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Design Studio I

Main Design Solution for FamilyMonitor

Key Terms

- Family unit
  - A **family unit** is the group of individuals participating in a location tracking with one another through FamilyMonitor. This is not restricted to immediate family members and can include caretakers such as a babysitter.
    - Ex. Family Unit A —> Sarah Smith (guardian), James Smith (guardian), Tommy Smith (child), Veronica Roth (caretaker)

- Family member
  - A **family member** is any individual within the family unit.
    - Ex. Sarah Smith is a family member of Family Unit A from above.

- Caretaker
  - A **caretaker** is an individual that tracks children and is part of the family system.
  - Admins must give consent to caretaker in order for **caretakers** to modify the system.

- Normal
  - A location is considered **normal** if it's within the specific boundaries of a location that is marked on a family member's schedule.

- Abnormal
  - Any activity that is cause for safety concern is considered **abnormal**
    - Ex1. A location is considered **abnormal** if it's outside the specific boundaries of a location that is marked on a family member's schedule
    - Ex2. If a family member loses connection or turns off location services, then it is considered **abnormal** activity

- Smart Device
  - An electronic device that has the basic ability to determine an individual's location. It can operate interactively and will connect to different wireless protocols.

- Monitor
  - Ability to determine normal and abnormal activities relative to a family member's entered schedule.

- Tracking
  - Ability that determines where a family member is based on their position at a certain time and place.

Goals

FamilyMonitor has three goals — two of them address the safety concerns of families, while the other addresses how the FamilyMonitor system is used.

- The 1st goal is to **provide real-time locations with real-time tracking**.
  - With real-time tracking, FamilyMonitor pinpoints where every member of a family unit is at, and members can view where others are at any time.

- The 2nd goal is to **alert the family of possible safety risks**, specifically when a member is not traveling or at a place where they normally would go or be.
  - With real-time tracking, the FamilyMonitor system determines which locations are "normal" to a member of a family unit, and alerts other members if one is connected to any "abnormal" activity.

- The 3rd goal is to **provide a simple interface** that is easily accessible to all members of a family unit.
  - Because family members who use FamilyMonitor can range from children and teenagers to older adults, the FamilyMonitor system must account for universal usability.

Constraints

- Location tracking may fail. This may happen if a family member loses connection or chooses to turn off location services. In this case, FamilyMonitor must alert this abnormal activity and provide the rest of the family with the last known location of the family member.
- Anyone using the FamilyMonitor application is giving their full consent to being tracked and monitored. If not, they will not be included within the system as to respect their privacy.
- The security of the system will limit a user of FamilyMonitor to only track and monitor the locations of his or her own family unit.

Assumptions

- Every member using FamilyMonitor will have access to a smart device. Most individuals who do not have a device are young and do not need to be directly included within the system because they will always be with a caretaker.

- Every member, using FamilyMonitor will have a basic schedule that they follow. These individual schedules will help the system track normal and abnormal behavior.
- Family member within the FamilyMonitor system will give their consent to being tracked. Members will only be included within the tracking system if consent is given.
- Family members within the system can only view individuals from their own family unit. At no times should they be able to view the locations of members of other family units. This aspect offers both security and protection.
- Location tracking with the FamilyMonitor system will be accurate and be able to inform family members of an individual's last known location if anything were to occur (e.g. loss of signal).
- All members will accept push notifications. This will be important because in the event of an abnormal event, the system needs to alert other family members through notifications

Decisions

- FamilyMonitor's main design will revolve around an application on a smart device. A majority of individuals own a smart device and others who do not own one are assumed to be with someone does.
- It will have the ability to allow every family member track members of their own family. Only members within their own family unit should have access to each others locations. This reinforces the safety and security of the system.
- Users will also be allowed to set their own schedule. By marking a general area on a map and setting a "normal time zone" of when they should or will be in that particular area, it will allow for a more accurate read on a member's location in regards to their schedule.
- An admin role will be included. In terms of hierarchical order, admins will have the most power in regards to using the system. Admins will have access to not only adding and removing family members from the system, but also appointing other admins (they must be from within the family). They will also have the ability of approving a schedule and seeing modifications of a schedule.

