CS6750 Assignment M3 (Summer 2021)

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***Abstract*—** The task of using text messages as means of communication has become more ubiquitous in recent years. While there are various benefits to text messages, there are also pitfalls in comparison to verbal communication methods. This project explores and investigates the task of sending a message on the native iOS message application, with the goal of redesigning the interface to address a common but often detrimental scenario: *"accidental message sends"*. Collectively, the project will go through the process of defining the problem space, identifying the user types, planning & executing the needfinding plans, gathering requirements, brainstorming, creating prototypes, and performing evaluations.

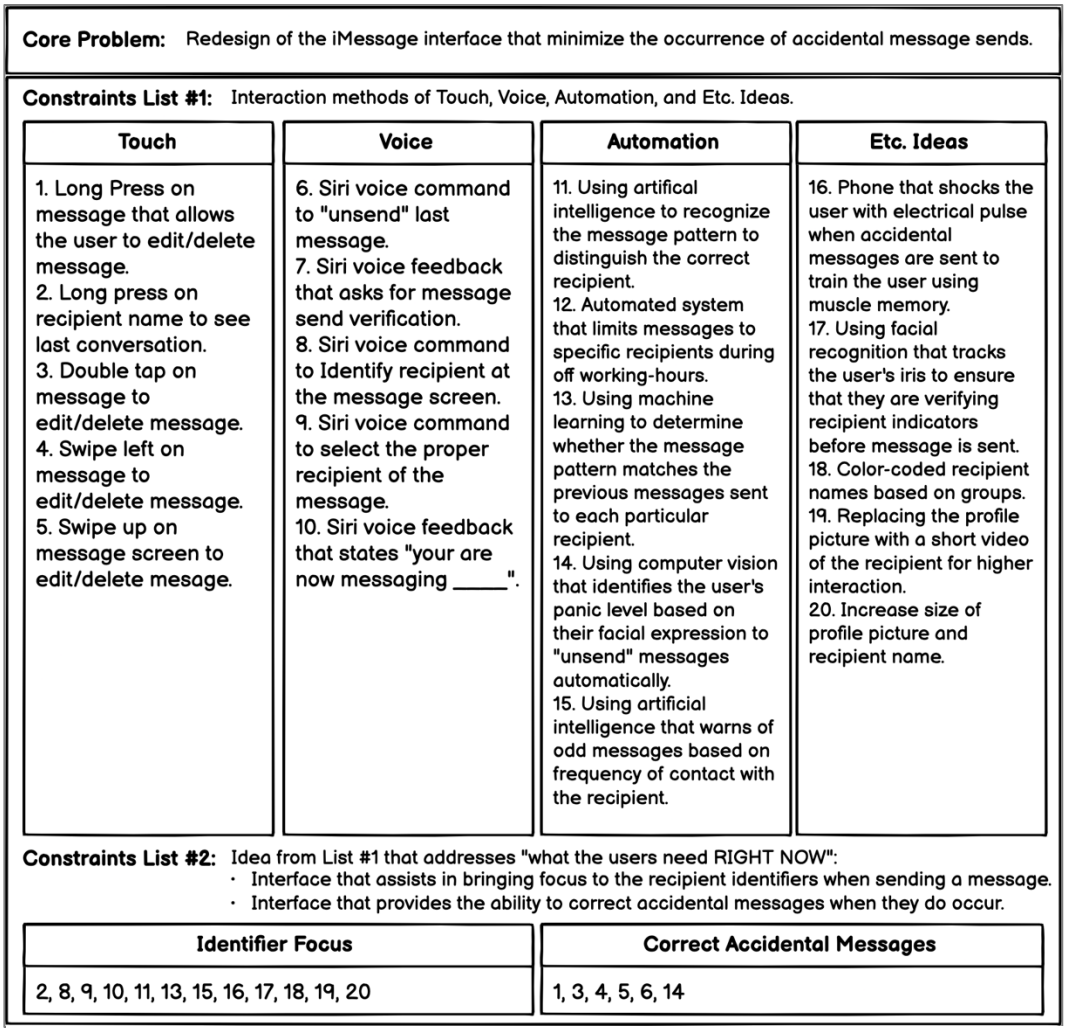
1 BRAINSTORMING PLAN

The core problem that is going to be addressed through *individual brainstorming* (Joyner, 2021e & 2021g) is to minimize the occurrence of accidental message sends on the native iOS message application (iMessage) through interface redesign. The constraints that will be enforced are as follows: (1) At least three ideas that utilize one of the interaction methods of *touch*, *voice*, and *automation* will be generated. (2) At a minimum, a total of twenty simple ideas that pertain to design descriptions will be generated. And lastly, (3) A previously identified list of things that the users need *right now* (*Assignment M2*) will be divided into the two categories of (a) improving message recipient identifiers and (b) ability to correct accidental messages post occurrence. The time that will be allocated for brainstorming would be for a span of four hours over the course of three days, accounting for any breaks that might aid in the brainstorming process. Once the brainstorming concludes, the standard to meet is to generate a list of high-level general design alternatives that describe general ideas of how to redesign the interface of the iMessage application.

2 BRAINSTORMING EXECUTION

To better facilitate the process, a *brainstorming worksheet* was utilized to ensure

that the ideas are grouped into the two categories identified above. A total of twenty ideas was generated through the brainstorming sessions, which spanned for a period of three days consisting of total of four hours and fifteen minutes. The brainstorming was conducted insuring that the constraints outlined above were followed, which resulted in various ideas to be used for prototyping (Joyner, 2021h) once the ideas were deemed to meet the *selection criteria* (*Section 3*). Below is the image of the *brainstorming worksheet* that outlines the results from the execution:



