TagChat Contract Book

Abstract

Good mental health is essential when battling sickness and undergoing long term treatment in the hospital. Especially for adolescents who do not get to interact with their peers on a regular basis and be seen as a "normal kid," the toll on mental health can be devastating, leading to stunted development and feelings of anxiety and isolation. We have proposed a mobile messaging application suitable for adolescent use. This app, entitled "tagchat," is designed to connect adolescent hospital patients together by allowing users to search for and begin conversations with other patients around the world who may be experiencing similar conditions or treatments as them. This contract book serves as a complete guide for the conception, design, and financial plan for this product. From technical aspects that serve to explain and provide background into the development of the process to the proposed business model that will serve as the plan to ensure success on the market, we present our product and all the work that went into its creation.

Introduction

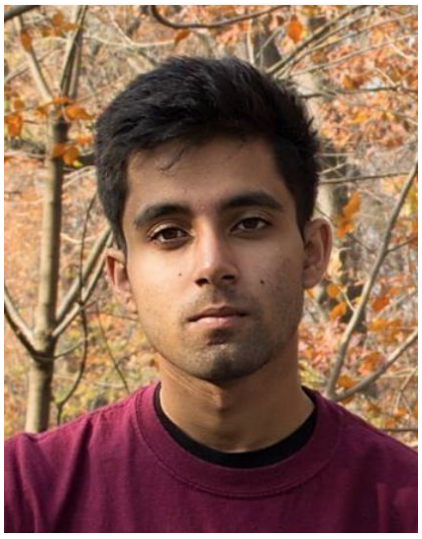
The amount of stress that adolescent patients in hospitals face can be enormous due to serious diagnosis, long term treatment, and isolation from their peers. Kid patients who are treated for months at a time are taken from school and are thus limited in the social interactions that normal kids their age would have access to. Social media is a large aspect of society for all ages, however most mobile applications are created to connect acquaintances who have already met in real life. This poses a problem for hospital residents who don't have access to meeting new friends, which can definitely take a toll mentally. When undergoing various treatments, the mental state of the patient is arguably just as important as the physical state, and feelings of isolation and separation can lead to deteriorating mental health.

We propose a solution to this pressing issue that many long term adolescent patients face through the creation of a mobile messaging application. Through this app, adolescent hospital patients will be able to create a profile containing basic information (first name, age, treatment/diagnosis), search for other patients, and begin conversations that could lead to friendships and connections all over the world.

When undergoing treatment, it helps to know that other patients are going through similar experiences, and this can be beneficial in boosting morale. We believe that our app, entitled TagChat, is the perfect combination between support and social media. Not only does it allow patients to find new friends that they wouldn't have been able to meet otherwise, this app provides a safe platform to start conversations about illness/treatment. Inspiration for the name TagChat, came from a hospital tag. Just as hospital tags worn by patients are used for identification, useful for the hospital staff, we believe this basic information can be a starting point for creating conversations with patients all around the world.

Founders

Nicole Kim is a senior at the Johns Hopkins University, Whiting School of Engineering, majoring in electrical and computer engineering. She is from McLean, Virginia, and lives with her family and her dog. Throughout her academic career, Nicole has always had an interest in developing apps as well as working on hardware in the lab. After graduation, she intends to pursue a career in law with a concentration in patent and intellectual property law.



Aurik Sarker is a senior at the Johns Hopkins University, Whiting School of Engineering, majoring in electrical and computer engineering. He is from Anaheim, California, and lives with his parents and sister. During his time at Hopkins, he developed an interest in building devices and applications in the medical field. After graduation, Aurik wants to pursue graduate education, and hopefully a position in research and development in signal processing.

Field Survey

Before developing the software for our product, we wanted to ensure that there was a specific need as well as market space for our messaging application. This was accomplished by first identifying the issue we aimed to tackle, restated as thus: adolescent children in hospitals lack social interactions which can lead to deteriorating mental health. Our proposed solution is a social media messaging application that allows adolescent users to search for and find new patients to talk to in order to begin honest conversations about their experiences and make them feel less alone. With this in mind, we set out to identify the solutions that the market currently provides and interview medical staff to make sure that a product that we propose is something that could be viable.

Current forms of online support include forums and chat rooms where patients and/or everyone else can begin discussions about their illness. However, these online domains are usually open to the general public, and there's no way to tell whether someone is lying about who they say they are. Although some patients have noted that these forums are helpful in reaching out to others who are going through similar experiences, most online support is not tailored to children.

