

BUILDING A LOCATION-SHARING APPLICATION TO BE SOCIAL AND SAFE
INVESTIGATING THE TECHNOLOGICAL MOMENTUM OF INSTAGRAM

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By

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On my honor as a University student, I have neither given nor received unauthorized aid
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Introduction

Location-sharing apps can serve a crucial role in promoting connectivity and safety among friends and family. By allowing users to share their real time location, people can find each other easily in crowded areas such as urban centers or large-scale events. Furthermore, location-sharing greatly improves personal safety as trusted friends and family are more easily able to keep tabs on users. In the event of an emergency or a dangerous situation, location sharing provides an easy means for users to know each other's whereabouts.

In accordance with these interests, I will propose a new location-sharing mobile application to aid users in facilitating social events and promoting safety. Existing applications have very limited features, and the proposed application will introduce new features to facilitate its main use cases. To build a successful application, I will draw on the STS framework of Technological Momentum to analyze the success of Instagram, a large social media platform. Specifically, I will investigate how early in the development cycle users shaped the design of Instagram. I will also investigate how after Instagram gained momentum many design choices with negative consequences are hard to reverse.

Failing to embrace the influence of early users has the potential to alienate users and create a product that no users want to use. Failing to consider the weight of design choices before technology has gained momentum has the risk of leading to deep-rooted problems that become challenging to overturn. Because the challenge of creating a location-sharing application that fulfills user needs is sociotechnical in nature, it requires attending to both its technical and social aspects to accomplish successfully. In what follows, I set out two related research proposals: a technical project proposal for developing this new location-sharing application and an STS

project proposal for examining how technological momentum impacted the design decisions of Instagram.

Technical Project Proposal

Today, nearly everyone carries a smartphone that can interact with the satellite-based Global Positioning System (GPS). This allows people to pinpoint their exact location and receive directions, assisting in navigation and locating landmarks or points of interest (POI). One increasingly popular use for GPS technology is location sharing. In 2022, the New York Times reported that sixty-nine percent of Gen Z and seventy-seven percent of millennials activated location-sharing services (Baker, 2022). Location-sharing services, accessed through mobile applications, allow users to share their real-time geographical location with other selected users. Location data can make organizing social interactions easier, allowing friends to meet up easily or find each other in crowded places. Additionally, many people view location sharing as an expression of friendship (Baker, 2023). Sharing location data can also enhance the safety of users, especially if a user becomes lost or finds themselves in a dangerous situation (Jennings, 2023). As a result of the benefits of location-sharing services, multiple apps and services have surfaced for users to use.

One of the most prominent location-sharing apps is called Life360. Life360 focuses on safety, advertising itself as a family safety service. Users form “circles” with other people to share location. Life360 also has an automated arrival notification feature that lets other people know once a user reaches their destination (“Beyond location sharing”, n.d.). Furthermore, Life360 reports metrics such as top speed which shows how fast someone drives with built-in crash detection. If the application believes the user has been in an accident, it will notify

emergency services for help. The application is entirely focused on safety and provides no other benefits. Through its extensive features focused on improving its user's personal safety, Life360 fulfills its purpose as a family safety service but lacks anything that serves to facilitate social uses.

Some other location-sharing services most people use are Find My Friends and Google Maps. Find My Friends comes preinstalled on Apple phones and Google Maps comes preinstalled on Android phones. These two apps behave almost identically. For Find My Friends and Google Maps, users can opt to share their real-time location with someone from their contacts list. Both of these apps allow users to mark a location and can give a notification when a contact arrives similar to Life360. However, these apps also have integration with their respective parent companies' navigation apps. Users can see and route to nearby locations such as restaurants, POIs, or even people directly in the application ("Locate a friend", n.d.). This makes it easier to find nearby locations to go to for social purposes as well as finding people in locations. While Find My Friends and Google Maps both provide ease and convenience for social events, there are still several shortcomings. The interface for both apps becomes cluttered once multiple people are in the same area because people's icons fight for space. Both apps also lack any function for creating shared POI or organizing locations.

