Thunderbrain Proposal

CSC 212 Human-Computer Interaction - Oct 12, 2017

Group Members

Name:	Field(s) of Study:	Role:	Skills:
Matt DelSordo	B.S. Computer Science/minor History 2019	Backend development	Android, JS/React, AWS experience
Luis Nova	B.A. Computer Science 2018	Full-Stack development, Connecting Client-Server Interactions	Android, Django, Node.js
Sharfuz Shifat	B.A. Computer Science/Economics 2019	Front-end design, user interface	Web development, Java/C
Alex Kautz	B.S. Computer Science 2019	Front-end design, scheduling and organization	Java, Photoshop

Introduction

Problem Statement

Brainstorming is one of the most important ways that human beings interact. It is a powerful tool for creating new ideas, and is the first step for any project. Unfortunately, brainstorming can also be very challenging. Brainstorming sessions that lack structure and focus can go awry, and participants' ideas can be disregarded due to the biases of the other brainstormers rather than due to the merits of the ideas themselves. Current methods of structuring brainstorming to solve these issues are flawed in that they tend to require a participant to remove themselves from the discussion in order to facilitate it. By finding a way to solve the

problems inherent in brainstorming we could help ourselves, and people all over the world, discover new ideas.

Proposed solution

Our purpose is to create an agent that removes ownership from ideas contributed to a group brainstorming session. By removing ownership of ideas, we aim to observe how much an agent can mitigate the bias that some ideas face from critics, due to their association the idea's owner. We hope to create a web app, where users can join lobbies with set agendas and begin contributing anonymous ideas that are organized and presented to the others. Applications with a similar goal have been attempted in the past, such as Free Conference [1]. However, these apps still require the group to designate a moderator, and are more focused on meetings rather than brainstorming in specific.

Methodology

Need finding

We plan on using a variety of need finding techniques to explore the problem of brainstorming.

Interviews

Early on, we plan on interviewing 3 professors; Prof. Henry Kautz, Prof. Steve Gonek, and Prof. George Ferguson. Professors are good choice because they commonly lead groups which engage in brainstorming. The following interview questions are those we asked Steve Gonek:

- Introduction
  - Hi, we are undergraduate studying brainstorming. We are interested in hearing your experience with the technique.
- Kickoff
  - Do you use brainstorming?
  - How many times a month do you employ brainstorming?
  - If he doesn't use brainstorming
    - how often do you have group meetings?
- Built Report
  - How do you structure your brainstorming sessions?
    - Do you designate a person to lead the session?
  - When was your last brainstorming session?
  - Were you satisfied with the idea they came up with?

- ○ What was the process they followed?
- ○ Did you encounter any problems?
  - ■ Did you find certain individuals dominating the conversation?
  - ■ Did you find it hard to come up with the initial ideas?
  - ■ Did you find it hard to structure your ideas, and keep them all written down?
- Grand Tour
  - ○ What has been your most successful brainstorming session?
  - ○ What made the session so successful?
  - ○ What do you like about the brainstorming process?
    - ■ Why?
  - ○ What do you dislike about the brainstorming process?
    - ■ Why?
- Reflection
  - ○ We're currently designing an app to help with brainstorming sessions. What features would you like to see in the app?
  - ○ What things would you like us to avoid?

The problem of brainstorming is partially subjective, which is why it is important to interview participants directly. this way, we can get their subjective views on the brainstorming technique.

Observations

We will observe groups of students as they perform brainstorming. While they brainstorm, we will take notes on how long each student talks, whether specific students don't speak at all, and how the brainstorming session naturally flows. Observational studies allow us to understand them or objective parts of the problem of brainstorming.

