

PROJECT 3: NOVEL INTERFACES

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Better Apartments

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INTRODUCTION

Most apartment buildings in downtown Madison have many floors filled with many residents, and as the number of residents increases, the need to address safety, privacy, and security increases. In order to do so, most apartment buildings have restricted access, requiring keys to enter the building. We assume many residents find comfort in the security of their buildings, but we also believe that current security systems offer the opportunity for improvement.

Setting and Action

The action we chose to observe is the process of unlocking the door and gaining access to apartment buildings. This process varies vastly from building to building, but most require a key or key fob. While restricted entry is reassuring to safety, it can also prevent both residents and their guests from entering easily.

If residents leave their keys in their bags, they will take several minutes to search their bag to find the key. If residents are leaving without a bag, they may struggle to find somewhere to store or hold their key. Finally, if residents have multiple keys (car, work, home, etc) they may take several minutes to not only find their keys, but then to determine which key is correct.

If residents have friends or family visiting, they must leave their apartment, go down to the entry, and escort their guests through the building. Some have a buzzing/calling system that allows guests to buzz residents inside their apartments, which temporarily unlocks the door so that they can enter without the resident having to leave their apartment.

Another factor to consider is forgetting or losing your key. Losing the key to your

apartment is inconvenient, annoying for roommates, and jeopardizes the safety of all residents if someone with mal-intent finds the key. On top of that, replacing a key is often expensive.

Stakeholders

Anyone who lives in an apartment would benefit from the improvement of common security systems. These people are busy, on-the-go, social individuals who may be leaving and entering their building close to 10 times per day. Not only will these people want a quick and simple entry for themselves, but they will want to know that it will not be quick and simple for any suspicious characters; access should be limited to residents and resident guests.

Another important quality to the stakeholders is guest entry. Residents of high-rise apartments should have an easy way to temporarily unlock the door for guests without having to leave their apartment. The stakeholders desire an efficient way to grant access to their visitors.

Finally, the stakeholders would appreciate a more efficient way for food delivery services to access the building. It can be frustrating when you desire food to be delivered to your door, but the deliverer is unable to make it past the entryway.

Simply from experience, our group concluded that a standard method of securing entry would benefit large apartment buildings and their residents, as well as hospitals, banks, and businesses with restricted access. Standardization would not only provide people with familiarity, but would allow for innovation within the system.

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UNDERSTANDING

In order to collect sufficient data we decided to observe the restricted access security system at four apartment buildings: The James, La Ciel, Metropolitan Place, and a split house on Langdon.

Observations

First, we conducted fly-on-the-wall observations. At each location we observed the people entering and leaving the building. Overall, we observed that most people who entered during the daytime had their own keys, while after dark there were many people without keys being let in. We also noticed that visitors aren't often met with any barriers to entry - residents rarely question who they allow to enter, letting almost anyone in.

On certain occasions when guests were waiting to be let in, we observed the awkwardness created by their presence. Standing in the entrance lobby waiting to be let in - leaning against the wall, looking down at their phone - unsure of how to act as a recognized stranger in the building. As previously stated, other residents often let these guests inside when they entered, but certainly acknowledged their presence as awkward.



Fig 1. Entrance Devices Near Front Doors

Another thing we noticed was the amount of time it took for people to unlock the doors. People who walked in with their keys in hand unlocked the door in less than a minute, while those who were walking dogs, carrying groceries, or engaged in conversation took more than a minute to find their keys and unlock the door.

Interviews

In order to validate our fly-on-the-wall observations, we conducted interviews with key informants - tenants and guests at each building. We approached four different people with our interview questions in order to gather comprehensive data with a wide variety of opinions. We asked our interviewees nine questions about how they accessed their building, their level of satisfaction with the current system, and the level of safety in their building.

The interviews confirmed our observations; each interviewee expressed their desire to live in a building that is not only safe, but is easy to enter and simple to unlock for guests. We took pictures so we could analyze the similarities and differences in how the space flows, and how it helps or deters security and ease of unlocking.

Data Analysis and Findings

First, we used codes to analyze our field notes and interviews. Half of the people observed used neither a phone nor a buzzer and an equal amount were let in by a friend and by a stranger. 70% of people let someone else in behind them, while 50% left the door propped open behind them. Three out of four interviewees said they were not satisfied with their current system.

Next, we made an affinity diagram of this data in order to find similarities and themes amongst different people and different buildings. The affinity diagram helped us identify four priorities: ease, speed, security, and guests. Based on our experience in the setting, we were particularly interested in shifting the social dynamic of the space. We think that redesigning the space to better fit the needs of guests and residents will ultimately make the entire process less awkward.

