HomeSense

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Contextual Inquiry Report
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Roles

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Problem and Solution Overview

What do you do if you're the last one out of the house, almost late for work, then realize you can't remember if you locked the back door? With typical houses, if you want to check the current state of anything you have to physically walk to it, no matter how inconvenient or far away it may be. To help save time and increase the accuracy of checking the current state of your house, we propose an application that allows users to quickly check the status of the house. The specific items monitored are variable; you could monitor your doors, windows, appliances, or lights. Sensors monitoring the various items in your home feed information to a local database on your home network, and that data would be used by our application. These sensors can be more accurate than checking windows by eye across a room, giving you accurate data about your entire house from a single screen. This can let parents to make sure their children are actually asleep at night, and ensure the house is locked down when everyone left. The information stored can be used to ensure that state you left it in is maintained until you return home, which saves time and makes you safer.

Contextual Inquiry Participants

The target customers are any households so we interviewed and observed several potential customers each with a different background.

Michael and **Renee** are a married couple in their late 40's living in the suburbs with their high-school son **Skyler** and a small dog **Dallas**. They have a large 2-story house with a security system. On weekdays, Michael and Skyler go to work and school respectively, while Renee works from her home office on the second floor. The dog spends most of his time throughout

the day on the first floor and in the back yard. On school nights, Skyler has a curfew and a bedtime, but on the weekends he's allowed to stay out late with his friends. By observing and interviewing them about how they interacted with the house and alarm system, we hoped to gain some perspective on what such an atomic family might stand to gain from our system.

Miriam and **Mike** are a married couple in their early 40's living in the suburbs with their 13 and 14 year-old sons **Jason** and **Steven** with a small dog, **Lucy**. Mike is an engineer at Microsoft and the entire family is very tech-savvy. They live in an older 2-story house without a security system. Most weekdays Mike goes to work, Steven and Jason go to school, and Miriam stays at home or visits neighbors. Lucy is emotionally attached to Miriam and goes into hiding when Miriam leaves the house. After school and during evenings, the boys spend almost all their time on the lower level of the house while the parents typically remain upstairs. The main entrance, kitchen, living room, and all bedrooms are upstairs - the downstairs is one large family room and a computer room. Activities on one level of the house are usually not observed on the other level, like doorbells or shouting. We chose to interview and observe this family because Miriam and Mike try to be aware of their son's activities, they have no home security system and the family members easily adopt new technology.

Tingko is a female college student currently living with her cat, **Blacky**, in a one-bedroom apartment on the University Way. Her apartment has one bedroom, one living room, one bathroom and one kitchen. She represents a segment of our target audience – young college student living in an apartment where security is not the main concern of hers. To interview her, we followed her to her apartment and observed how she interacted with her cat and house appliances. We also imagined how our product could come in place under various situations, for example, looking for where the cat is hiding or check if the heater is off when she leaves her house.

Bonnie is an 80-year old female who lives in a one-bedroom apartment with a dog. The apartment also has the standard one bathroom, kitchen, and living room. We decided to include Bonnie in our contextual inquiry, because she represents a drastically different demographic than the other participants. She's about as tech savvy as 80-year-olds get, but that amounts to carrying a cell phone for calls and frequent use of the Internet for email. She also has valuable insight into the technological habits of her peer group - other senior citizens. Observing her in her home let us learn of common tasks she performs and common concerns that arise throughout her day.

Contextual Inquiry Results

Each of our participants expressed concerns about keeping track of their pets in the house throughout the day. Renee, for instance, spends much of the day in her second floor office, and thus does not tend to notice her dog, Dallas, scratching at the back door to come in or go out. This results in her having to interrupt her work regularly to go check that he is not tearing up the back door. Renee expressed interest in the idea of a sensor that could alert her in the case of Dallas asking to come in or out so that she could respond when and only when he asks.