Contextual inquiry

Bringing together our observational and interview based need funding, we will perform contextual inquiry.
- Focus: To understand how students currently perform brainstorming.
- Context: We will bring a group of students together perform a brainstorming session, and observe them as they brainstorm.
- Partnership: After brainstorming, we will ask participants questions about their experience during the session.
- Interpretation: Looking at our notes on the session and the students responses, we will determine the problems the students experienced while brainstorming.
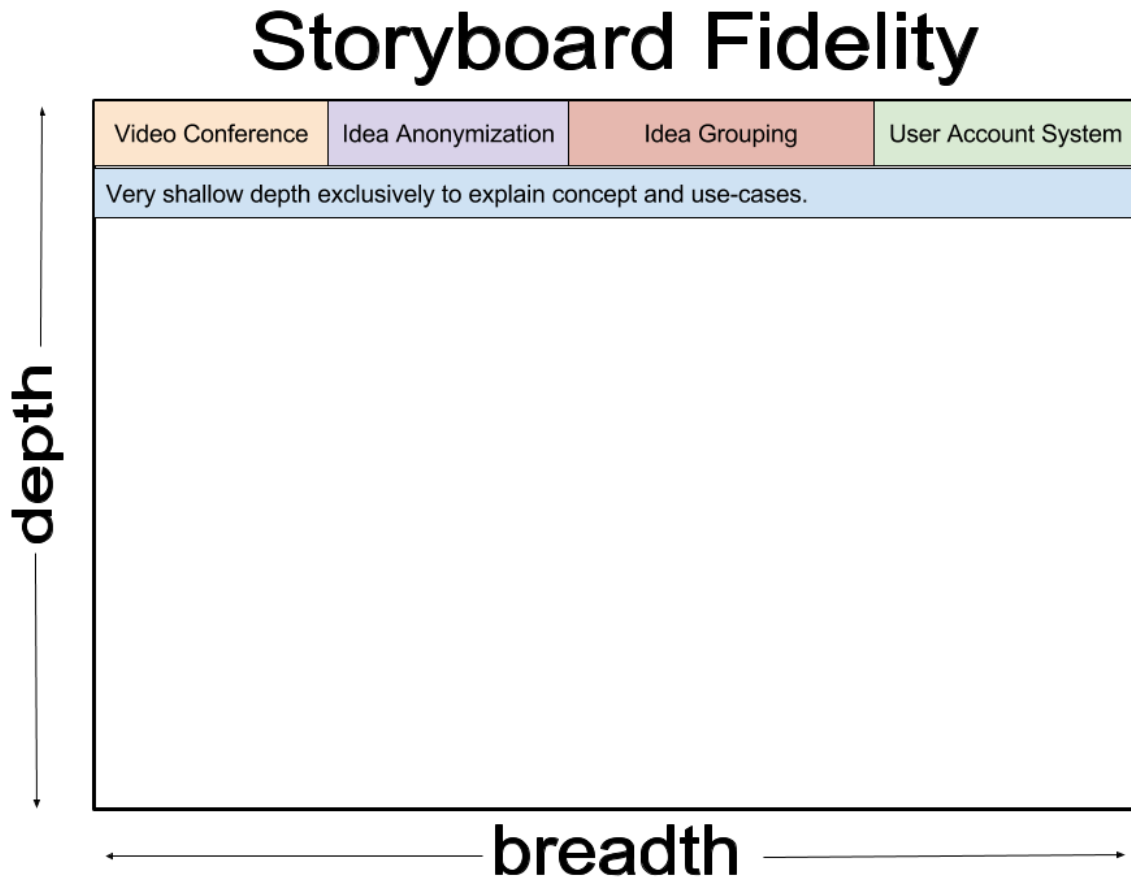
We plan on convincing students to do this using some form of a reward (such as candy).

Prototyping

Storyboarding

In our storyboarding prototype, we will map out the use case for our program. We will create a cartoon displaying characters attempting to brainstorm new ideas. The first section will display them without our application, where certain users have a clear bias against the opinions of other characters. The second section will display the characters with our application, where all ideas are valued equally due to being anonymized. We will purposely avoid displaying any of the user interface.

Diagram:

Storyboard Fidelity

Video Conference	Idea Anonymization	Idea Grouping	User Account System
Very shallow depth exclusively to explain concept and use-cases.			

depth

breadth

Paper prototype

   In our paper prototype, we will prototype some of the functions of our application. This prototype will focus on the actions the program can perform, and not on the actual user interface design. To accomplish this, we will perform a brainstorming session with a group of students, where we act for the program. Users will submit ideas on cards individually and without the knowledge of the other users. We will then present these ideas to the group within a mockup of the intended video conference UI This will let us get good feedback on how people view the different features of our application.