Audiences

- The main audience of FamilyMonitor is the family unit using the application. This can include guardians, caretakers, and children. A possible audience also being considered as a precaution are malicious actors.
  - Guardians
    - These individuals will most likely be the admin of the FamilyMonitor system for their own family. Guardians approve and oversee all changes and edits made to a particular family member's schedule. They also have the ability to add or remove people from the system (within their own family unit).
  - Caretakers (e.g. babysitters)

- - - Caretakers may be a part of the family unit as they are responsible for children's safety. Guardians can track small children, who do not have a mobile device, inadvertently through these caretakers.
    - ○ Children
        - ■ Children will be monitored using the FamilyMonitor system. Children can modify their schedule under admin approval.
    - ○ Malicious Actors
        - ■ There is a chance there are individuals who may abuse the FamilyMonitor system. Possible dangerous individuals could be stalkers, hackers, and even kidnappers.

Other Stakeholders

- An important stakeholder is the FamilyMonitor company and Project Manager of FamilyMonitor. A project manager would make sure the project would have a decent plan and execution and determine whether the application is well designed and suited for their needs.
- Another stakeholder is any possible sponsor that can help market FamilyMonitor. Their attitude toward FamilyMonitor can contribute to its success and future growth.
- Designers should also keep in mind the concerns of non-participants in being inadvertently tracked through people they interact with who use FamilyMonitor.

Considerations

- If crimes are happening within a location that a family member is either in or heading towards, the admin will be notified. In addition, the "endangered" individual will be notified with an alert message and then have the option to either "mark themselves as safe".
- If the severity of the system abnormality is extreme, the system will send an option to the admin of calling the police or send a notification to the police automatically.