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IDEATION

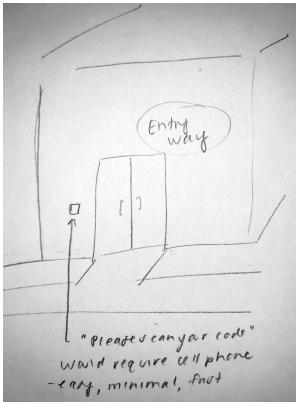
Design Ideas

Based on the pain points we discovered through observation and interviews, we developed 3 preliminary design ideas. Our goal is to make a more efficient process while maintaining the security of current systems by focusing on ease and speed of entry for both residents and guests.

Overall, most of our design ideas focus on eliminating the idea of a physical key completely. We believe this would allow residents to have a more enjoyable experience because they do not have to carry a key with them, spend time searching for it, or worry about misplacing it.

Device Access:

Our first idea was to have the buzz systems connect directly to the residents' cell phones; when the guest arrives, they buzz the apartment number and it calls the residents cell phone from which they can temporarily unlock the door.

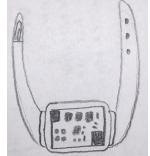


This design would require residents to have a QR code on their phone that unlocks the door. We thought this would be efficient and convenient while upholding security. It also

would allow the use of other smart devices like tablets and watches.

This idea incorporates personalization and speed in entering, but also requires that every resident has access to a cell phone and that may not always be the case.

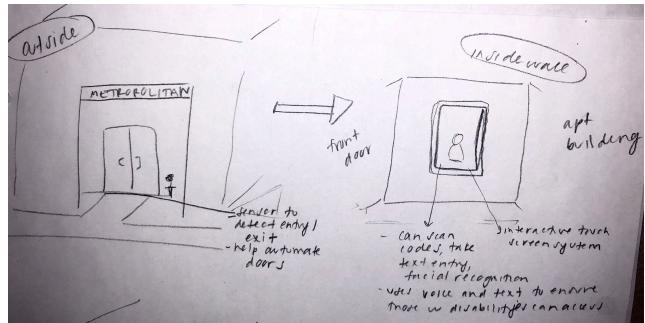
Another obstacle we face is in the event



that a resident loses their phone, it dies, or is stolen. They would be left key-less with no way to enter the building until they could charge their device or be let in by another resident.

Key-Free Access:

Our final idea is to implement a completely "key free" security system - rather than using a key or device of any type, the resident themselves act as the key. The system would identify residents using facial recognition, and when a guest arrives they would have the ability to enter a code sent to them by the resident they are visiting. This design eliminates the need to carry a key, combats the frustration of getting locked out, and provides an easy way for guests to enter. Not



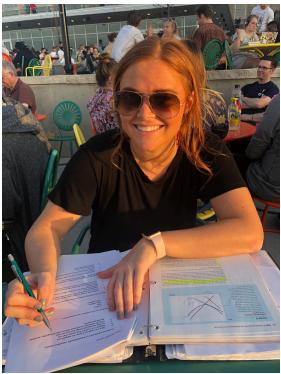
only would this system eliminate the need for a key, but it would accommodate a variety of disabilities. The system would be predominantly sight based, but would use minimal audio cues to assist with guests and residents who may be visually impaired. Further, this system would be based on automated doors. The doors will open if you're a recognized resident, and will open for guests if they have a valid code sent to them. Automated doors would be helpful to people carrying groceries or walking dogs, and would make it possible for people in wheelchairs or walkers to enter without hurting themselves.

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PROTOTYPING

Scenario

We brainstormed a scenario to guide our design and give our video a narrative.



Meet Jess. Jess is a 22 year old college senior who lives at Lucky with her 3 roommates. All 4 girls are very busy - they have classes every day, and after class they exercise, grocery shop, study, and socialize.

Jess values safety and privacy, and is thankful that she has never had her apartment broken into or has ever had anything stolen from her.

During her freshman year, Jess lost her keys and had to stay at a friend's house for the night until her roommates woke up and let her in. Now, Jess keeps her keys tied on a string around her wrist so she doesn't lose them, but often gets annoyed by them. When Jess goes running or goes to the gym, she tries to remember to wear clothes with pockets for her keys, but usually ends up sticking them in her shoe and hoping they don't fly out!

