DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
THE UNIVERSITY OF TEXAS AT ARLINGTON

# SYSTEM REQUIREMENTS SPECIFICATION
# CSE 4316: SENIOR DESIGN I
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# PASSIVE AGGRESSIVE SOLUTIONS
# LATELESS

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## Revision History

| Revision | Date | Author(s) | Description |
|---|---|---|---|
| 0.1 | 10.3.2022 | MM, CW, GD, TN, NL | Document creation |
| 0.1 | 11.30.2022 | MM | Polishing |

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# 1 Product Concept

This section describes the purpose, use and intended user audience for the LateLess product. LateLess is a mobile application that allows users to set up events with colleagues or friends and track the location of those colleagues in order to discern whether or not they will be late to an event the user is also attending. LateLess Users will be able to see the location, distance, and drive time estimates of these other individuals also attending the same event.

## 1.1 Purpose and Use

LateLess will be able to rely on location tracking as well as traffic navigation systems to dynamically display the arrival status of individuals attending an event. It can be used either as a remedial solution to the issue of constantly late individuals or as a scheduling utility to minimize wait time in organized meetings.

## 1.2 Intended Audience

The intended audience of LateLess falls into two categories that are both viable, public, and can exist in tandem. The first is individuals using the app as recreational software alongside friends and family in a non-constructive or relaxed environment. These individuals would download the LateLess application as a fun way of interacting with other people they know that also use LateLess. The second class of users are individuals that would download LateLess as an efficiency tool to cut down on the dead time generated from poorly communicated meeting times or vague standards for arrival. Though this does not refer specifically to a cooperate environment, a version of the application could also be easily expanded and customized specifically as a cooperate tool and marketed to this category of users as well. Overall, LateLess is intended for general use and the current product tailored specifically for the public.

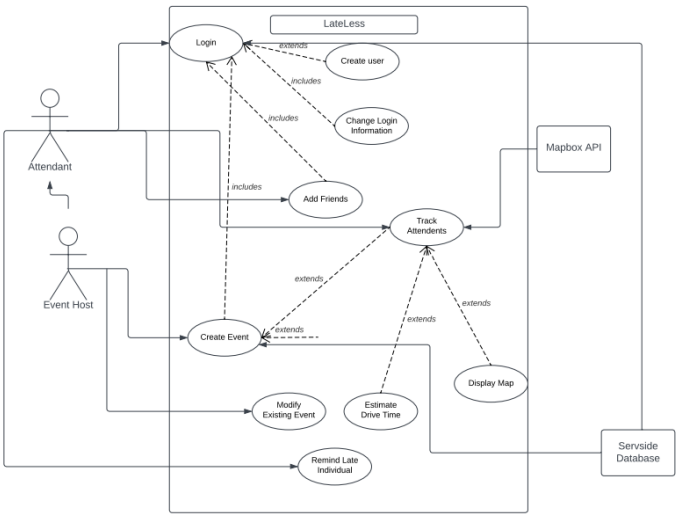


Figure 1: Figure 1

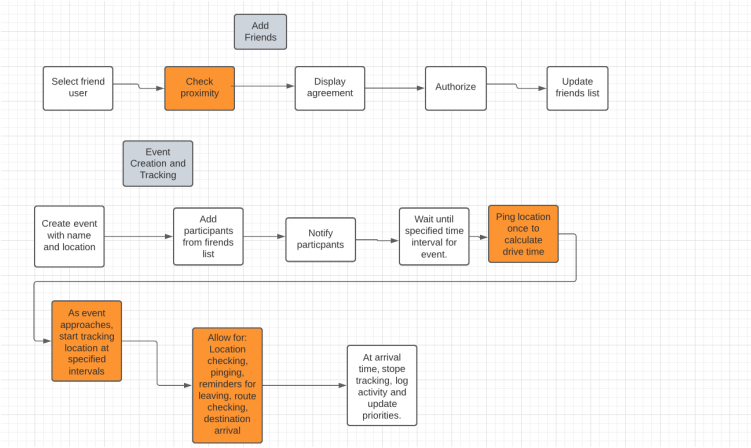


Figure 2: Figure 2

# 2 Product Description

This section provides the reader with an overview of Lateless. The primary operational aspects of the product including system dependencies, intended use categories, and system overviews are defined here. The key features and functions found in the product, as well as critical user interactions and user interfaces are described in detail.