Current forms of mobile applications/social media in the medical field only include messaging applications that connect doctors to patients but not patients to other patients. These applications are helpful in emergencies or situations that require medical attention but aren't considered a form of social media. Although there's no reason that kid patients in hospitals can't use traditional forms of social media like Facebook, Instagram, Snapchat, etc, all of these applications are based on initial in-person contact before connecting online. There's no real way to meet strangers and make new friends on these social media apps. After being in the hospital for an extended amount of time, kid patients can fall behind the social interaction curve and find themselves at a loss for new peers around their age.

Although we believed our idea was unique, we wanted to ask professionals who worked in the medical field to gauge whether our app could be successful. We reached out to medical staff at the Johns Hopkins Hospital and asked if they thought adolescent patients would use an app like ours. We also surveyed classmates and friends, who also thought that our app had the potential to thrive and connect lots of patients.

Intended use

Our mobile application is targeted for children ages 7 - 17 who are long-term patients at registered hospitals around the world. We decided that this age range is a large enough group of users who are old enough to be able to use an app as well as compose messages to other patients. We decided to cap the age range at ~17 as at that point, young adults have more independence and access to other apps/social media. The intended use for this mobile application is to allow patients to search for and find other patients, preferably around their own age, and start conversations as a way of relieving stress and making new friends.

This application was created exclusively for patients who reside in hospitals rather than for the general public. This was done to prevent predators from using the app: adults who may pose as children in order to gain private information is a threat that was kept in mind when deciding upon the target users of the app. Although there are many children who are sick yet reside in their homes, we wanted to design an app specific to patients who face long term treatment away from their homes as we believe the hospital environment to be very different.

The intended use for our product is to facilitate communication and conversation among hospital patients, however, we have anticipated other uses of our product. For example, we don't expect patients to solely use this product to only talk about their experience in the hospital and their specific condition. We want our app to foster real, genuine friendships, thus we encourage normal and natural conversations. Instead, we've created a safe environment for patients to talk about anything and to meet new people. We will, however, implement filtering to prevent use of profanity and hurtful racist remarks, etc. But because we value the intimacy and privacy of friendships, closely monitoring chat histories is not part of the intended use of this product.

In short, we have designed this product as a mode of support for hospital patients and hope that all of our users use our application to meet new friends, learn about new conditions and experiences that others go through, and feel less alone during their stay at the hospital.

Patent survey

An extensive background patent search was conducted in order to ensure that our product was unique and that our patent application would have a chance of approval. We understand that our product does not encompass new ideas, rather the implementation and market for our product is different than patents previously filed and approved. The patents listed below consist of software technology that our product is similar in its build. We drew inspiration from these patents and took them into account when drafting our own patent application.

1. Engstrom, G. Eric, inventor; Wildseed Ltd, assignee. Unified message box for wireless mobile communication devices. US Patent 10,687,511. September 15, 2002.

2. Rasmussen, Jens Eilstrup, inventor; Google Inc, assignee. Digital mapping system. US Patent 11,051,534. February 5, 2004.

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4. Arad Rostampour, Noah Benjamin Suojanen Kindler, Russell Douglas Fradin, Steven Cary Heyman, inventor; SOCIALSHIELD Inc, assignee. Method for detecting suspicious individuals in a friend list. US Patent 13157536. May 10, 2011.

5. Mark A. Watson, Philip C. Weighill-Smith, Paul A. Duffin, Petr Vik, Szymon W. Kurcab, Slawomir P. Malota, Jaroslaw K. Cora, Maciej K. Misiolek, Pawek P. Duda, Michal J. Karpinski, Joseph George, inventor; Mark A. Watson, Philip C. Weighill-Smith, Paul A. Duffin, Petr Vik, Szymon W. Kurcab, Slawomir P. Malota, Jaroslaw K. Cora, Maciej K. Misiolek, Pawek P. Duda, Michal J. Karpinski, Joseph George, assignee. Integrated mobile application development platform. US Patent 13,765,067. February 12, 2013.

6. Howard Ganz, Karl Joseph Borst, inventor; Ganz an Ontario partnership consisting of S H Ganz Holdings Inc and 816877 Ontario Ltd, assignee. Multiple-layer chat filter system and method. US Patent 12042045. March 4, 2008.

7. Kamper, Robert J., inventor; International Business Machines Corp, assignee. Highlighting tool for search specification in a user interface of a computer system. US Patent 088964. July 18, 1997.

Regulatory issues.