Mockups of FamilyMonitor on a Smart Device + Functionality Explanations

*It is important to note that there are 2 types of users on the FamilyMonitor system: **admin users and general users**. Admin users have access to the same features as general users, but have special privileges such as adding members and changing any member's schedule (including their own).*
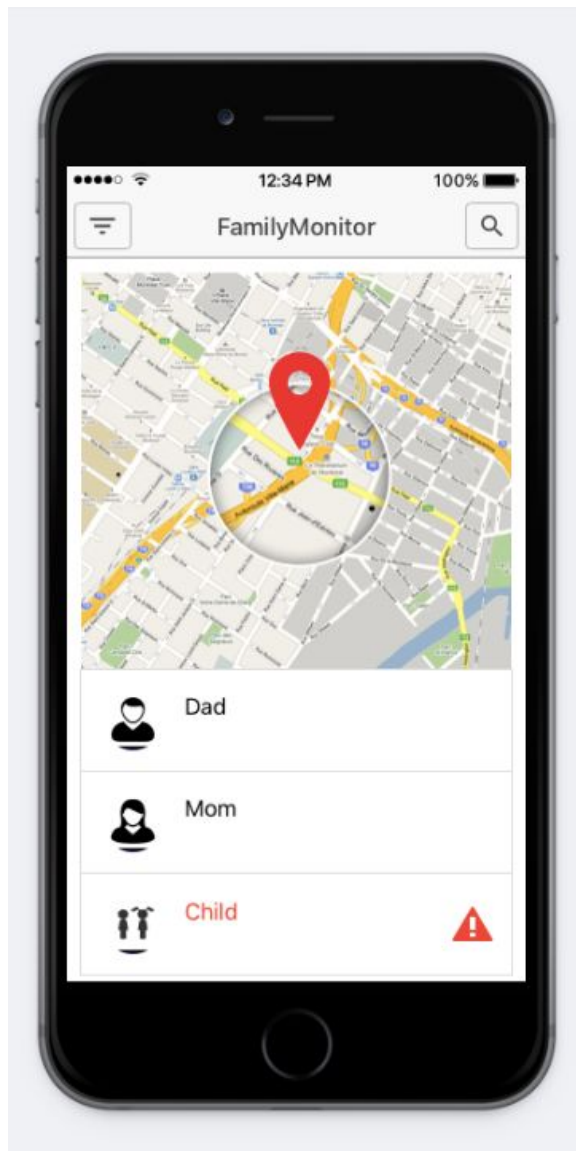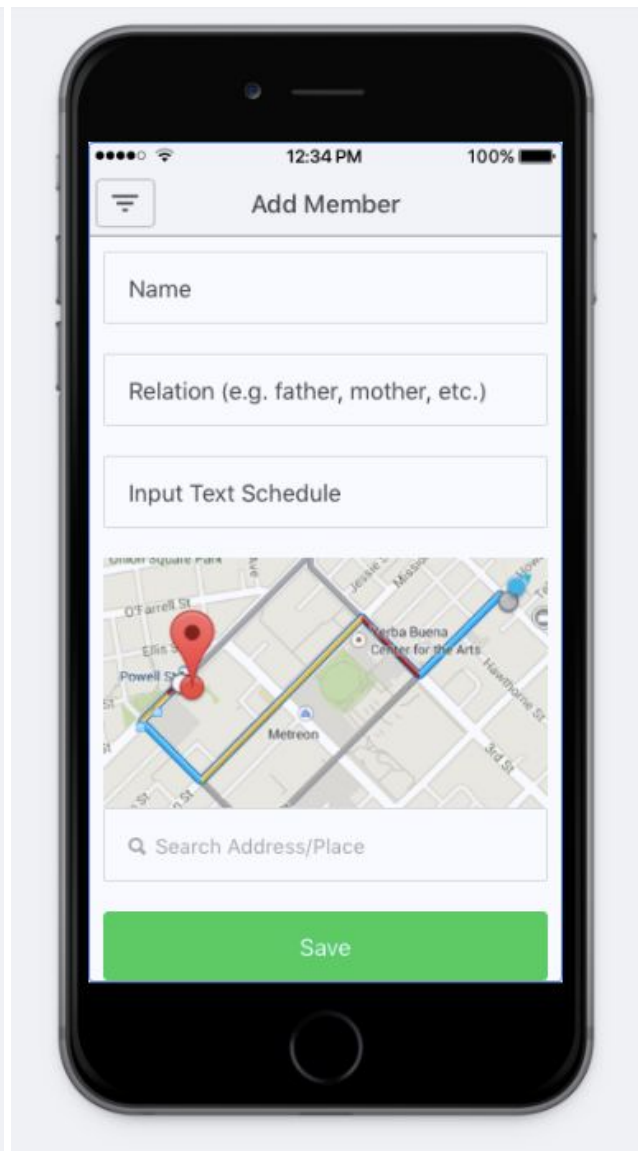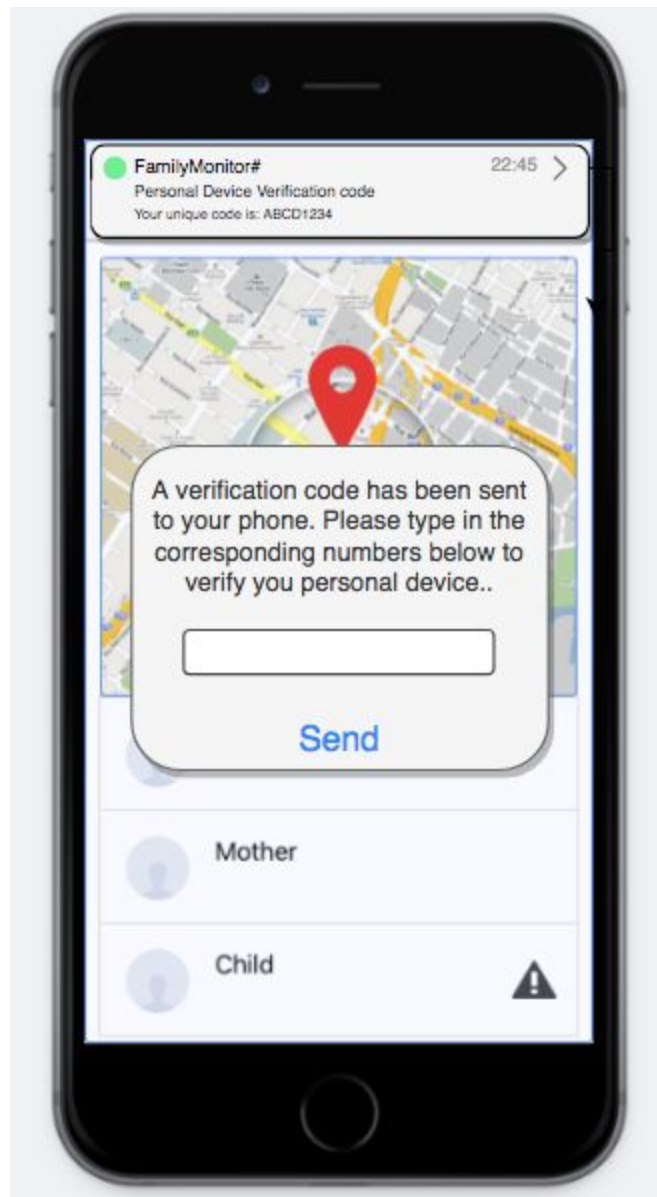

Figure 1.