## 2.1 Features & Functions

LateLess is a mobile application for both android and IOS. Figure 1 depicts the central actors of the system which involves 2 user roles: attendant and Event Creator. There are also 2 external components that link to certain functionalities of the system. This diagram illustrates what actors and systems interact with the following features. LateLess will have a secure user profile system that requires login credentials and authentication. Users will be able to create a profile along with a password to keep their information secure. This information will be backed up to a server side database to allow login from multiple devices. While logged in, users will be able to add other users of the application as friends, and the server side database will remember these connections for future use. Logged in users will also be able to create an event, specifying a location and a time as well as a list of friends added through the application who are expected to attend. The user will not be able to add anyone to an event that they are not friends with. The location will be registered, validated, and linked to a reference in the external navigation system to allow for appropriate tracking. From hear the application will wait until a specified time before the event itself. At this time the location of all individuals in the event will be tracked by the navigation system. From this point on the app will allow attenders of the event to check on the location and estimated arrival time of individuals till the event concludes or everyone arrives. The application will record everyone's arrival time and store this information. Figure 2 explicitly illustrates the two central functionalities of the system and when exactly location tracking is active. The highlighted orange states represent points where the application is tracking the location of the user.

## 2.2 External Inputs & Outputs

The following table describes the information flow of data in the LateLess system. Name is the data described, Use is how exactly the app utilizes the information, Description is a summary of the data descried and Input/Output specifies if it is generated by the app or inputted externally.

| Name | Use | Description | Input or Output |
|---|---|---|---|
| Login ID | For User Authentication | A unique login ID tied to the user | Input |
| Password | For User Authentication | A unique key tied to the user | Input |
| Friend Request | For user linking | an invitation to another user to friend their accounts | Input |
| Location | For ETA Estimation | The current location of the user | Input |
| Friend Location | For display during event window | Current location of another attendant | Output |
| Estimate Commute Time | for display | How long an attendant needs to commute to an event | Output |
| Event location | For event setup | The location of an event | Input |
| Event Time | For For event setup | The time of an event being created | Input |
| Final Arrival Times | logging and user history | the final times of arrival of all attendees that attended | Output |

Table 2: Overview of Data Inputs and Outputs

## 2.3 Product Interfaces

Below are the 7 central graphical interface elements of LateLess planned for the development prototype. The login and password will be handled by the login screen, while registering a first time user will function through the registration screen. Friend requests will be sent through the friends screen with the option of either accepting or sending a request. Location of the current user will be displayed through the home screen, as well as needed to display the information in the status tracking screen as well as the See Attendant Location Screen. The Estimation of Commute time will be displayed through the Status Tracker Screen. Event location, time, and event attendants will be entered in by the user through the Event Creation screen. The final arrival times will be logged as of present by the database, for the implementation of future features.