Core Problem: Redesign of the iMessage interface that minimize the occurrence of accidental message sends.

Constraints List #1: Interaction methods of Touch, Voice, Automation, and Etc. Ideas.

Touch	Voice	Automation	Etc. Ideas
1. Long Press on message that allows the user to edit/delete message. 2. Long press on recipient name to see last conversation. 3. Double tap on message to edit/delete message. 4. Swipe left on message to edit/delete message. 5. Swipe up on message screen to edit/delete mesage.	6. Siri voice command to "unsend" last message. 7. Siri voice feedback that asks for message send verification. 8. Siri voice command to Identify recipient at the message screen. 9. Siri voice command to select the proper recipient of the message. 10. Siri voice feedback that states "your are now messaging _____".	11. Using artifical intelligence to recognize the message pattern to distinguish the correct recipient. 12. Automated system that limits messages to specific recipients during off working-hours. 13. Using machine learning to determine whether the message pattern matches the previous messages sent to each particular recipient. 14. Using computer vision that identifies the user's panic level based on their facial expression to "unsend" messages automatically. 15. Using artificial intelligence that warns of odd messages based on frequency of contact with the recipient.	16. Phone that shocks the user with electrical pulse when accidental messages are sent to train the user using muscle memory. 17. Using facial recognition that tracks the user's iris to ensure that they are verifying recipient indicators before message is sent. 18. Color-coded recipient names based on groups. 19. Replacing the profile picture with a short video of the recipient for higher interaction. 20. Increase size of profile picture and recipient name.

Constraints List #2: Idea from List #1 that addresses "what the users need RIGHT NOW":

- Interface that assists in bringing focus to the recipient identifiers when sending a message.
- Interface that provides the ability to correct accidental messages when they do occur.

Identifier Focus	Correct Accidental Messages
2, 8, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20	1, 3, 4, 5, 6, 14

Figure 1—Brainstorming Worksheet.