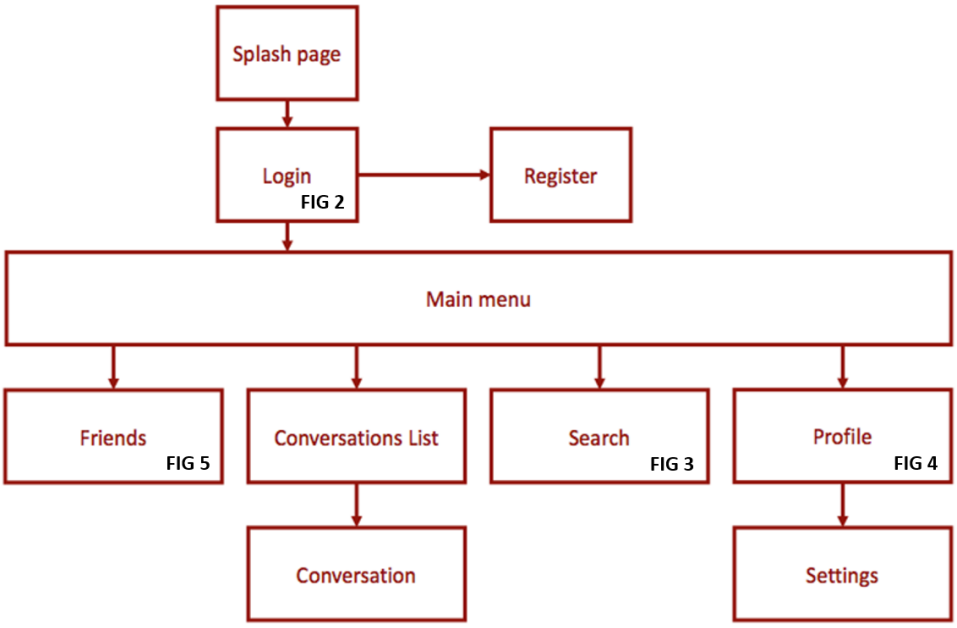
Although health-related, our product does not deal directly with the physical conditions of one's body and it must be noted that mobile phone apps have become universal in the modern world. However, the app development has quickly become one of the largest and quickest revenue sources for small start-ups and technology companies. In this climate, legal protection and compliance are becoming increasingly important issues in countries where app development has secured a firm place in the technology market. The laws governing apps vary widely depending on consumer base, nature of content, and utilized business model, however, there are numerous legal issues for all mobile applications that must be considered when developing and placing these services on the public market for users.

The first right that must be considered is the Intellectual Property Right (IPR) in the application's software. Many apps today use open source software (OSS) which, in this case, IPR and end user licensing require special consideration since OSS licenses (GPL, LGPL, Apache) have specific requirements for attribution, distribution, and non-discrimination with respect to each platform. A single app may use a combination of OSSs, each of which is governed by a different license leading to further complications in its use.

The next issue that governs the use of software regulation is the intellectual property right in the content of the application. Developers are required to secure "rights clearance" from copyright owners in order to be protected against infringement claims. This arises in the case that an app uses (displays, reproduces, publishes, modifies, etc) copyrighted content such as images, sound, video, etc. Trademark issues may also play a role in any infringement case, as similar logos and slogans may interfere with pre existing copyrights.

Because our app, TagChat, deals with displaying basic medical information online, privacy and data collection is a sensitive area that had to be carefully considered. Effective terms of use and privacy policy statements that are reflective of the developer's consumer base are necessary to avoid lawsuits as well as the app's support and sale. Medical confidentiality is a relationship between physicians and patients that most people believe should be protected. Some users may not feel comfortable with sharing their medical history online and thus be swayed from using our app. To further emphasize the need for security, our app mainly deals with adolescents and the basic information they provide for their profiles. It is generally deemed unsafe for children to put private information online in an attempt to avoid online predators who may want the information for their own purposes. Because of these concerns, encryption and safe storage of information is vital in avoiding breaches and legal cases that could arise.

Product schematic design and explanation of each block.