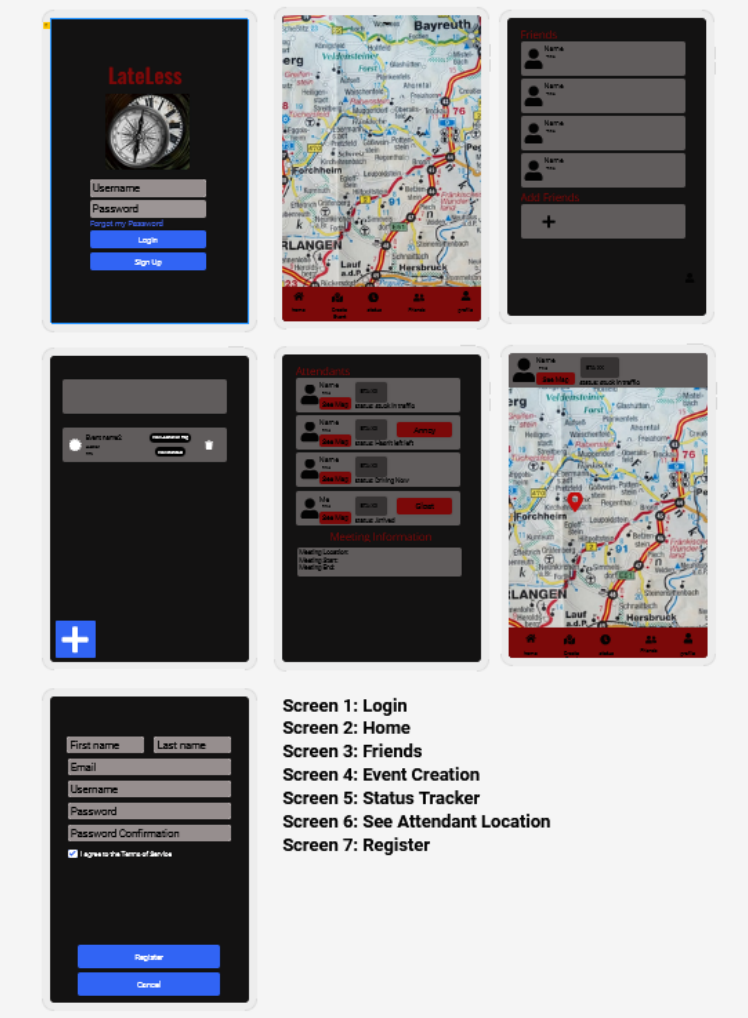


Figure 3: Screens Mock-ups

# 3 Customer Requirements

The following customer requirements are the predetermined requirements of the LateLess system, specifically pertaining to the application's intended features and functionalities. As a user end application, all the following features should be accessible through a graphical user interface unless otherwise specified. Though the security of certain features may be stressed by the customer in this section, any exact standards for security requirements will be explicitly listed in the security section.

## 3.1 User Authentication

### 3.1.1 Description

The application will rely on a login system that is password protected and persists from device to device in order to ensure location data is only accessible to authorized individuals

### 3.1.2 Source

Shawn Gieser, Product Meeting: 9.30.2022

#### 3.1.3 Constraints

The password must be encrypted using some established encryption standard.

#### 3.1.4 Constraints

N/A

#### 3.1.5 Standards

N/A

#### 3.1.6 Priority

High

### 3.2 Event Creation

#### 3.2.1 Description

A logged in User must be able to create an event with a set future time, location, and attendant list. The location must be recognized or linked to the third party navigation chosen to handle arrival time calculation. The attendant list must only consist of users the event creator is friends with. This process should be handled in an easy to use graphical environment that is intuitive and quick.

#### 3.2.2 Source

Shawn Gieser, Product Meeting: 9.30.2022

#### 3.2.3 Constraints

N/A

#### 3.2.4 Standards

N/A

#### 3.2.5 Priority

Critical

### 3.3 Attendant Status Check

#### 3.3.1 Description

A logged in User must be able to see the time to arrival for all attendants of an event that they are part of. This must be easily visible and quick to check, with a clean graphical interface.

#### 3.3.2 Source

Shawn Gieser, Product Meeting: 9.30.2022

#### 3.3.3 Constraints

This status must only be visible a predefined amount of time before the scheduled time of the event itself. It should also continue to be visible until all the attendants of an event have arrived or cancelled.

#### 3.3.4 Priority

Critical

## 3.4 Account Friending

### 3.4.1 Description

A logged in user must be able to send a friend request to another registered user of the application. It must be possible for the receiver to accept this invitation and upon acceptance, each user is added to the other's list of friends.

### 3.4.2 Source

Shawn Gieser, Product Meeting: 9.30.2022

### 3.4.3 Constraints

This process must be very secure so as to prevent the application becoming a target for malicious third parties looking for on demand location information.

