Interim Report
Nov 12, 2015

1. Introduction

Our project, *Analysis of Instant Messengers and their Evolution,* aims to look at what features and designs make an instant messenger both successful and useful in communication and collaboration, and how we can improve on them in the future. In our project, we are doing research on both historic instant messengers (IMs) and current popular IMs to compare designs and features that shows improvements over past iterations or competitor IM's. We conducted a survey and performed research using different methods (controlled experiments, user studies, use cases) over 5 different IM's. Based on these researches, we are designing low-fidelity prototypes, and later a high-fidelity prototype which will provide a User Interface for a new IM.

2. Motivation

Instant Messengers such as Yahoo, Skype, iMessage, Whatsapp, Slack, and many others have all come to light at some point throughout the last 15 years. They quickly rose to popularity and provided users with a competitive market for collaborative tools. They contain many various features, including text chatting, audio calls, video calls, file sharing, and many more. As the need for collaboration and communication increases, users require higher quality and more advanced features in IMs. Some of those traditional IMs survive and are still widely used, but many of them do not meet the evolving requirements and lose their market share. Moreover, there are no instant messengers that possess all of the features required by some users in the current market. Therefore, we think it is important and beneficial to research features and designs that make an instant messenger useful and appealing to users.

3. Impact of Project

The deliverables of this project will include 5 sub reports on different IMs, datasets from our research, a UI prototype for a new IM, a final presentation, and a final report about our results. Our project will benefit the following communities:

Students: A better understanding about IMs and user requirements, and inspiration on future research topics and master thesis.
Lecture professors: A new perspective on instant messengers.
Software development teams: A guideline and a prototype for developing new IMs.
IM Users: Knowledge on criterias and features of IM and instruction on choosing suitable IM software.

4. Methodologies

The methodologies of this research project include a survey, reference research, experiments, case studies, and prototype design. First, we conducted an online and an in-class survey to look at both past and present IMs that have been popular. After gathering results, we assigned each group member with an IM to research on according to the following template.

- Introduction
- Features
- Technologies
- Use Cases
- Analysis
- Conclusion

Each member of the group used their own techniques to gather information on the assigned IMs. Most of the data acquired for the research was from papers/manuals/previous researches/articles found online which are all referenced in the respective reports as well as the next section of this report. For the Use Cases, Adithya (Whatsapp), Zhuoli (WeChat), Josh (Facebook Messenger) and Keith (Skype) downloaded the IMs and produced a report after personally going through their use cases. For Kushal (MSN Messenger) was unavailable due to discontinuation, so his Use Cases came from various online images of MSN in different states. In his research of WeChat, Zhuoli conducted a series of controlled experiments to transform the qualitative analysis into quantitative analysis which is briefly overviewed in the next section of this report.

Analysis was performed by each member based upon their understanding of their respective IM. The team focused primarily on the design of the application and ease of use so that we can look to match or improve on these factors in our own UI design. We also looked at how valuable various features were to the users.

Currently, we are all building individual low-fidelity (paper-based) prototypes so that we may soon meet and discuss our various designs to come up with a unified idea for our high-fidelity prototype. We are using the research done on current and past IMs to input features and design layouts for our own prototypes.

5. Expected & Interim Results

Our project contains five sub research reports, each of which focuses on one popular IM. Each team member conducted a single research individually. At the end of our project, we will combine and perform

a parallel comparison of our results from the individual reports, and then we will merge all the assumptions and data into the final report. Followings are the details of our sub reports.

Zhuoli Xiao: Research on WeChat:

Reference Research:

[1]Czerwinski, Mary, Edward Cutrell, and Eric Horvitz. "Instant messaging and interruption: Influence of task type on performance." *OZCHI 2000 conference proceedings*. Vol. 356. 2000.

[2]Hui, Tong. "Research on WeChat According to Communication Study and Its Influence." *Chongqing Social Sciences* 9 (2013): 011.

[3]Wang, Shengmei. "Collaboration Factors and Quality of Learning Experience on Interactive Mobile Assisted Social E-Learning." *Turkish Online Journal of Educational Technology-TOJET* 13.2 (2014): 24-34.