Figure 2.

Figure 1. depicts the home screen of FamilyMonitor. When you open the app you will see a map with the list of family members below it. When you click on a member of the family it displays their current location. The search icon (magnifying glass) in the top right corner allows for users to search for a particular member if their family unit list is lengthy.

Figure 2. shows the ability to add a new family member. ***This action is an available feature to admin users only.*** After being added, the user can modify and add to their schedule under approval of the admin users.
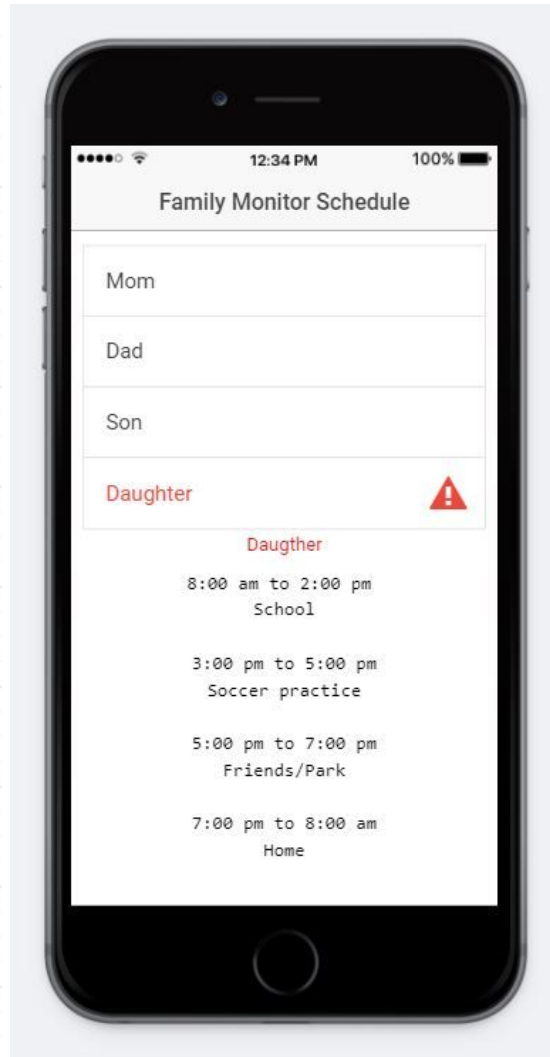

Figure 3.

Figure 3. illustrates the security verification system of FamilyMonitor. Individuals who are added to a family unit will be sent a unique code to verify their identity. Once verified, users will then be able to see other individuals within their family unit as well as also be tracked and monitored themselves.

**Figure 4.**   **Figure 5.**

Figure 4 is the layout of the FamilyMonitor schedule layout. It shows the people that are connected to the FamilyMonitor system and if there is a long list of people on the system, you can search their name by typing it. By pressing on the name, it goes onto another page.