### 3.4.4 Constraints

N/A

### 3.4.5 Standards

N/A

### 3.4.6 Priority

Critical

## 3.5 Cross Platform Functionality

### 3.5.1 Description

The application must be platform independent, at minimum being being developed in a framework that supports both IOS and Android. Whether or not the application is tested or entirely functional is a different requirement

### 3.5.2 Source

Shawn Gieser, Product Meeting: 9.30.2022

### 3.5.3 Constraints

The framework chosen must be able to interface with a third party navigation API and server-side database for user information.

### 3.5.4 Constraints

N/A

### 3.5.5 Standards

N/A

### 3.5.6 Priority

Critical

## 3.6 Attendant Map

### 3.6.1 Description

As an extension of the Status Check, the application should be able to display, through a third party navigation API, a rendered map including the location of a particular event and the current location of all attendants.

#### 3.6.2 Source

Shawn Gieser, Product Meeting: 9.30.2022

#### 3.6.3 Constraints

The attendants location must only be visible a predefined amount of time before the scheduled time of the event itself. It should also continue to be visible until all the attendants of an event have arrived or cancelled. The rendered image must dynamically pick a map radius to display based on the distance of the farthest attendant.

#### 3.6.4 Constraints

N/A

#### 3.6.5 Standards

N/A

#### 3.6.6 Priority

Medium

### 3.7 Attendant Reminder

#### 3.7.1 Description

The application must send a notification to the local device reminding the current user of the device when an event is drawing near.

#### 3.7.2 Source

Shawn Gieser, Product Meeting: 9.30.2022

#### 3.7.3 Constraints

The Notification must occur a sufficient amount of time before an event to be a useful reminder to the user.

#### 3.7.4 Constraints

N/A

#### 3.7.5 Standards

N/A

#### 3.7.6 Priority

High

### 3.8 late Attendant Addition

#### 3.8.1 Description

The creator of an event should have the ability to add other individuals that they are friends with to the event later.

#### 3.8.2 Source

Gia Dao Duy Duc, Product Meeting: 9.30.2022

#### 3.8.3 Constraints

This operation should only be possible within a reasonable window of time before an event begins.

#### 3.8.4 Constraints

N/A

#### 3.8.5 Standards

N/A

#### 3.8.6 Priority

Moderate

### 3.9 User Reputation

#### 3.9.1 Description

The application should keep track of the arrival time of attendants to an event and store them with the users profile to display a publicly visible tag representing that users punctuality tendencies.

#### 3.9.2 Source

Matthew McNatt, Product Meeting: 9.30.2022

#### 3.9.3 Constraints

N/A

#### 3.9.4 Standards

N/A

#### 3.9.5 Priority

Low

### 3.10 User Profile

#### 3.10.1 Description

Every registered user of the application should have a profile associated with the login id that has a profile image as well as a punctuality reputation.

#### 3.10.2 Source

Matthew McNatt, Product Meeting: 9.30.2022

#### 3.10.3 Constraints

N/A

#### 3.10.4 Standards

N/A

#### 3.10.5 Priority

Low

### 3.11 About Page

#### 3.11.1 Description

The application will have an abut page including a tutorial on how to use the basic functionalities of the application as well as a full description of how the application's tracking works, when it initiates, and what happens with this information.

#### 3.11.2 Source

Matthew McNatt, Product Meeting: 9.30.2022

#### 3.11.3 Constraints

N/A

#### 3.11.4 Standards

N/A

#### 3.11.5 Priority

Moderate

# 4 Packaging Requirements

The following packaging requirements will go over how the users will get the LateLess system onto their devices. The user should, in the future, be able to install the application through either the apple store or the Google play store. Also, the users should not have to do anything other than download the files through a store.

## 4.1 Install through app store

### 4.1.1 Description

The user should be able to go to the apple or google play store to install this application. All they need to do is hit the install button and the application should be installed, without errors, onto their device without any other

### 4.1.2 Source

Colby Wyrick: 10.7.2022

### 4.1.3 Constraints

Needs to be installed either through the apple store or the google play store. Also has to be on either an apple or android device.