Discoveries:

1.The most important reason for users to choose an IM is because their friends and other contacts are using it.[1]
2.Many (percentage not clear) WeChat Users prefer using voice messages to text messages.[3]
3. 78 % WeChat users share their daily lives in Moments in the form of photos and blogs.[2]
4. 98 % WeChat users are involved in more than 5 chatting groups. [2]
5. 71% WeChat users are between age 15 and 35.[2]

Assumption 1: Combining text messages, voice messages and photo delivering can increase the efficiency of communication.

Controlled Experiment: We have 10 participants attending in this experiments. We divide them into 5 group, each group contains 2 participants. Each group is required to finish 3 tasks in random order of a.using only text messages, b. using only voice messages, c. using combination of text messages and voice messages, d. using combination of text messages, voice messages and photo delivering.

Task 1: Explaining *Vertex Cover* Problems in Wechat.
Task 2: Sell the book named *Computation Geometry* in WeChat.
Task 3: Tell the story of Snow White in WeChat.

Results: We evaluate the efficiency by the number of exchanged messages and cost of time. Following charts show the data from experiments.

Chart 1. Time Cost on Different Tasks (Unit: mins)

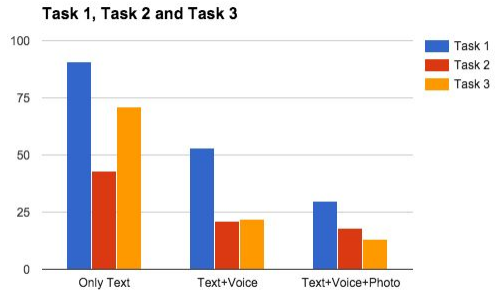

Chart 2. Number of Messages to Complete Tasks

Analysis: From this data, we can see that including voice messages and photo delivering leads to a decreases both in time cost and message number in all of the 3 tasks. There is an exception in Chart 1 Task 1. We found that it takes more time to explain Vertex Cover with photo delivering than without. The reason is participants spend some time drawing graphs on paper then take a photo and load it into WeChat. It does not conflict to our assumption. Therefore, our data from controlled experiments is coherent to our assumption that voice messages and photo delivering features increase the efficiency of communication.

Assumption 2: WeChat is more suitable to community ages between 20~25.
Controlled Experiment: Experiments are the same as Assumption 1. We sort the data according to ages range instead our group.
Result:We evaluate the efficiency by the cost of time.Following chart shows the data from experiments.

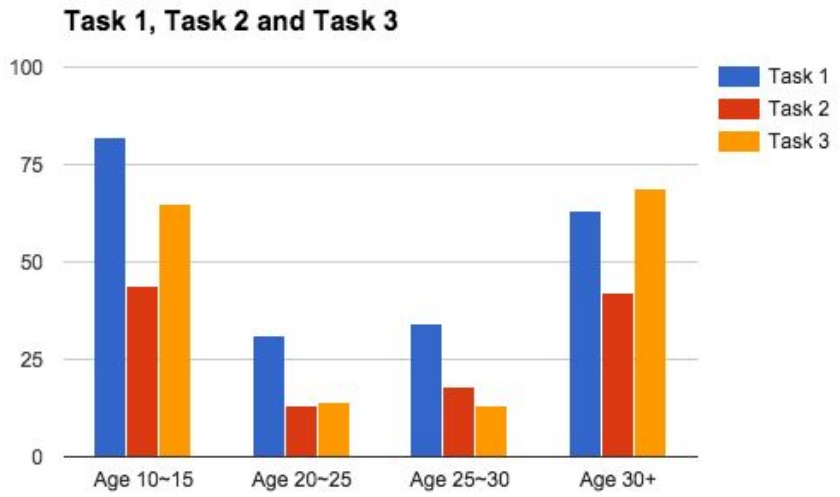

Chart 3. Time Cost to Complete Tasks by Different Ages.

Analysis: The data is coherent to our assumptions. We can see participants aged 20~25 complete tasks very fast and efficiently. However, our dataset is too small that the evidence is not strong enough to prove WeChat is most suitable for user between 20~25. We might need to search more existing data from other papers.

Case Study: Still on progress. I will include it into final report.

Adithya Rathakrishnan: Research on Whatsapp :

Discoveries:

Strengths: WhatsApp is considered as an alternative to SMS service provided by mobile networks. And it has been popular because of the following reasons WhatsApp remains completely ad-free, the cost of using WhatsApp ranges from absolutely none to 0.99$/year, works on multiple platforms like Android, iPhone and Windows, no international charge, It has a “last seen” or “online” timestamp feature, Personalized group messaging.