3 SELECTION CRITERIA

The first selection criteria that will be used to select the three ideas to move forward to prototyping will be based on whether the idea addresses *at least three* of

the four *requirements definition* (Joyner, 2021d) outlined previously (*Assignment* M2). Below is the summary of the *requirements definition* for a recap:

1. *Functionality* – The redesigned *iMessage* interface needs to be able to allow the users to: (1) search through the contacts, (2) select their desired recipient found from the search, (3) identify the recipient before sending a message, and (4) send the message to the desired recipient.
2. *Usability* – The interface must be dynamic enough to be used in a wide range of contexts with varying degrees of extraneous aspects that compete for the user's attention.
3. *Learnability* – The interface needs to be extremely easy to use, ensuring that users can learn how to use the redesigned interface almost immediately, as the same interface will be used by users from various age groups and proficiency levels.
4. *Accessibility* – The interface needs to be accessible to anyone with iOS devices because the redesign is intended to be replacing the existing interface.

The second selection criteria that will be used to ensure that each idea addresses at least one thing that the user needs *right now* as noted in the *data inventory*:

1. Assists in bringing focus to the recipient identifiers when sending a message.
2. Provides the ability to correct accidental messages when they do occur.

4 PROTOTYPE 1 – TEXTUAL PROTOTYPE

4.1 Description of the Textual Prototype

First and foremost, participants from the needfinding exercise of *evaluation of existing interfaces* placed particular emphasis on the "larger profile image" and the "larger text size" of the recipient indicators in the alternative messaging application *Signal*. Using that insight as an advantage, this prototype will consist of a larger profile image and the text size of the recipient indicators directly on the messaging screen. Second, a color-based text user interface is incorporated, where the recipient names are color-coded based on groups defined by the user. For example, users can color-code critical recipients in "red" and families in "green" to easily differentiate the type of recipient during the task of sending messages. This will allow a secondary layer of identification of the recipient to minimize the occurrences of accidental messages to critical recipients. And lastly,

to further increase the "attentiveness" of the users during the task of sending messages, an optional feature that asks the user to verify the recipient before each message sends is added as a user-selectable option. This will implement a secondary check and procedures in place for recipients of the user's choosing (e.g., user's manager, formal colleagues) where accidental message sends can often be detrimental. To explain how this feature would work, once a list of recipients is categorized as "critical", whenever a message is being sent to a recipient on that list, a popup screen will ask the user to verify the message and the recipient after the usual "send" button is pressed.

4.2 Evaluation From Perspective of Requirements

First and foremost, this prototype meets the requirement of an interface from the *data inventory* that "assists in bringing focus to the recipient identifiers when sending a message". The larger profile image and text sizes will emphasize the recipient more profoundly. The group-based color-coded recipient naming will provide a visual layer to the recipient identifiers for additional visual cues. And the secondary verification feature for critical recipients will add yet another verification layer that assists the user in identifying recipients. Second, this prototype also meets the *requirements definition* (Joyner, 2021d) of *functionality, usability, learnability, and accessibility* (*Section 3*). It meets the *functionality* requirements of identifying the recipient before sending a message, while also ensuring that it aids the user in sending the message to the desired recipient. It meets the *usability* requirement of an interface that is dynamic enough to be used in a wide range of contexts that might compete for the user's attention, as the core functionality of messaging is not altered. It meets the *learnability* requirement of an interface that is easy to use, where the users can learn how to use the redesigned interface easily, as the ease-of-use of the original iMessage interface is kept while incorporating a "grouping" feature that the user can customize based on their need. And lastly, it meets the *accessibility* requirement of an interface that is accessible to anyone with iOS devices, as the redesigned interface is intended to replace the native iMessage application that comes preloaded into iOS devices. As the *textual prototype* here meets the *selection criteria* outlined, which were designed to meet the needs of the users outlined in the *data inventory*, this prototype *meshes* with the intended audience of the redesigned iMessage interface as it addresses the needs that the participants of the *needfindings* raised.