### 4.1.4 Standards

N/A

### 4.1.5 Priority

Future

## 4.2 Website for application

### 4.2.1 Description

The user should be able to visit the website and install the application through a link. This install should install all required files to be able to run without any other set up.

### 4.2.2 Source

Colby Wyrick: 10.7.2022

### 4.2.3 Constraints

Needs to be installed with an android or apple device.

### 4.2.4 Standards

N/A

### 4.2.5 Priority

Low

# 5 Performance Requirements

This section goes over the general performance of the application. Specifically, the speed of loading page and data for mapping, storing information, create and launching events will be basic functionalities that require optimal and effective execution time.

## 5.1 Page Load Speed

### 5.1.1 Description

The page should load with a max time of 5 seconds

### 5.1.2 Source

Nghia Lam: 10.7.2022

### 5.1.3 Constraints

Requires an internet connection

### 5.1.4 Standards

N/A

### 5.1.5 Priority

Medium

## 5.2 Map Ping

### 5.2.1 Description

Every 5 minutes each user in the event should get a ping and that should update and get posted for everyone in the next 10 seconds

### 5.2.2 Source

Nghia Lam: 10.7.2022

### 5.2.3 Constraints

They need location and Internet

### 5.2.4 Standards

N/A

### 5.2.5 Priority

High

# 6 Safety Requirements

This section goes over the safety requirements for the LateLess system. Because this application is entirely software, there isn't too much for users to worry about in terms of hardware safety. The following information will talk about required hardware requirements.

## 6.1 Laboratory equipment lockout/tagout (LOTO) procedures

### 6.1.1 Description

Any fabrication equipment provided used in the development of the project shall be used in accordance with OSHA standard LOTO procedures. Locks and tags are installed on all equipment items that present use hazards, and ONLY the course instructor or designated teaching assistants may remove a lock. All locks will be immediately replaced once the equipment is no longer in use.

### 6.1.2 Source

CSE Senior Design laboratory policy

### 6.1.3 Constraints

Equipment usage, due to lock removal policies, will be limited to availability of the course instructor and designed teaching assistants.

### 6.1.4 Standards

Occupational Safety and Health Standards 1910.147 - The control of hazardous energy (lockout/tagout).

### 6.1.5 Priority

Critical

## 6.2 National Electric Code (NEC) wiring compliance

### 6.2.1 Description

Any electrical wiring must be completed in compliance with all requirements specified in the National Electric Code. This includes wire runs, insulation, grounding, enclosures, over-current protection, and all other specifications.

### 6.2.2 Source

CSE Senior Design laboratory policy

### 6.2.3 Constraints

High voltage power sources, as defined in NFPA 70, will be avoided as much as possible in order to minimize potential hazards.

### 6.2.4 Standards

NFPA 70

### 6.2.5 Priority

Critical

## 6.3 RIA robotic manipulator safety standards

### 6.3.1 Description

Robotic manipulators, if used, will either housed in a compliant lockout cell with all required safety interlocks, or certified as a "collaborative" unit from the manufacturer.

### 6.3.2 Source

CSE Senior Design laboratory policy

### 6.3.3 Constraints

Collaborative robotic manipulators will be preferred over non-collaborative units in order to minimize potential hazards. Sourcing and use of any required safety interlock mechanisms will be the responsibility of the engineering team.

### 6.3.4 Standards

ANSI/RIA R15.06-2012 American National Standard for Industrial Robots and Robot Systems, RIA TR15.606-2016 Collaborative Robots

### 6.3.5 Priority

Critical

## 6.4 Driving Awareness

### 6.4.1 Description

The application must detect whether or not the user is driving before sending potentially harmful distractions to the user.

### 6.4.2 Source

Shawn Gieser, Product Meeting: 9.30.2022

### 6.4.3 Constraints

This feature must be automatic but is not required to be so secure that a user looking to ignore thsi feature could not get around it. If this feature somehow proves impossible to implement, the app must not pose any threat to individuals that could be driving.