Weakness: The weakness of the WhatsApp would be its privacy. [7] The primary concern was that the users were required to upload their mobile phones entire address book to WhatsApp servers so that WhatsApp could identify the app users. But it turned out the information of people who are also not using the WhatsApp will be uploaded with their contact information which in turn violates privacy. The other thing is before the introduction of ‘Block contacts’. A user can chat with another user and see their avatar picture by just using the intended recipient’s number.

References:

[1] Statista-http://www.statista.com/statistics/260819/number-of-monthly-active-whatsapp-users/

[2] Forensic Analysis of WhatsApp Messenger on Android by Cosimo Anglano
[3] Social Networks IM Forensics: Encryption Analysis by Al Barghuthi and Huwids Said
[4] An App worth $16 Billion? 8 reasons WhatsApp is so popular
http://www.nbcnews.com/nightly-news/app-worth-16-billion-8- reasons-whatsapp-so-popular-n34141
[5] FreeBSD- https://www.freebsd.org/
[6] YAWS- http://yaws.hyber.org/
[7] WhatsApp -https://en.wikipedia.org/wiki/WhatsApp

Josh Stelting: Research on Facebook Messenger:

Discoveries:

Facebook is considered one of the most popular instant messengers with over 700 million users. It uses "chat heads" that floats your conversation over nearly any application so that you can check you new messages with a single tap at any time. Facebook Messenger can be found from any browser and has apps on all of the major smartphone operating systems so it is very accessible. Not only that, but the UI remains consistent whether you are on mobile or desktop, allowing users to use the service on both platforms without having to learn two separate ways of using it.

Facebook does have downfalls, however. It's target audience is for social media users who just want to chat with friends. This results in a lack of team-focused tools for collaboration. Looking at Slack as a comparison, the group chatting functionality is much more comprehensive, allowing for tagging of users, dropbox and google drive integrations, as well as pinning important information. All these features are absent from Facebook Messenger. File sharing is possible, but it can quickly be lost in the sea of messages that follow it. Facebook messenger may be a great instant messenger for social chats and talking to friends, but it seriously lacks the qualities sought after by teams that want to work collaboratively.

References:

[1] "WhatsApp and Facebook Messenger usage in the U.S. 2013." (2013, November 1). Retrieved November 4, 2015, from http://www.statista.com/statistics/301048/us-whatsapp-and-facebook-messenger-penetration-by-age/
[2] O'Connor, Jack (March 5, 2012). "Introducing Messenger for Windows". Facebook Newsroom. Facebook. Retrieved November 4, 2015.
[3] Oreskovic, A. (2015, June 11). "Facebook Messenger added 100 million users in the last three months." Retrieved November 12, 2015, from http://www.businessinsider.com/facebook-messenger-has-700-million-users-2015-6
[4] Zhang, Lucy (October 19, 2011). "A Faster Way to Message on Mobile" The Facebook Blog. Facebook. Retrieved November 4, 2015.
[5] Zhang, L. (2011, August 12). "Building Facebook Messenger" Retrieved November 12, 2015, from https://www.facebook.com/notes/facebook-engineering/building-facebook-messenger/10150259350998920

Kushal Patel: Research on MSN Messenger :

Discoveries:

MSN was the first ever instant messaging service to gain 100m users in 2003. This was because of its worldwide availability, that competitor AOL did not offer. MSN offered service to anybody as long as they had an email address or a phone number. Messages could be sent to anybody, which also was a con as much as a pro. MSN still significantly gained popularity having 330m users in 2011, which is the highest users for any messengers as of 2014. It provided games and activities along with messaging and audio/video calling. It's downfall began in 2011 when Microsoft acquired Skype, whose popularity was booming even quicker. Along with Lync,Skype and MSN communicated through Microsoft Notification Protocol (MSNP).

Microsoft offered a MSN companion application for its Internet Explorer, which displays a contacts recent activity on any website and lets users comment. It offered connectivity to Yahoo and later Facebook as well, which was partly a reason why they had 300m plus users.