On Figure 5, it goes onto another page with the detailed schedule of the person you choose on Figure 4. The system knows where the school, soccer practice, park and home is so it knows that's where the person should be throughout the day.
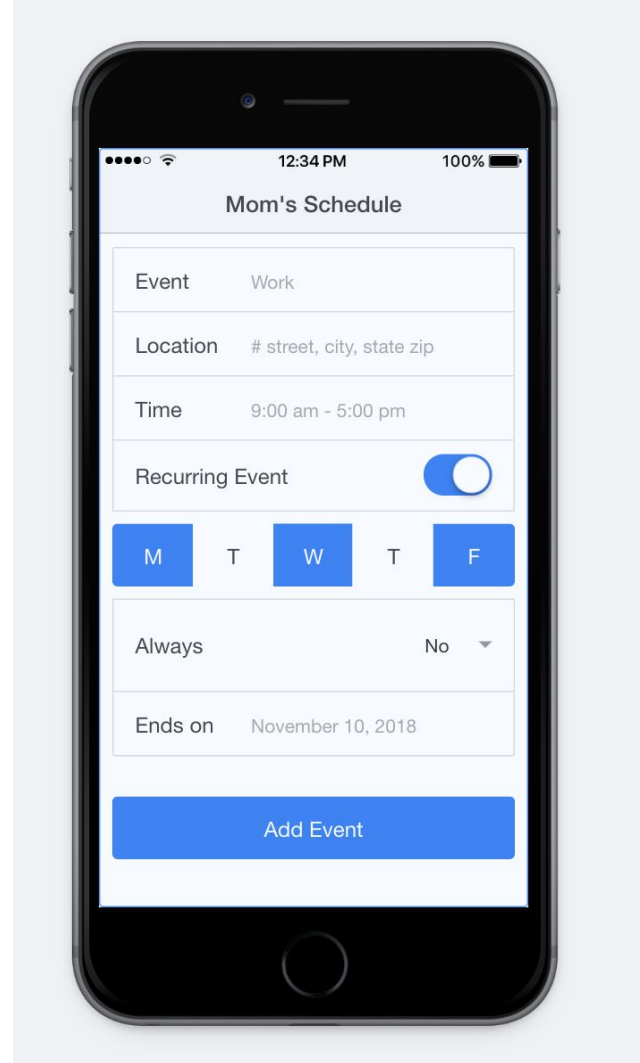
**Figure 6.**   **Figure 7.**

Figure 6. shows the schedule for family member "Mom". She can press the red circle with the "+" to add more events to her own schedule so that FamilyMonitor can track her locations.

Figure 7. depicts a scheduling screen that would open when the user wants to add an event. It asks the user to enter an event with location and the details on what time they will be at this unique event.

This functionality is for both general users and admin users. However, the main difference is how a member's schedule is changed. In Figure 7, when an admin taps the "Add Event" button of a member's schedule, it will add to the member's schedule immediately. However, when a general users taps the "Add Event" button on their own schedule, it will be sent to all admin users to review and confirm.

It's important to reiterate that general users can only make changes to their own schedule, and upon making changes, their newly-changed schedule has to be reviewed and approved by any admin user. Admin users, on the other hand, can make changes to their own schedule and any members' schedules.
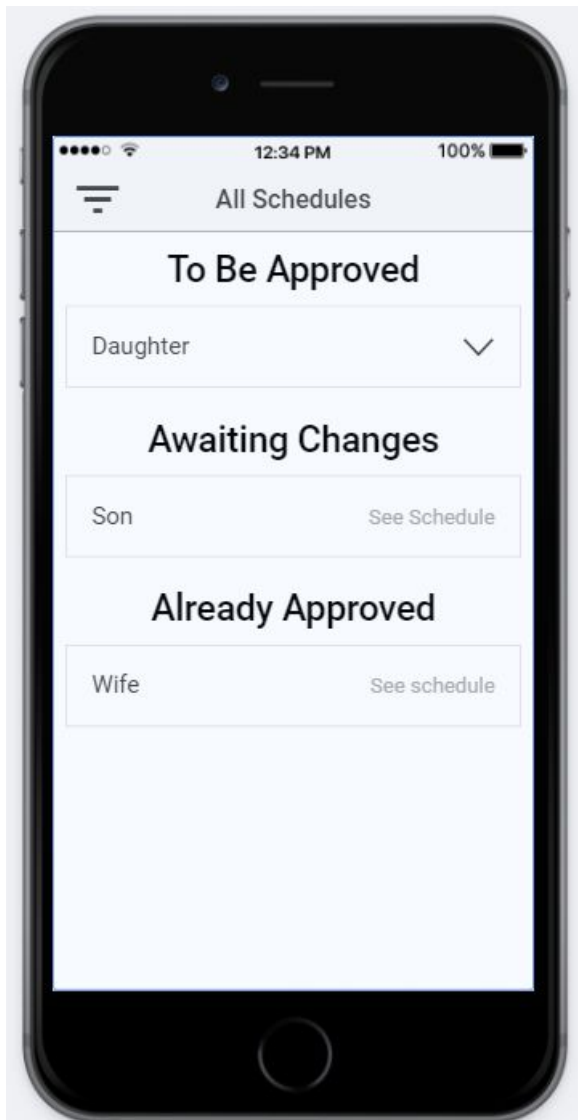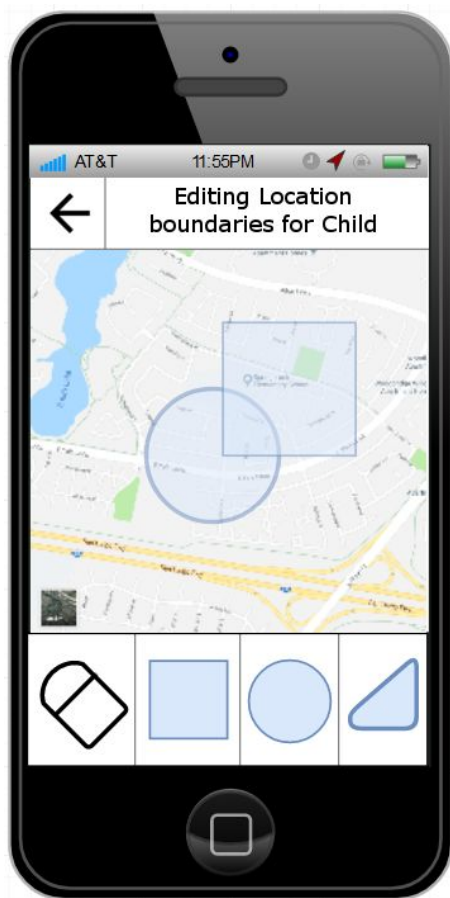