Diagram:

Paper Prototype Fidelity

Video Conference	Idea Anonymization	Idea Grouping	User Account System
			Not implemented
Video conferencing simulated by human beings standing in a room	Ideas are submitted via notecard, in secret, to a human facilitator before being presented to the group.	Ideas will be sorted by the human facilitator into groups based on topical similarity.	

depth / breadth

Wireframe prototype

   In contrast to our paper prototype, our wireframe prototype will represent the design of our user interface. In it, we will sketch out the UI, and then link up

various buttons with Invision. This will not give us feedback on the different features of our project, but instead on our user interface. By presenting this to testers, we will learn what parts of the UI are intuitive, and what parts are confusing.

Diagram:
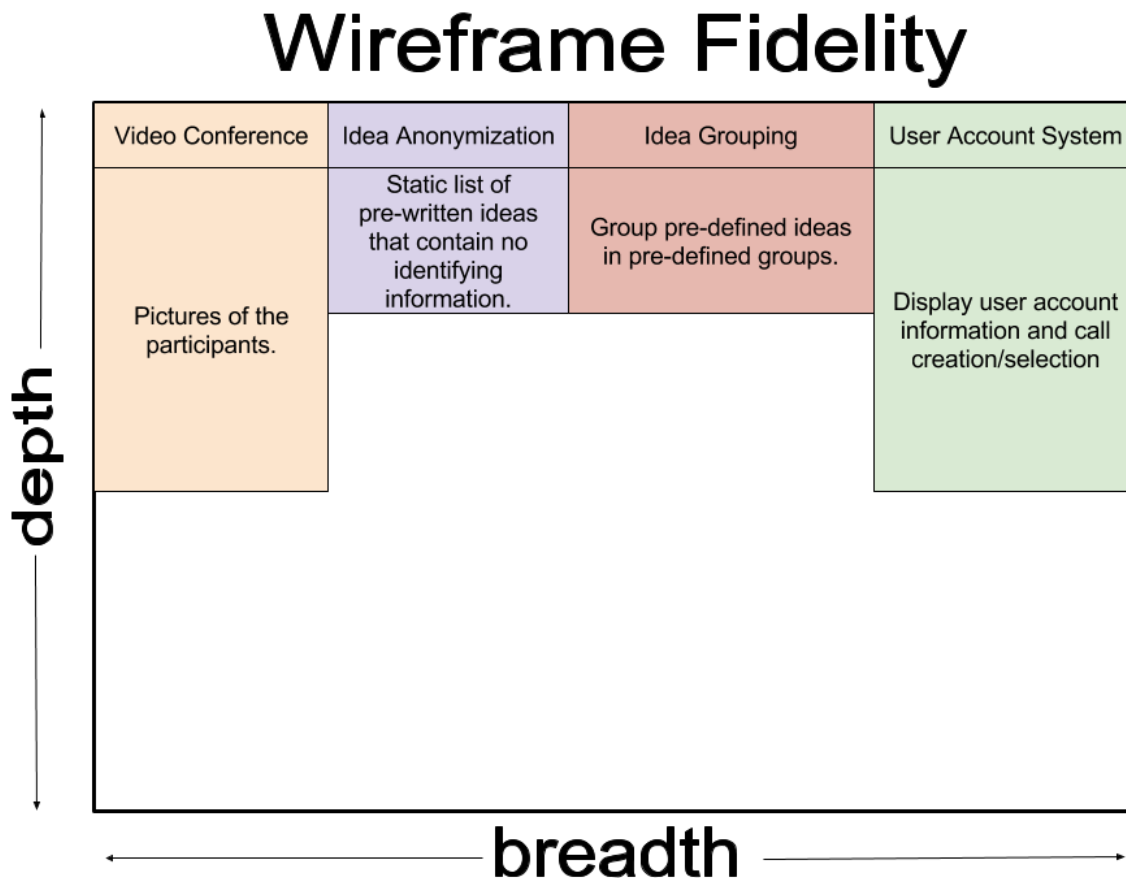
User Study and Evaluation

We will run a series of experiments in order to evaluate our three prototypes and final system.