All participants expressed some concern about locking up as they leave home. For example, Miriam said that when she leaves the house during the day, she has to go through the entire house to make sure everything is locked up and turned off. Mike and Miriam live in a densely forested neighborhood and burglaries are not uncommon; they know that spending a minute to double check windows and doors is worth it if it prevents a break-in. Miriam said that being able to check if all windows are locked and appliances are off would save time and ease her mind knowing she didn't forget to check anything. Bonnie added that it would be nice to know that all of her appliances are off. She mentioned that it's a common problem among senior citizens to leave dangerous appliances, like a kitchen stove, on while they are away.

Along those same lines, participants showed concern about locking up the house for night. Mike and Miriam were specifically concerned about windows and doors, but participants were also concerned about making sure appliances are off. Bonnie pointed out how inconvenient it is to check these things if you've already gotten in bed.

Michael and Renee had the joint concern of their son Skyler's comings and goings from the house on the weekends. Occasionally, they allow him to stay out late enough that they are already asleep by the time he returns. One instance of this resulted in an interesting interaction. Skyler was coming home late, and Renee wanted to know when he got home. Michael doesn't like being disturbed in his sleep, and he knew that when Skyler got home, the combination of the alarm going off and Skyler coming in to tell Renee he's home would wake him, so he decided to stay awake until his son returned. Both parents suggested some method by which they might be able to check their son's time of arrival as soon as they woke up (and without having to wake Skyler up and just take his word for it).

Steven and Jason don't come and go at late house of the night; however, each have a television and computer in his room. On school nights, Mike and Miriam have established a 10pm lights-out rule, such that both kids must be in bed with their computers, televisions, and lights off at that time. However, Steven has become rebellious and wants to watch TV when he is supposed to be asleep. To combat this, Mike or Miriam discreetly check-up on him to make sure he hasn't turned on anything. This has put a bit of stress on the couple because it's an inconvenience on them and they have to stay up a little later, and Steven doesn't like his parents lurking outside

his bedroom door at night. Both parents were supportive of a way to record if and when TVs and lights are turned on, that way they can deal with Steven in the morning, rather than a constant nuisance through the night.

Analysis of Existing and New Tasks

Easy Task – Checking if the house is ready for you to leave

Jeffrey is 26 and living alone, and he's ready to go to his first day at his new job. As he's about to begin his walk to the bus stop, he realizes that he doesn't quite remember whether or not he turned the stove off after scrambling his eggs for breakfast. He also needs to make sure that he locked the back door after letting his dog in earlier. He's reasonably confident that he closed his bedroom window the night before, but he wants to be sure. Jeffrey doesn't want to be late for the bus, but he needs to secure his house before heading out.

This task represents the mental checklist that many people go through as they leave their house (or later in the day, if they're forgetful or paranoid). Usually, this requires pacing back through the house and visually or manually checking each detail before leaving. Ideally, with our application, Jeffrey could be reassured—or warned, if he actually did forget something—at the touch of a button on his way out the door.

This task would be performed every time everyone leaves the house. Depending on the family, this could be a few times a day or a few times a week. We believe this will most likely be the most used feature of the system, and could be performed with only a couple taps. Ironically, this task is much more complicated for the system than the moderate task because this one must check so many things in the house and the list of things it checks could be customizable.

Moderate Task – Checking if garage door is open

Homeowners Fred and Melissa returned home from Walmart at midnight when it started to rain. They parked in the detached garage and hustled to get all the bags into the house because it started to pour heavily. After bringing all their low-cost groceries and goods in the house, Melissa realized she didn't close the garage door and Fred can't remember if he closed it either. It's pitch black and wet outside and neither wants to go outside to check because the door isn't visible from any house window.

This task is a specific case of when someone cannot remember if he left a particular light on, or left an appliance running by mistake. This requires going back to the room and visually or manually checking the item in question. With our application, Fred can check the status of the garage door without leaving the house.

This task is used because it demonstrates how to check the status of any one item being monitored, which could be the stove or a particular window. The easy task can be thought of as an automated way of checking many things in the house, where each check is a different moderate task.