- Splash page: This is the first page that appears when the app is opened. This page contains the logo that is displayed while the app loads.
- Login: This page contains 3 text boxes that allow the user to enter their username, password, and hospital ID. The hospital ID is a unique key specific to each hospital to ensure that only registered patients have access to the app. This page also contains an option to register for new users.
- Register: This page contains text boxes that allow new users to enter an email address, username, password, and unique hospital ID. The user will then receive an email allowing them to activate their account where they will be able to set up their profile and add basic information such as first name, age, diagnosis/treatment.
- Main menu: This page contains tabs that will allow the user to navigate to different pages of the app. The four different options are: friends, conversations list, search, and profile.
- Friends: This page contains the list of connections that the user has made. When a name on the list is clicked, the user is taken to another page where the friend's profile can be viewed.
- Conversation list: This page contains the current conversations that the user has open. From this page, each individual conversation can be accessed, where messages can be sent to and from various patients.
- Search: The search page contains a text box where the user can input keywords in order to filter and find other patients to begin conversations with. When a search is being conducted, the database of patients will be accessed, and relevant users will be found and displayed on the screen.
- Profile: This page contains information about the user (first name, age, condition, hospital) as well as setting options.

Detailed design (hardware, software).

The app was initially designed to be used for any android device. This was chosen because the initial coding was completed in Android Studio. However, for future use, we definitely want to expand our device range and adapt our code so that iOS users can also use this app.

Programming functionality into the app consisted of first writing xml files in order to obtain the layout of the displayed activity. This was accomplished by creating various textboxes and buttons that the user could press in order to navigate to different pages. The layouts for each page were created first in order to visualize the sequence of events that each user would undergo when using our app. Each page was created in the same way: the necessary text boxes, buttons, and words were placed in a simple and easy-to-use way. Next, java classes were created to add functionality to the layout files. By linking buttons and text boxes together by calling different classes, the code allowed users to navigate between pages (also called activities).

We designed the main menu to have four different options: friends list, conversations, search, and profile. Drawing inspiration from existing messaging apps as well as what we believed to be suitable for children, we condensed our main menu to these four different pages. In order to keep it kid-friendly, we used large text and simple shapes, as well as keeping with the dark red color of our logo.

Communication

The main intent for our app is to allow patients around the world to connect and start conversations. This is the main form of communication that our app promotes and is essential to our mission. The conversations that patients have aren't monitored (except for profanity and inappropriate messages) so the patients are free to talk about whatever they want. We wanted our messaging app to allow natural friendships to grow, and we didn't see fit to monitor and filter every message that is sent through the server.

Another mode of communication is between us and the users. Although we will hire a customer service representative to answer logistical questions, we want feedback from our target audience. On the website that we set up as well as a company email, we want patients to feel comfortable giving us feedback about the app and what they would like to see improved. In the end, we are providing a service to them, so giving a voice to those who are using our app is important to us and we think this is very important when the app hits the market.

Instruction manual with troubleshooting

Register:

1. Click on app icon to open.
2. At the login page, click the Register button.
3. The next page will prompt you to enter your email address, username, password, and hospital ID
    a. If you do not know what your hospital ID is, please contact your primary caretaker (nurse, circulation desk) or contact our customer service to connect you with one of our representatives.
4. Upon registration, you will be sent an email with a link that will allow you to activate your account.
5. Click the link in the email to activate your account. Congratulations! You are now a part of the TagChat community!

Login:

1. Click the app icon to open.
2. At the login page, enter your username, password, and hospital ID. Then, click LOGIN.
3. You are now logged in and should be at the main menu.

Logout:

1. From the main menu, navigate to the Profile tab.
2. Click Settings.
3. Click Logout.

Find patients:

1. From the main menu, navigate to the Search tab.
2. Click the search bar at the top of the page.
3. Enter specific keywords (diagnosis, treatment, hospital name, etc) and press Enter.
4. Search results should populate below with patients who match the entered keywords.
5. Click on a specific patient, and then click the Add option in order to add them to your Friends list.
    a. In order to start a conversation, a patient must accept a friend request first.

Start a conversation:

1. From the main menu, navigate to the Friends tab.
2. Click on a friend from the list, then select Start Conversation.
3. You will be taken to a new conversation page, and messages can now be sent.
4. The conversation will now appear on your Conversations List.

Troubleshooting:

Forgot your username/password?
There will be an option on the login screen with the words "Forgot your username/password?" which can be clicked if necessary. The user will then be taken to a page where the email address can be entered. An email with a link to reset the username/password will be sent.

Is your message not sending?
Check your internet connection. Messages are sent to our server over the internet so if your router is down or if you are not connected, your messages will not be sent.

The app keeps crashing when I open it.
Check to see that you have the latest update of the app. This can be accessed through the app store updates. Our developers are working to fix any bugs or kinks that might come up when using the app, so if it keeps crashing, update to the latest version.

A conversation that I had on my conversations list disappeared.
This may be because that person has unregistered with us or has deleted their account. We encourage users to use other social media, especially when checking out of the hospital. TagChat isn't available for users outside the hospital so if someone has left, their account will be deleted.