Brainstorming experiments

➔ Population:
◆ 4 to 7 Undergraduate students from the University of Rochester
◆ Motivation: will be provided candy
◆ Why: Population is very accessible, and is our target population

- ➔ Experiment:
  - ◆ Participants will sit separately, and communicate via video chat.
  - ◆ Participants are given an idea to brainstorm.
  - ◆ Brainstorming process occurs, with one of the following modifications
    - ● Paper prototype: Users submit different ideas for the brainstorming to a human, who then groups the ideas and presents them to the group anonymously, by being included in the video chat.
    - ● Final system: users submit different ideas for the brainstorming to a electronic system, which then groups the ideas and presents them to the group anonymously, by being included in the system.
    - ● Control system: Users are observed brainstorming using a conventional video conferencing system such as skype
  - ◆ We will record the session.
  - ◆ After the session is complete, we interview each participant, asking
    - ● What parts of the brainstorming session did you enjoy?
    - ● What parts of the brainstorming session do you feel could be improved?
    - ● What are your thoughts on your group's final ideas?
    - ● Describe some of your feelings during the session.
  - ◆ We thank the participants and provide them with candy.
- ➔ Analysis:
  - ◆ We will look at the participants face as they present their idea, see if they are uncomfortable with their idea being analyzed.
  - ◆ We will observe the interruption rate in people who disagree with others ideas.
  - ◆ We will count how many times people criticize their own ideas.

Implementation

Features

Our app will be constructed as a web app. Web technologies, such as server-client communication in a browser, will best allow us to create a platform for users to find other users online and connect with them for brainstorming sessions. While we could build this app on a mobile platform, a mobile device does not suit itself as well to discussing ideas in a productive capacity, due to the casual nature of their usage. With a web app implementation, our app could be used by anyone with a computer that has a webcam and internet access, making it highly accessible.

In our web app, users should be able to create accounts and search for other users. Users should be able to both create lobbies and set a brainstorming agenda or join lobbies that they have been invited to or that have agendas and topics that interest them. Once users enter the lobby and the lobby leader starts the brainstorming session, all users will have a predetermined timeframe in which to submit brainstormed ideas based on the agenda which appear in the UI as bubbles. After the time has elapsed, the submitted ideas will have identifying information removed from them and be grouped according to topic. Users will then enter a video conference phase where they are able to discuss the submitted ideas and vote via clicking on the idea bubbles they like, which are at this point visible to all users. A set number of rounds of this process will occur with the result of a final set of agreed upon ideas or solutions relating to the topic at hand. These ideas and the idea set they came from will be saved as session history which users who participated in the session will be able to access.

Technology

To implement our solution, we plan to create a web app using the "MERN" stack, along with WebRTC for its communications and video chat APIs and potentially a service such as Amazon Web Services for hosting and computing. Within the Node.js environment (the "N" in "MERN"), we'll use MongoDB ("M") to store user information and brainstorm session history, Express ("E") to run the back-end of the app, and React ("R") to handle the front-end user interface. We chose this stack because of its conventionality and associated breadth of documentation. WebRTC was chosen due to its price point (free) but we plan to use Twillio's video conference APIs as a paid backup if WebRTC proves too complicated to work with. React was chosen over Angular both because the group is more familiar with it and because using React eases any future mobile port via React Native.

Familiarity and documentation were important to us when deciding on a stack due to the group's collective inexperience with full-stack web development, which may lead to challenges in implementation down the line. We are confident, however, that our present level of familiarity with these technologies will allow us to easily pick up what we have yet to learn and produce a functional product in a relatively short timeframe.