Figure 8.
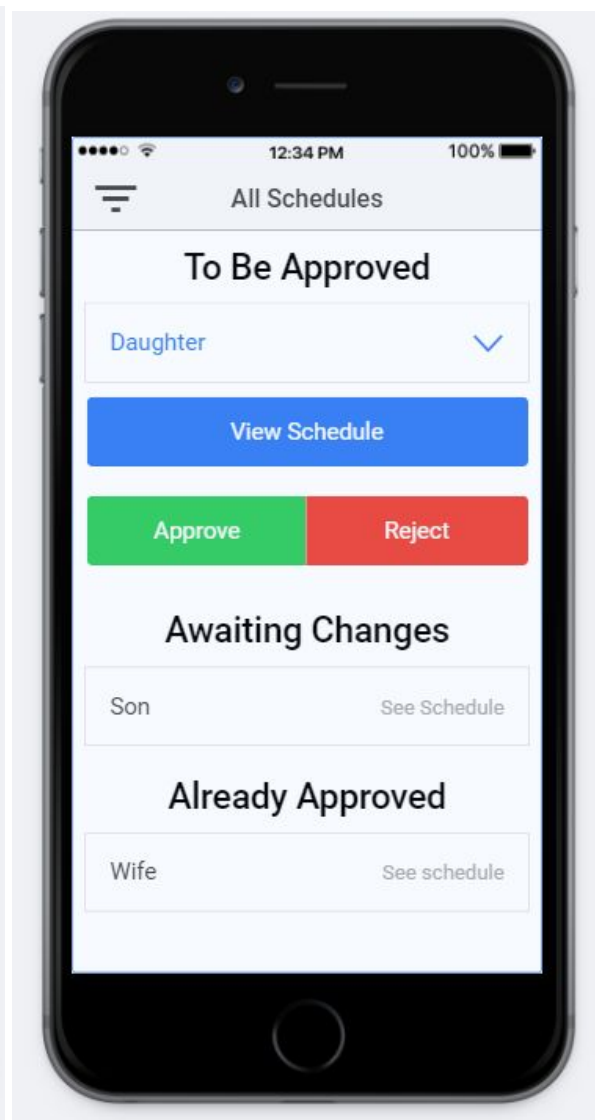
Figure 9.

Figure 8 and Figure 9 display the "All Schedules" screen page, which can only be accessed by admin users only. The purpose of this page is for an admin to approve or reject other member's schedules. If an admin approves one's schedule, the FamilyMonitor system will make the necessary changes to the map on the homepage screen (Figure 1). If the admin rejects one's schedule, that member has to make changes to their schedule and have it be reviewed again.