Do you have further questions?
If you still can't figure out why TagChat isn't working properly or if you have more questions that need to be answered, don't hesitate to call our support line: 240-281-8024. Our customer service representatives will be happy to help with any problems you may have.

Reimbursement.

Although most hospitals in the US have access to mobile devices such as phones and tablets, we wanted to ensure that all kids who reside in hospitals have the chance to use our app. This is why we have considered a device reimbursement program where we would provide devices to hospitals at discounted prices or allow the hospitals themselves to purchase devices and be reimbursed. This is done as an incentive for hospitals to purchase subscription to our service, and allow access to all registered patients. Our app is designed to work with any android device (and in the future we want to expand to other platforms) so the purchased devices need not be high end.

Business model:

We have decided that the best way for our company to sell and get our product out on the market is to sell directly to hospitals. We were debating whether the application should be available to the general public on various app stores, but we wanted hospitals to have exclusive use to our product. This was done to ensure that only registered patients at hospitals had access to TagChat in an effort to protect patients from online predators and posers who may want to use the app for their own benefit.

TagChat will be available for purchase through a monthly subscription fee, which can also be prepaid for the entire year. The price point for this is currently at $5 a month/user. Depending on how many patients the hospital would like to purchase the app for, the price that each hospital pays us will vary. We believe that a subscription fee is the best way to bring in revenue as the number of patients is always fluctuating and we felt that a flexible pay plan is the optimal route for a service to be provided.

The revenue brought in with subscription fees will be used to maintain the server on which all the messages are sent through, and encrypted databases that hold private information. Other areas that need to be funded include developers who work to maintain and improve the software, as well as buying devices at bulk price for the device reimbursement plan.

Financial plan (Costs based on 2 years)

Employees:	Developers (x3)	$600,000
	Customer service (x1)	$100,000
Server/Cloud storage:	DigitalOcean	$2,800
App Store:	Apple Store	$198
	Google Play Store	$25
Location:	Office space	$72,000
	Utilities	$2,400
	Computers/equipment	$5,000
Total:		$783,200

We plan on spending the bulk of our cost on human personnel, which we believe is essential to the upkeep of our app, as well as the on-call support. Other than that, it is necessary to pay for cloud storage in order to host and send/receive messages between users as well as store their information. Although we will sell directly to the hospitals, app store space is needed to put our app out on the market. Finally, looking into the future, office space and furnishings will be required as a small start-up. This brings a total investment of $783,200 needed for the next two years to continue in developing our product.

Website.

As of now, we do not have an operating website. However, we plan to have a working website in the future that will serve as the central hub and support center for our app. The website will contain information about the founding of the app: its founders, idea development, history, as well as practical support for the app. This includes news of updates, bug fixes, and live chats that route the user to call centers where questions can be answered. FAQ will also be provided on the website that allows quick answers to questions that many users will find helpful.

Logo, trademark

Patent.
The full patent application is attached

Pitch to investors:

Elevator pitch:

Hello, our names are Nicole Kim and Aurik Sarker, and we are currently students at the Johns Hopkins University, both majoring in electrical engineering. We are the creators of TagChat, a mobile messaging application intended for adolescent patients at hospitals. Hospitalized adolescents can face enormous amount of stress everyday due to their diagnosis, treatment, and even isolation from their peers. Because social media is an integral aspect in today's society, we have developed a messaging app created for the benefit of adolescent patients to connect with other patients who may be undergoing similar treatment and experiences.

Through basic information and registration tied to the patient's current hospital, patients will be able to search for contemporaries around the world and begin conversations with them. Our app promises to offer an easy-to-use graphical interface for adolescents of all ages, encrypted and secure databases for user info, as well as provide smart search features to allow patients to find others to bond with. We believe the opportunity to connect and build friendships can have a positive effect on the mental health of the patient, as the mental state is important overall when undergoing treatment. We hope that our app will be able to connect patients all over the world.