5 PROTOTYPE 2 – VERBAL PROTOTYPE

5.1 Description of the Verbal Prototype

"Imagine an interface on the iOS devices that you use to send and receive messages, very much like the native iOS message application of iMessage. There are various ways that you can select the desired recipient of your message: The first method is by opening the application, wherein which you are greeted with the default view, which is a list of messages in descending order from *most* to *least* recent. From that view, you can select the recipient and/or conversation of your choice, which then allows you to read the messages from the recipient(s) and compose and send a new message. The second method is pressing the 'compose' button at the top right-hand corner from the default view, which opens a dialog indicated by 'New Message' that allows you to search for a recipient by name (if exists in your contacts list), by a phone number, or by the iCloud account email of the intended recipient. Once the recipient(s) is selected, if there were any previous conversations with the recipient(s), it will allow you to read the messages, and compose and send a new message. If there were no previous conversations, then it will allow you to compose and send a new message."

"Now, once the message is sent to the recipient, it will allow the user to edit or delete the message by performing a *long press* on the message of their choosing. Once the desired message is pressed for longer than three seconds, a popup over the message will display, that allows the user to select from the following three options: *edit*, *delete*, *cancel*. The *edit* option will open a text field containing the original message, which then allows you to make any desired modifications before saving. Once the message is edited and saved, the message that is visible to the user and the recipient(s) will be modified accordingly, with a small text indicator on the bottom that states 'edited' and the corresponding time and date when the edition occurred. The *delete* option will completely remove the message from the view of both the user and the recipient, while only leaving a small indicator that denotes a message being 'deleted' with the corresponding time and date when the deletion occurred. Lastly, the *cancel* option would just remove the popup from the screen, allowing the user to retract their *long-press* that displayed the popup in the first place.

5.2 Evaluation From Perspective of Requirements

First, this prototype meets the requirements of an interface from the *data inventory* (Joyner, 2021d) that "provides the ability to correct accidental messages when they do occur". The popup list of options of *edit, delete,* and *cancel* that is activated by a *long press* on the desired message allows the user to not only correct the accidental messages by providing an edit functionality but also allows the user to completely "unsend" the messages outright. Second, this prototype also meets the *requirements definition* of *functionality, usability, learnability, and accessibility* (*Section 3*). It meets the *functionality* requirements of: (1) ability to search through the contacts, (2) ability to select desired recipient found from the search, (3) ability to identify the recipient before sending a message, and (4) ability to send the message to the desired recipient. It meets the *usability* requirement of an interface that is easy to use and learn, as it provides a familiar interface that is analogistic to iMessage in terms of overall look and features. It meets the *learnability* requirement of an interface that is easy to use, where the users can learn how to use the redesigned interface easily, as it takes advantage of the *affordances* (Joyner, 2021a) that the users might have in terms of the popup options available in and around the iOS system that is launched through an interface of *long presses*. And lastly, it meets the *accessibility* requirement of an interface that is accessible to anyone with iOS devices, as the redesigned interface is intended to replace the native iMessage application that comes preloaded into iOS devices. As the *verbal prototype* here meets the *selection criteria* outlined that were based on the *data inventory*, this prototype *meshes* with the intended audience of the redesigned iMessage interface as it addresses the needs that the participants of the *needfindings* raised.

6 PROTOTYPE 3 – WIREFRAME

6.1 Description of the Prototype

There are two main features that are comprised in the *wireframes* (*Figure 2*) (Joyner, 2021j). First, the recipients on the list are categorized based on the user-specified groups. In this example, the "Manager" is categorized in the "Work" group indicated by the *red* font. Additionally, in the message view, the group category is listed under the recipient's name to emphasize which group the current recipient belongs to. This feature will assist in bringing focus to the recipient

identifiers when sending a message, not only by the easily identifiable color-coded text of the recipient's name, but also allowing the user to identify the group the recipient is in, therefore adding additional layers of recipient identification. Also, the size of both the profile picture and the text are significantly increased from the existing iMessage interface, ensuring that the recipient indicators are easily identifiable and more prominent in the screen's real estate space. Second, the ability to correct accidental messages when they do occur is provided through *edit* and *delete* buttons, which are launched through a *long press* on the message of their choice. This will allow the user to not only "unsend" the messages, but also to modify the messages that were sent if a user input error were to occur. As a note, the following wireframes were generated using *Balsamiq* wireframing tool (Balsamiq, 2008).