Diagram:
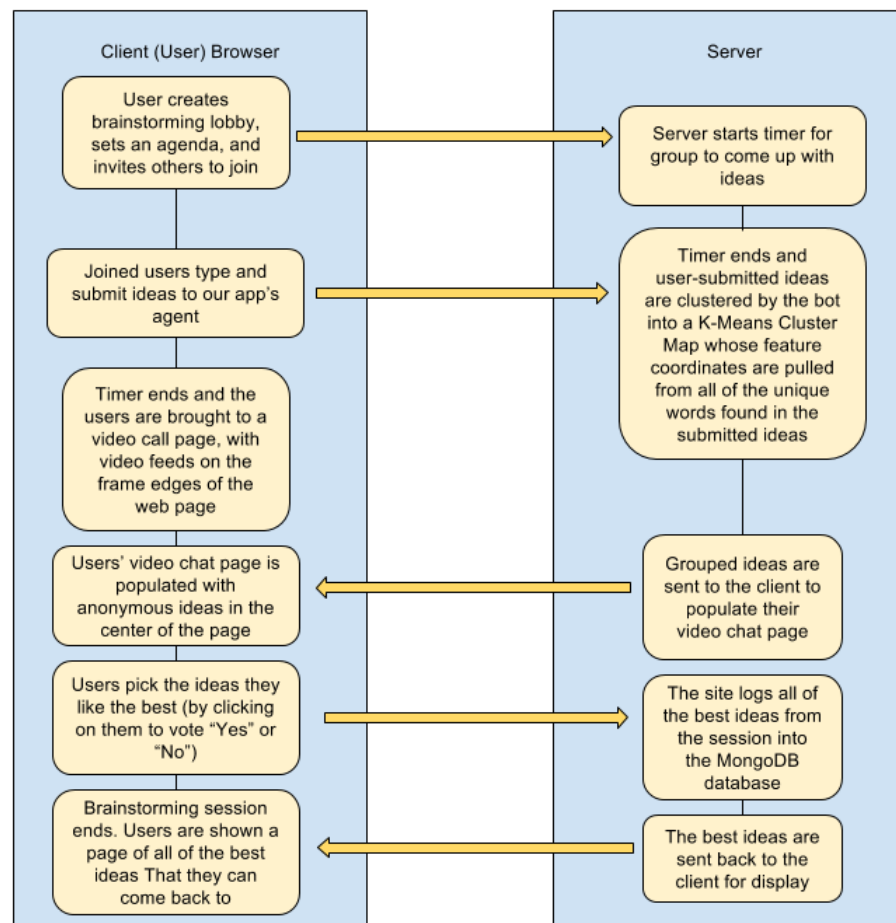
Risks

      As touched on before, in terms of the follow-through with our project's implementation, inexperience with the technologies used could lead to roadblocks. Additionally, if any of the project's sub-features fail to work as intended or disregarded by test users we plan to scrap those features and focus on making the base features functional and reliable. It is also entirely possible that through our user testing we discover that a moderating brainstorming app might negatively affect a brainstorming session.

      A risk involved with this system in general is the possibility that anonymized ideas will in fact be detrimental to the brainstorming process. If this occurs we will analyze what causes this detriment, in order to more deeply understand human psychology in regards to brainstorming and interaction.

Timeline

Date/Time	Deliverable	Group Meeting / Event	Members
10/11/17 11:30-12:30	Meeting notes	Meeting with Prof. Gonek	Alex
10/18/17 2:00-4:00	Developer environment configured, storyboard developed	Wednesday Meeting	All
10/21/17	Write up of results	Contextual inquiry/observational study of people brainstorming	All
10/25/17 2:00-4:00	Paper prototype designed	Wednesday Meeting	All
10/31/17	Project website goes live		All
11/01/17 2:00-4:00	Paper prototype tested, create wireframe mocked up	Wednesday Meeting	All
11/02/17	Low-fidelity iteration of project		Matt and Luis
11/08/17 2:00-4:00	Wireframe tested	Wednesday Meeting	All
11/15/17 2:00-4:00	Full functional implementation of project (no styling)	Wednesday Meeting	All/Luis, Matt
11/22/17 2:00-4:00	Full UI implemented	Wednesday Meeting	All/Alex, Sharfuz

11/28/17	Presentations Begin		All

Bibliography

[1]   https://www.freeconference.com/feature/moderator-controls/