The aim of this technical project is to further improve location-sharing services for social events by developing a mobile application that can facilitate social gatherings of larger groups. This new design has two primary objectives, a scalable design approach compatible for small and large groups and introducing more features related to locations and POI. This application will work similarly to Life360's "circles". Within a circle, users can form smaller groups with one user serving as a representative. This allows users to partition themselves when sub-groups

need to split up for transportation or any other reason. Groups will be able to combine and split apart and people can fluidly move between them. Assigning each group a representative addresses the clutter on the map as now the map can display subgroups instead of every person. This partitioning should allow circles to scale much better with larger groups of people. The other new feature is adding a new form of marked location. Instead of a static location that notifies people when someone arrives, the proposed application can mark events and locations similar to calendar apps. This would help greatly for coordination as a group could decide that they want to meet somewhere at a certain time and the proposed application would be able to provide all of the information and route to the location.

The initial design for the application will be developed for iOS devices with the potential to port the application to the Android platform in the future. The application can be broken up into three main parts, the front-end user interface, the back-end data management, and the data storage. The user interface will be developed using SwiftUI which is a framework built for Swift to allow for more control on the user interface and user experience. The main back-end system of the application will be written in Swift and will interface between the user interface and the data storage. The application will utilize Amazon Web Services' cloud servers to store the data. The application will first be developed as a minimum viable prototype and then go through repeated iteration, following agile software development methodology. During the iteration, some individuals will be recruited to test and provide feedback on the application. After the development of the main application is completed, more individuals will be recruited to evaluate the completed product.

In 2010, Instagram first launched as a platform for photographers to share photos and videos. The application originally only allowed users to upload square photos, inspired by Polaroid photos. Within just two years, Facebook bought the application for approximately a billion dollars. Now, Instagram has evolved into a social media powerhouse. Instagram has become a vital tool for digital marketing, brand building, and celebrity interaction.

Most current discourse on the role of Instagram pinpoints the purpose down to a handful of use cases. Previous writers believe people use Instagram to see a more nitty-gritty personal look into people's lives, especially celebrities (Evans, 2018). This more raw and authentic side of people is fully captured in Instagram Stories (Gardner, 2023). Alternatively, there are also countless users and brands using Instagram as a digital marketing space and even making sales directly from the built-in store functionality (Adams, 2017). Lastly, one of the most controversial uses is how Instagram acts as a personally customized content gallery to provide quick entertainment to people until they become addicted to scrolling through content and posts (Blystone, 2024).

While all of these uses seem to be a big part of the application, none of them were part of the original vision of the founders. The developers reworked ideas from their previous social media projects into a photo-sharing platform known as Instagram (Eldridge, 2024). Instagram started as a platform for photographers to display their semi-professional portfolios. Initially, the only features were filtering, liking, and commenting on photos. Due to user feedback, Instagram slowly started rolling out more networking features such as following users and direct messaging. Later Instagram added stories for people to post quick updates after users began making additional accounts just to post casual status updates. By capitalizing on what users wanted, Instagram was able to continue to gain popularity.

Now, Instagram is forming scrolling addictions and impacting the mental health of people by negatively affecting peoples' body image (Sutherland, 2021). A far cry from the trendy photo-sharing platform. It is important to understand how early Instagram was shaped by society and how various design choices are shaping our society now. By studying the process and effects of Instagram's technological momentum, software application developers will gain an understanding of both how society initially shapes the technology and how technology's influence on society changes over time. I argue that early in the lifecycle of Instagram, users greatly shaped the design of the application. But, over time Instagram gained momentum and has begun to shape social habits and dynamics among young people.

My argument draws on the framework of Technological Momentum, developed by Thomas Hughes. Technological Momentum examines how as a technology is being developed its future development and integration are shaped by society and as a technology gains momentum, it begins to shape society's practices and values (Hughes, 1994). I will use Technological Momentum to discuss various factors of how users shaped the development of the application for Instagram to gain mass popularity as well as how certain design choices have left lasting problems that Instagram is dealing with now. The evidence I will draw on to support my argument will primarily be taken from news media articles and business reports such as Gareth Evan's article on Instagram's history on *BBC* (Evan 2018).

Conclusion

I propose a technical project on developing a location-sharing mobile application that is better suited for user needs by incorporating more features that greatly improve the usability of the app for social gatherings and events while also including functionality centered around

promoting user safety. I also propose an STS project proposal to investigate the impacts of Technological Momentum on another mobile application, Instagram, to gain a deeper understanding of how initially society shapes technology and how technology's influence on society changes over time. I hope to apply insights from this STS project to guide design choices to be aware of the impact of users on the design and considerate of the potential impact of the design on society.

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