Slideshow:

tagchat

Founders

Nicole Kim

JHU Electrical Engineering ‘18

Aurik Sarker

JHU Electrical Engineering ‘18

Current Issues

- 5.8 million children under the age of 17 registered as patients
- Lack of social interaction
- Lack of social media
- Mental health
- No real support?

tagchat

- Messaging app designed for children patients in hospitals
- Hospital tag
- Support + social media

tagchat

Market Research

- 5500 registered hospitals, 5 million yearly patients in the US
- The average cost for one patient's stay is over $10,000
  - Hospitals would be able to cover the cost
  - Private insurance may possibly cover the cost in the future
- Apps can easily spread through hospitals and their patients
  - More patients using the app incentivises other patients

- Potential market - $33,000,000
- Market space is unused, no competitors taking up potential customers

Competitors

- Existing messaging applications tailored towards adults
- Facebook Messenger, Hangouts, SMS
  - Connections typically made between friends
  - Little security against unwanted messages

- Attempted messaging apps for children lack important functions
- Marimba Chat, Monster Messenger, ClassDojo
  - Restricted to certain use cases
  - Lacks security against receiving unwanted messages
  - Limited search feature

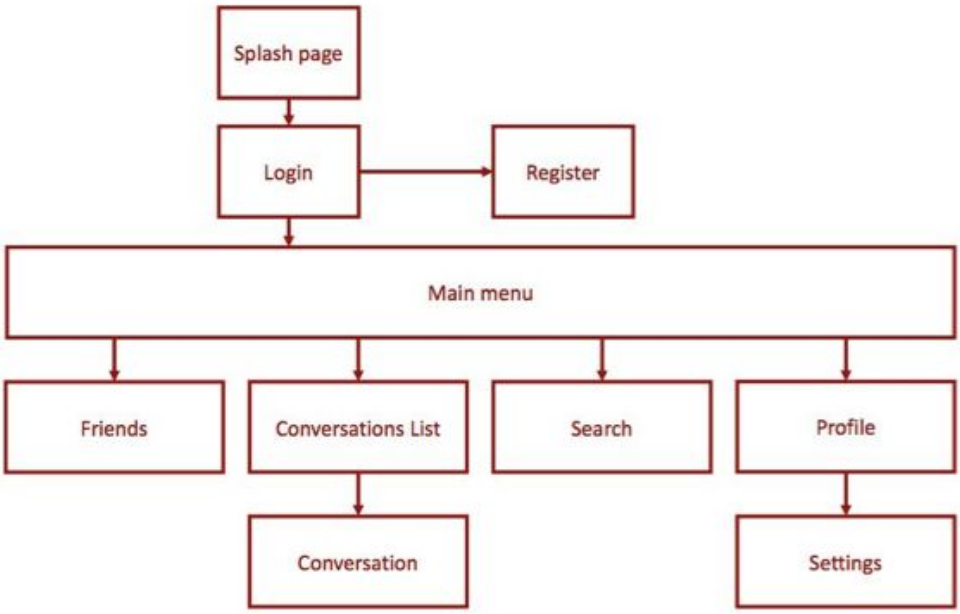
Features

- Basic profile
  - Hospital registration key
  - Basic info
- Search features
- Child-friendly interface

Features

- Patient information security
  - Any information provided is optional
  - Information may be removed at any time
- Chat filter
  - Filter potentially harmful messages
  - Report, blocking feature
- Protection against potential offenders
  - Hospitals are provided with a security key
  - Message reception limited to connections only

Layout



Distribution

- Subscription-based pricing
- Contract hospitals to distribute the application among patients
- Begin regionally, expand to hospitals outside the US
- Expand to older kids and adults
  - Extend purpose, allow older patients to network about their condition
- Larger database for more storage, better algorithms to match patients

Costs - Two-year Total

Employees:	Developers (x3)	$600,000
	Customer service (x1)	$100,000
Server/Cloud storage:	DigitalOcean	$2,800
App Store:	Apple Store	$198
	Google Play Store	$25
Location:	Office space	$72,000
	Utilities	$2,400
	Computers/equipment	$5,000
Total:		$783,200

Seeking $783,200 for investment

Summary:

In order to complete our project, initially, we have isolated an issue: adolescent hospital kids who stay long term in hospital face isolation from their peers and could use support. We set out to solve this problem by creating a social media messaging application called TagChat that allows patients to reach out to other patients and start conversations with them. This solution was run by medical professionals and our peers to check whether it was a viable project to pursue. We then began developing the software for our phone application while simultaneously designing layouts and features that we wanted to include. Finally, we tested our software using emulators and real devices as well as beginning to flesh out ideas for our business models and mode of implementation. This was accomplished by carefully projecting costs as well as budgeting out our estimated revenue over a two year model. We have finally included a slide show that depicts our pitch to a panel of investors.

We hope that our application is able to reach millions of children to reside in hospitals and are in need of a fresh face to talk to. Not only will TagChat be a mode of social communication and media, it will be a method of support for the patients who need to be reassured that they aren't alone in this battle.

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