Difficult Task – Checking overnight logged events

Catherine is a single mother of two teenage boys, and her eldest son Jerry is going to a party at a friend's house this Friday evening. Jerry has always been well behaved, and his grades have been stellar recently, so she decides to allow him to stay out as late as 2AM. However, her younger son has an early morning soccer game Saturday morning. Catherine needs to figure out how to make sure that Jerry gets back safely and on time, while preferably getting enough sleep to drive to the soccer game.
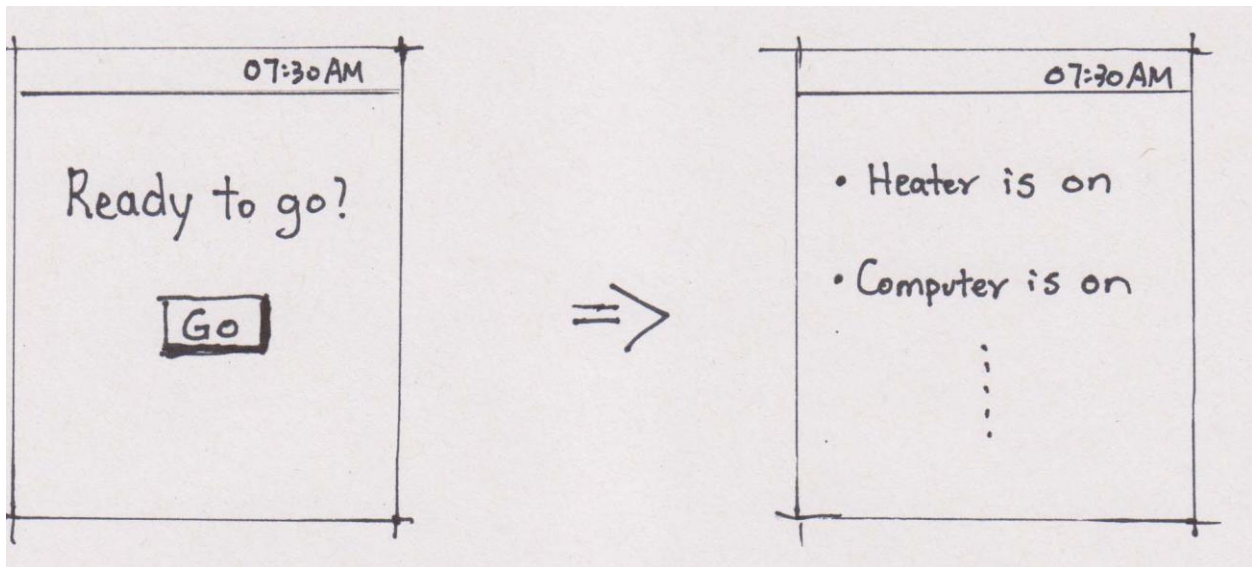
With existing systems, Catherine might handle this in a few ways. The most straightforward would be to stay awake until Jerry gets home, and then heading to bed; the main problem here is that her sleep suffers. She might also just have Jerry wake her when he gets home, but again this is an undue disruption of her sleep. Relaxing her curfew condition would mean that she would only have to check in the morning that he's home, but this might be difficult without knocking on his door and waking him.