MSN Research References

[1] "Windows Live Messenger" - https://en.wikipedia.org/wiki/Windows_Live_Messenger
[2] Movva, R. , Lai, W. , "MSN Messenger Service 1.0 Protocol". 08/1999 - https://tools.ietf.org/html/draft-movva-msn-messenger-protocol-00
[3] "The Rise and Fall of Instant Messengers" - http://www.whoishostingthis.com/blog/2014/10/22/instant-messengers/
[4] Cawley, C. , Goss, T. , "What's so good about Windows Live Messenger". 06/2011 - http://www.brighthub.com/computing/windows-platform/articles/120419.aspx

8. Difficulties faced and their back ups

The first difficulty we faced was while we were gathering results from our initial survey. We found out that we had a few open ended questions in the survey that received various responses that were actually quite similar. For example, we had an open ended question, "What features would you add in an IM?" that produced the following responses:

- "ability to favorite messages in a chat ".
- "being able to highlight a particular message".
- "pin messages".

Here, all the three response indicate the same thing. To solve this issue, we categorized such responses as one category, which helped us narrow down our result dataset. We took this approach due to limited time as we had to move on with our research. We could have improvised on our dataset by doing yet another

survey with options (narrowed categories from the previous survey) for such questions instead of asking for an open-ended response.

Another difficulty that all group members faced was while gathering information about the technologies used behind the assigned messengers. Since the IMs chosen are all developed by some of the best companies in the world, a lot of their back-end technologies and code is unavailable to the general public. Although, we did find some information, much of it was either really old or not in full.
This was not really a problem as we are looking to design the UI component of the IM and not actually implement it. However, it did affect our individual reports as we could not provide the design implementation of the respective IMs.

9. Conclusion

Researching various messengers has given us in-depth knowledge about their designs and features that makes them popular and useful as a collaboration tool. We are in process of building low-fidelity prototypes and plan to meet, discuss, and compare our designs to generate and idea for our high-fidelity prototype with an easy to use UI.

Our group faced some difficulties, and appropriate solution and feedback has helped us get on pace with our timeline.Going forward, we are confident that we will provide an excellent analysis on the evolution of messengers, the qualities that make them useful as collaborative tools, and present a high-fidelity UI prototype to demonstrate our vision as a result of our research.

10. Appendix

Team Members

Our team name is LegIM (pronounced *lee-gym, similar to 'Legion'*). We have 2 graduate students as team leaders and 3 undergraduate students as collaborators in our team. We split the whole project into a series of subtasks and assigned them to each team members according to their interest, abilities, roles and academic background.

Adithya Rathakrishnan: Team leader, Proposal review, Ethics application, Research on WhatsApp and design high-fidelity prototype.
Zhuoli Xiao: Co-Team Leader. Generate proposals, team reports, research on WeChat and design high-fidelity prototype.
Kushal Patel: Primary Contact/Collaborator. Report Editor. Research on MSN Messenger. Design high-fidelity prototype UI for a new messenger app.
Keith Rollans: Collaborator. Research on Skype. Design high-fidelity prototype.

Josh Stelting: Collaborator. Report Editor. Research Paper on Facebook Messenger. Design high-fidelity prototype.

Milestones

Although we met some technical problems during our research, we spent lots of time and effort to overcome difficulties and made the appropriate changes to our project timeline.

Oct 10th: - Whole team generates the survey together. **(complete)**
Oct 15th: - Kush and Josh conduct the survey in class and on campus. **(complete)**
Oct 23rd: - Kush and Josh finish the brief summary of survey data. **(complete)**
Nov 4th: - Adithya's rough research report on WhatsApp. **(complete)**
- Kush's rough research report on MSN Messenger. **(complete)**
- Keith finishes rough research report on MOC. **(Incomplete. MOC is off the market and cannot be downloaded anymore. Task switched to Skype and extension given.)**
- Josh finishes rough research report on FB Chat. **(complete)**
- Zhuoli finishes rough research report on WeChat **(complete)**
Nov 12th: - Zhuoli, Josh, and Kushal prepare an interim report. **(complete)**
Nov 18th: - Whole team finishes their own low-fidelity prototypes
- Team generates a report on the comparison of the 5 IMs they did research on.
- Keith finishes his report on Skype
Nov 25th: - Whole team designs a high-fidelity prototype and completes the final report
Nov 30th: - Finish the preparation for final presentation.

We are meeting our deadlines and progress continues to be made. We are confident that we will be able to deliver a high quality final presentation and report.