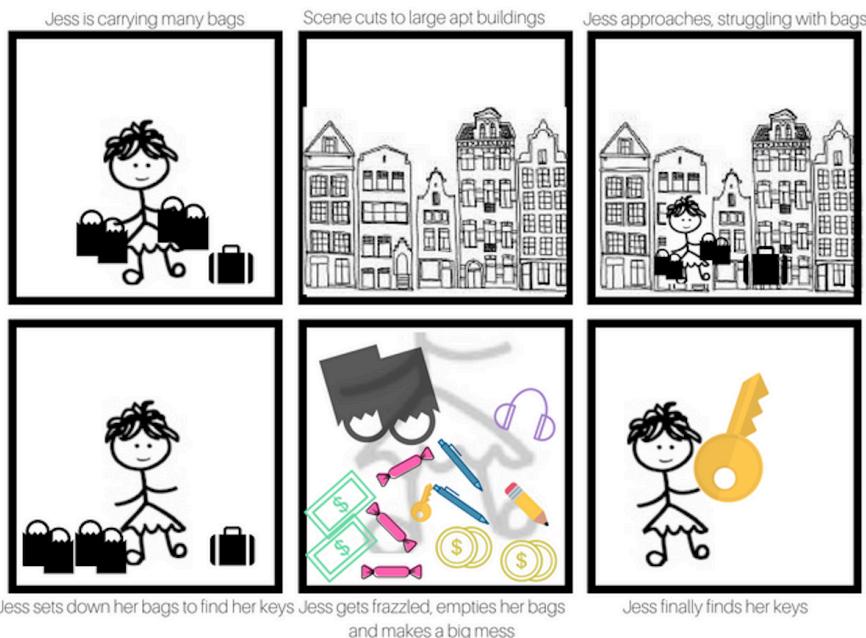
Jess likes to invite friends over, but every time a friend arrives she has to go down to the lobby to retrieve them. She wishes her friends could have temporary access to the building when she invites them over.

Overall, Jess and her roommates would benefit from a new security system that allowed their guests more accessibility and a "key free" system to combat losing keys.

Video Production

In order to turn our scenario into a video, we decided to follow the narrative of all the struggles people face when entering their buildings. The elements of frustration that we featured in our video include carrying bags, exercising, letting in friends, and food delivery.

We developed several storyboards to use in our video featuring each frustration as a new scene.



Then, we followed several different characters to feature these frustrations by asking friends to demonstrate them; they became the lead characters in our video.

Finally, we ended our video by showing the benefits of our new interface. The interface is featured on an entry way wall, recognizing residents, prompting guests for additional information, and denying entry to suspicious characters.

Script

Rather than have the actors in our video speak, we decided to narrate our video. This gave us control to emphasize the emotions the characters were feeling throughout, and gave the video a complete and polished soundtrack rather than cutting from scene to scene. Our script emphasizes the frustrations of using a physical key and the benefits of using the resident themselves as a "key".

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FINAL SOLUTION

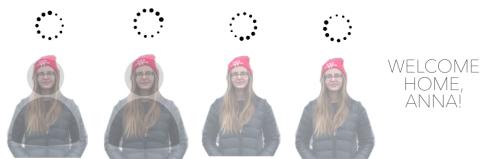
Our final solution is KeyFree Security.

KeyFree Security is a security system for apartments, banks, hospitals, and businesses in which access is restricted for safety, but many people enter and leave the building every day.

Design and Function

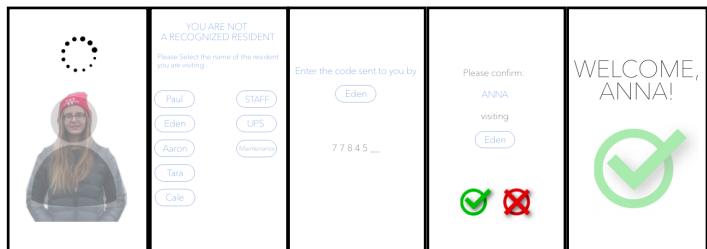
Rather than providing keys for residents/employees, this system uses facial recognition and temporary guest access to unlock the doors. This solution is easy, fast, and safe. Residents no longer have to worry about carrying their keys whenever they leave, but their buildings will be secure as ever.

The facial recognition system stores the identity of those who live in the building allowing them to access the building freely.



This system requires a resident to enter information about their guests prior to their arrival, including their name, the guest's name, and a 6 digit code.

If a person is not recognized by the system, they are prompted with additional security elements to ensure that they are a welcomed guest. The guest will be expected to identify the name of the resident whom they are visiting, as well as provide a code that the resident sent them ahead of time.



If the visitor enters the correct code, they are allowed entry. If not, they are denied and the doors remain locked.

Not only does this system make it faster and easier for guests to enter, but also for food and package delivery. Food delivery drivers no longer have to call when they arrive, but select the business they are from and enter the code they have been provided with.

Key Free Keys is the ideal security system because it