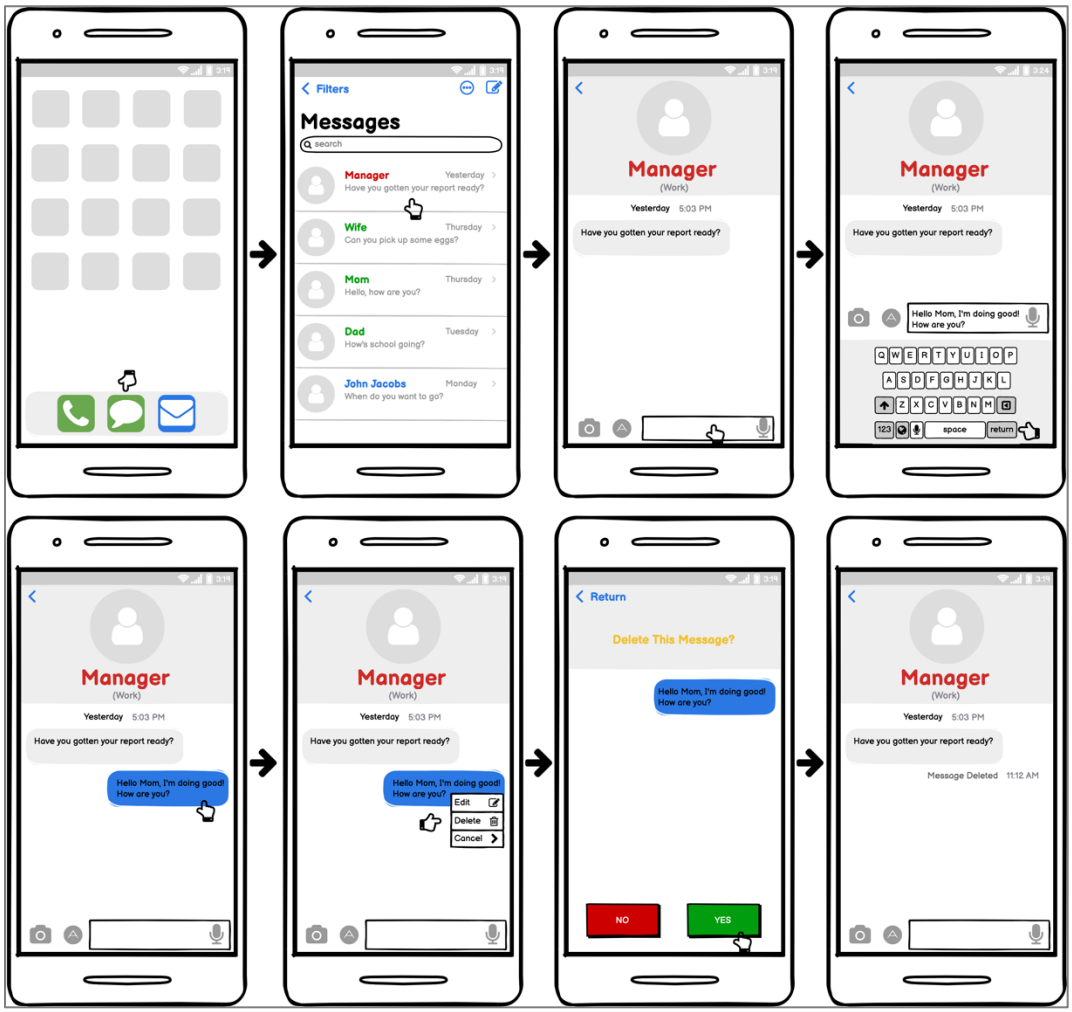


Figure 2—Wireframe of Redesigned iMessage Interface.