The screen is separated into 3 categories:

- The "To Be Approved" category contain members' schedules with new changes that need to be approved. Any new changes to a member's schedule is to be either approved or rejected by the admin user.
    - Figure 8 shows when the admin user first goes to that screen
    - In Figure 9, when the admin clicks on the user whose schedule needs to be approved, a series of buttons appear. The admin can either view, accept, or reject the member's new schedule.
- The "Awaiting Changes" category contain rejected schedules. This means that the admin rejected a member's schedule, and the admin is then waiting for that member to make the necessary changes to their schedule. Once the member changes their schedule, the member will then move to the "To Be Approved" category.
    - In Figure 8 and Figure 9, the admin will be waiting for their son to change his schedule. When the son changes his schedule, the list element "Son" will move from the "Awaiting Changes" category to the "To Be Approved" category and wait for the admin to either approve/reject his changed schedule.
- The "Already Approved" category contain any schedule approved by the admin and is used for monitoring in the FamilyMonitor system.


Figure 10. (shown on right)

Figure 10. shows a view of the editor for defining the boundaries for a safe location. The user can use a selection of shapes, including a box, an ellipse and a freeform shape, to create boundaries so they can tell the system in more detail what the safe area is. Tapping the eraser icon will allow the user to delete shapes from the map. This in particular is showing a location being defined for a user named Child. If the user decides not to define a boundary, the system will use a default circle boundary at the given address
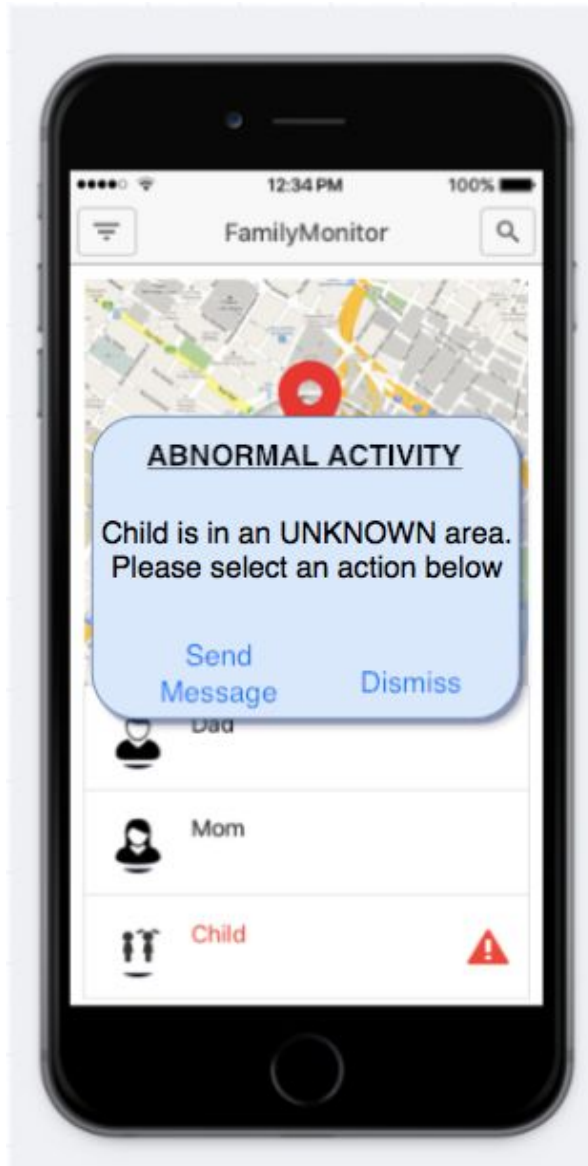
Figure 11.
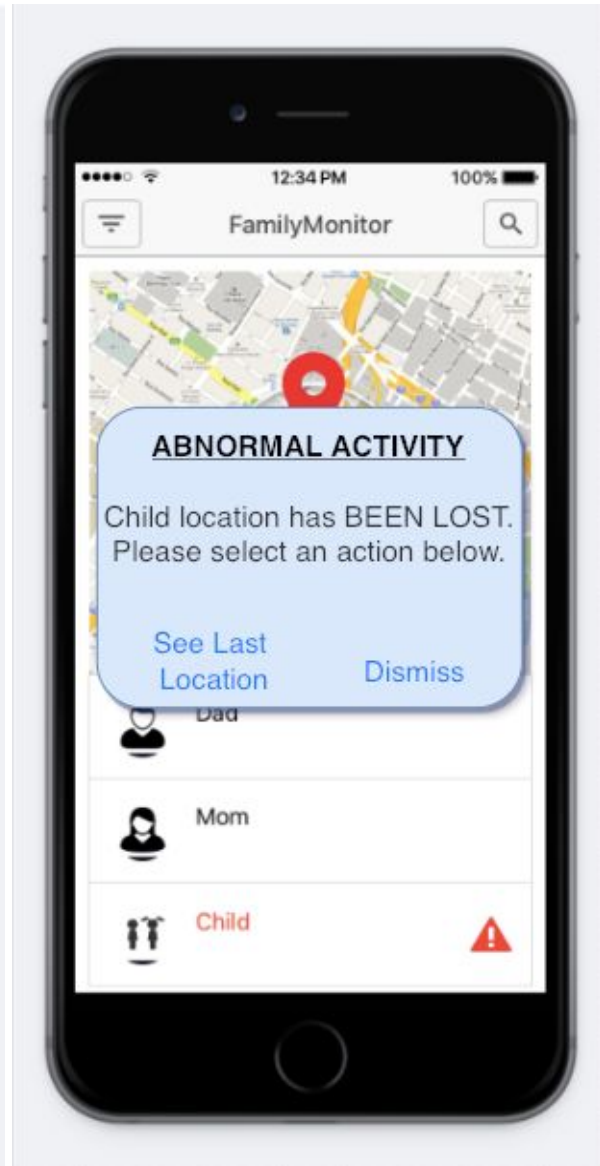
Figure 12.

