1&p=1&f=G&l=50&d=PG01&S1=20080235353.PGNR.&OS=dn/20080235353&RS=DN/20080235353). Patent Number 20080235353.

In this patent Facebook details a method for declaring and confirming relationships between a user and friend.

Jing, G.; Qing, H.; Hung, T. (2009). [A Personalized Recommendation Algorithm Based on Associative Sets](http://ehis.ebscohost.com/eds/pdfviewer/pdfviewer?sid=52b8438e-ad22-4a0e-a827-93b48b52276f%40sessionmgr13&vid=9&hid=23). Journal of Service Science & Management, Dec2009, Vol. 2 Issue 4, p400-403

In this paper the authors, devise a system of determining relevance in disjoined systems.

# Hardt, D. (2012). [The OAuth 2.0 Authorization Framework](http://tools.ietf.org/html/draft-ietf-oauth-v2-31). Draft ietf-oauth-v2-31.

The OAuth 2.0 protocol is defined in this IETF standardization draft. It describes the interaction between clients and web servers that support delegating authentication to trusted third party systems.

Investing Money (2012). [Facebook Inc](http://investing.money.msn.com/investments/stock-price/?symbol=FB). Retrieved from msn.com.

Investing Money is a web site that contains a collection of news and marketing statistics for many public companies. One of these auto generated pages focuses on Facebook Inc.

Lurie, I. (Apr, 8th 2012). [How The IPO Ruined Google](http://techcrunch.com/2012/04/08/how-the-ipo-ruined-google/). Retrieved from TechCrunch.com.

In this article Lurie, a CEO of a marketing agency, compares Google before and after their IPO. It identifies several challenges that lead to the reduction of the brand.

Pepitone, J (Jan, 30th 2012). [Is Facebook worth $100 billion](http://money.cnn.com/2012/01/30/technology/facebook_valuation/index.htm)? Retrieved from: CNN Money.

In this article Pepitone discusses the projected value of the Facebook IPO.

Protalinski, E. (Mar 1st, 2011). Facebook blamed for 1 in 5 divorces in the US. Retrieved from  
 <http://www.zdnet.com/blog/facebook/facebook-blamed-for-1-in-5-divorces-in-the-us/359>

Facebook has been cited as a cause in numerous divorce cases. This article gives a high level report of these statistics.

Vera, N., Wang, J., Steinberg, A., Kelly, C., D’Angelo, A. (2008). [Systems and methods for providing privacy settings for applications associated with a user profile](http://appft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.html&r=1&p=1&f=G&l=50&d=PG01&S1=20090013413.PGNR.&OS=dn/20090013413&RS=DN/20090013413). Patent Number 20090013413.

In this patent Facebook details a model for creating Access Control Lists, called privacy settings. These privacy settings can be used to limit who can view posts and other uploaded content.

Whittaker, J. (2012). [Why I left Google](http://techcrunch.com/2012/04/08/how-the-ipo-ruined-google/). Retrieved From: blogs.msdn.com.

Post IPO Google was forced to change directions and focus on advertising. In this blog Whittaker describes the internal changes that occurred because of the IPO and the change of the company.