6.2 Evaluation From Perspective of Requirements

First, this prototype meets both the requirements of an interface from the *data inventory* that: (1) provides the ability or correct accidental messages when they do occur, and (2) assists in bringing focus to the recipient identifiers when sending a message". The popup list of options of *edit, delete,* and *cancel* that is activated by a *long press* on the desired message allows the user to not only correct the accidental messages by providing an edit functionality, but also allows the user completely "unsend" the messages. Also, the color-coded recipient indicators based on user preset groups, along with the increased profile picture and text size, increases the prevalence of the recipient indicators on the screen's real estate space. This allows for a greater focus on the recipient identifiers that can minimize the errors caused by "carelessness", which was primary cause of accidental messages as denoted in the needfinding data analysis. Additionally, as the new interface design increases the *perceptibility* (Joyner, 2021b) by communicating necessary information effectively to the user, even in various contexts where the user's sensory ability resource might be sparse, it will allow an easier identification of the recipients that can prevent accidental messages, especially to recipients in groups that can potentially be critical (i.e., work). Second, this prototype also meets the *requirements definition* of *functionality, usability, learnability, and accessibility* (*Section 3*). It meets the *functionality* requirements of: (1) ability to search through the contacts, (2) ability to select desired recipient found from the search, (3) ability to identify the recipient prior to sending message, and (4) ability to send the message to the desired recipient. It meets the *usability* requirement of an interface that is easy to use and learn, as the interface is analogous to iMessage in terms of overall look and features. It meets the *learnability* requirement of an interface that is easy to use, as it takes advantage of the *affordances* (Joyner, 2021a) that the users might have in terms of the popup options available in and around the iOS system that is launched through an interface of *long presses*. And lastly, as with the previous prototype, it meets the *accessibility* requirement of an interface that is accessible to anyone with iOS devices, as the redesigned interface is intended to replace the native iMessage application that comes preloaded into iOS devices. As the *wireframe* here meets the *selection criteria* outlined that were based on the *data inventory*, this prototype *meshes* with the intended audience of the redesigned iMessage interface as it addresses the needs that the participants of the *needfindings* raised.

7 REFERENCES

1. Balsamiq. (2008). Balsamiq. Rapid, Effective and Fun Wireframing Software: Balsamiq. Retrieved June 26, 2021, from https://balsamiq.com/
2. Joyner, D. A. (2021a). 2.5: Design Principles and Heuristics – 5. Affordances [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14034/slides/70792
3. Joyner, D. A. (2021b). 2.5: Design Principles and Heuristics – 10. Perceptibility [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14034/slides/70797
4. Joyner, D. A. (2021c). 3.3: Needfinding and Requirements Gathering – 2. Data Inventory [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14030/slides/70676
5. Joyner, D. A. (2021d). 3.3: Needfinding and Requirements Gathering – 26. Defining the Requirements [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14030/slides/70707
6. Joyner, D. A. (2021e). 3.4: Design Alternatives – 4. Individual Brainstorming 1 [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14033/slides/70767
7. Joyner, D. A. (2021f). 3.4: Design Alternatives – 5. Individual Brainstorming 2 [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14033/slides/70768
8. Joyner, D. A. (2021g). 3.4: Design Alternatives – 6. 5 Tips: Individual Brainstorming [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14033/slides/70769
9. Joyner, D. A. (2021h). 3.5: Prototyping – 4. 5 Tips: Prototyping [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14036/slides/70854
10. Joyner, D. A. (2021i). 3.5: Prototyping – 5. Verbal Prototypes [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14036/slides/70855
11. Joyner, D. A. (2021j). 3.5: Prototyping – 8. Wireframing [video file]. Retrieved from https://edstem.org/us/courses/5912/lessons/14036/slides/70858