Figures 11 and 12 are representations of how FamilyMonitor will alert the family if any abnormal activity is detected.

Figure 11. shows a push notification in the case that a family member named "child" is in an area not specified within their schedule. It alerts the family with a short description of the issue — in this case the "Child is in an unknown area." Then it allows the user to send a message to the family member to inquire about their safety or to dismiss the notification.

Figure 12. shows a push notification in the case that child has disconnected from their location tracking. The user can either see the user's last known location or dismiss the alert.

Alternative Design #1

This will be a mobile application similar to the first version, except there is a necklace tracker for small children who do not have a mobile device.

Goals
- Building an efficient design that fits everyone and is comfortable
- Making sure that the necklace is children friendly, so kids don't take it off.

Constraints
- Having the budget to make the design intriguing and comfortable
- Finding a way to put the chip in necklace without damaging it, because it is a microchip
- People may be picky about the visuals of the necklace

Assumptions
- It is possible to find a chip both cheap enough and small enough to fit into the desired form factor for the necklace
- Necklace must have a good enough battery life so that it can be recharged/have it's batteries replaced on a comfortable schedule. This will need to be done so that the necklace won't have it's batteries dying at an inconvenient time

Decisions
- Application available on all mobile platforms (ios, android, etc.)
- Offer the necklace in different colors for customers to choose from

Audience
- The audience is much the same as the main design, including family members which consist of guardians, caretakers, and children.
- People who do not own a smart device, since they will be the ones wearing the necklace

Other Stakeholders
- The FamilyMonitor company and project manager are other stakeholders that we need to account for in designing the application as they have the authority over what is actually produced.
- The hardware manufacturer for our necklace, since they will have their own interests in mind

Considerations
- The necklace can be waterproof as to prevent it from being damaged (near water).
- The necklace has a design where it will not be lost easily (e.g. double clasp on the back).

Alternative Design #2

This alternative will involve Family Monitor being a one-time fee model. There will be an ability to pay for add-ons. This will be similar to the first design, except only the most basic functionality is included in the initial purchase.

Goals
- Provide basic functionality, including the ability to track family members.
- Satisfy a range of customers by allowing one-time fee model and add-ons for those who desire more functionality.
- Minimalistic and organized design to increase ease of use.

Constraints
- Must limit service in such a way that keeps server and maintenance costs down to a minimum.

Assumptions
- Some families simply want to track their family members, without anything more.
- Every member, using FamilyMonitor will have access to a smart device. Most individuals who do not have a device are young and do not need to be directly included within the system because they will always be with a caretaker.

Decisions
- One-time fee for the basic use of the application. Increased functionality will be available through additional purchases.
- Mobile application support on any smart device.

Audience
- The audience is much the same as the main design, including family members which consist of guardians, caretakers, and children.

Other Stakeholders
- The FamilyMonitor company and project manager are other stakeholders that we need to account for in designing the application as they have the authority over what is actually produced.

Considerations
- FamilyMonitor can have two options of either manual payment (with monthly email reminders) or an automatic billing system.