### 6.4.4 Constraints

N/A

### 6.4.5 Standards

N/A

### 6.4.6 Priority

Critical

# 7 Security Requirements

This following section will go over the security requirements needed for the LateLess system. Because of the need to store information such as passwords, friend lists, and other information, this application will need to use a database. Also, there will be a need to encrypt any password that will be used for the user's logging in process.

## 7.1 Password hashing and Authentication

### 7.1.1 Description

When the user registers to create an account, the password requires a combination of letters, numbers, special characters and at least 8 characters length. The password will be hashed and stored in the encrypted table in the database. In addition, for first time login or any sign in using different devices, two-factor authentication are implemented to verify the identity of users. Verifying code can be sent through email or phone number.

### 7.1.2 Source

Shawn Geiser: 9/30/2022

### 7.1.3 Constraints

Currently, the group has not yet come up with a compatible solution or technologies for hashing and storing the user's password.

### 7.1.4 Standards

N/A

### 7.1.5 Priority

Moderate

## 7.2 User privileges

### 7.2.1 Description

User privileges is an important aspect to consider in assign role to user. When the user creates an event, the users will be assigned as administrator, or owner of the event, and only the owner can modify the information of the event, including time, location, number of attendants. In addition, only the owner can send an invitation to their friends or other people in the network. Unless the owner promoted to a higher role or granted the permission to edit or modify, attendees can only view the event and share it to others.

### 7.2.2 Source

Shawn Geiser: 9/30/2022

### 7.2.3 Constraints

Owner has control over group.

### 7.2.4 Standards

N/A

### 7.2.5 Priority

Moderate

# 8 Maintenance & Support Requirements

The maintenance will be maintained by downloading the newest update through the Google play store or the Apple app store. We will have a team update the application for any major bugs that are found in a week. To do this we would need multiple developers and a complaint box in the app for any issues that appear in the application. We will also have a website as a guide for people to look at.

## 8.1 Apple Store and Google Play store

### 8.1.1 Description

Regular updates with bug fixes and added features through an app store.

### 8.1.2 Source

Nghia Lam: 10.7.2022

### 8.1.3 Constraints

N/A

### 8.1.4 Standards

N/A

### 8.1.5 Priority

Future

# 9 Other Requirements

Other requirements section goes over some low or moderate requirements of the project. These requirements are considered latter aspects that need to be concerned or developed in the future after the main requirements are implemented and corrected.

## 9.1 Portability and Usability Requirements

### 9.1.1 Description

The software application should be able to operate on multiple platform without causing bugs. Specifically, if the user switch to a different operating system, the application should function normally without the need to redesign the whole system. In addition, the user should be able to use the application with ease and the instruction for application's operation should be precise and comprehensive.

### 9.1.2 Source

Gia Dao Duy Duc: 10/7/2022

### 9.1.3 Constraints

For running the application in multiple platforms, the testing and implementing phases will require more time.

### 9.1.4 Standards

The application should able to switch between multiple platforms without causing errors, or function normally with minimal errors.

### 9.1.5 Priority

Future

# 10 Future Items

This section goes over items that our group will not add during the project timeline, but later in the future. These include requirements listed in previous sections of this document. The reason for repeating these requirements is for a concise statement of features that are considered but not implemented in the prototype of this application.

## 10.1 Install through app store

### 10.1.1 Description

The user should be able to go to the apple or google play store to install this application. All they need to do is hit the install button and the application should be installed, without errors, onto their device without any other

### 10.1.2 Source

Colby Wyrick: 10.7.2022

### 10.1.3 Constraints

Needs to be installed either through the apple store or the google play store. Also has to be on either an apple or android device.

### 10.1.4 Standards

N/A

### 10.1.5 Priority

Future

## 10.2 Apple Store and Google Play store

### 10.2.1 Description

Regular updates with bug fixes and added features through an app store.

### 10.2.2 Source

Nghia Lam: 10.7.2022

### 10.2.3 Constraints

N/A

### 10.2.4 Standards

N/A

### 10.2.5 Priority

Future

## REFERENCES