With our system, Catherine could sleep soundly knowing that determining her son's arrival time will be a simple matter of scrolling through the night's event log in the morning.
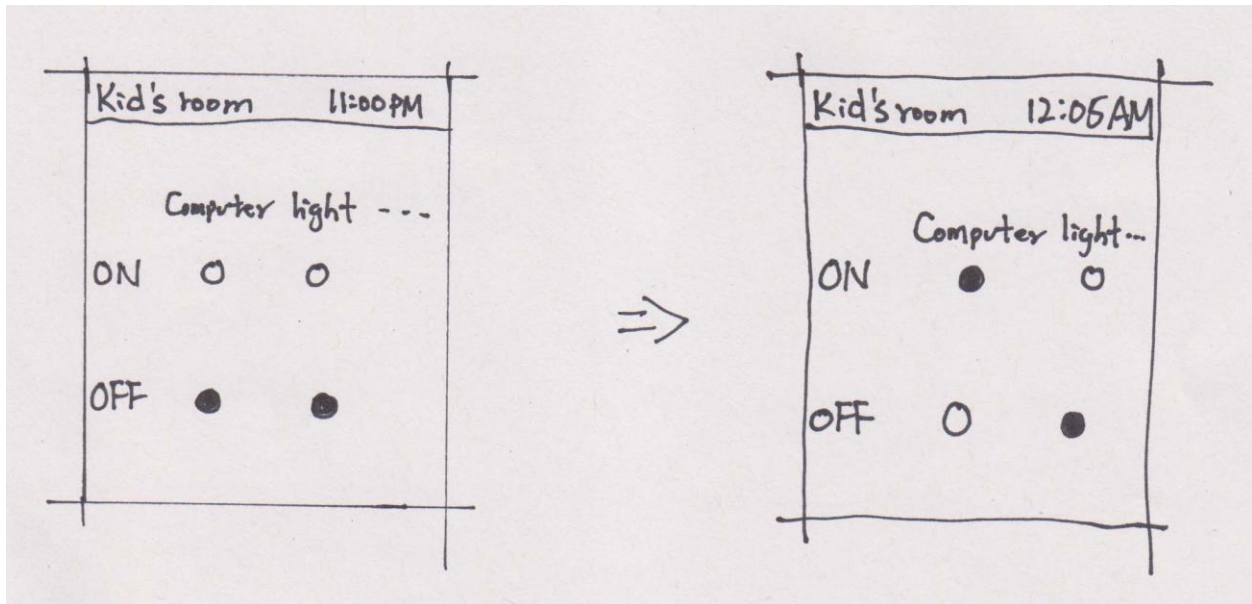
The most difficult task is requesting an event log for a particular monitored item. This task can be generalized to any item, not just the door. If you wanted, you could look over the stove's event log and see if the kids used it after school, or you could use it to see if someone snuck in or out of a window overnight.
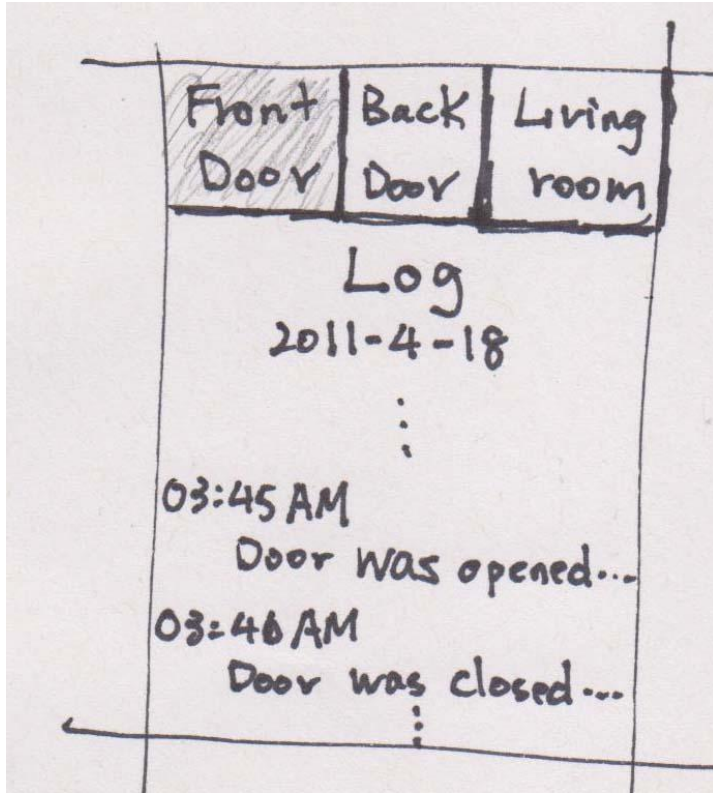
Sketches

Leave home secure-button

07:30 AM

Ready to go?

Go

=>

07:30 AM

• Heater is on

• Computer is on

⋮

Checking if kid is actually asleep

Kid's room   11:00PM

Computer light ---

ON   ○   ○

OFF   ●   ●

=>

Kid's room   12:05AM

Computer light ⋯

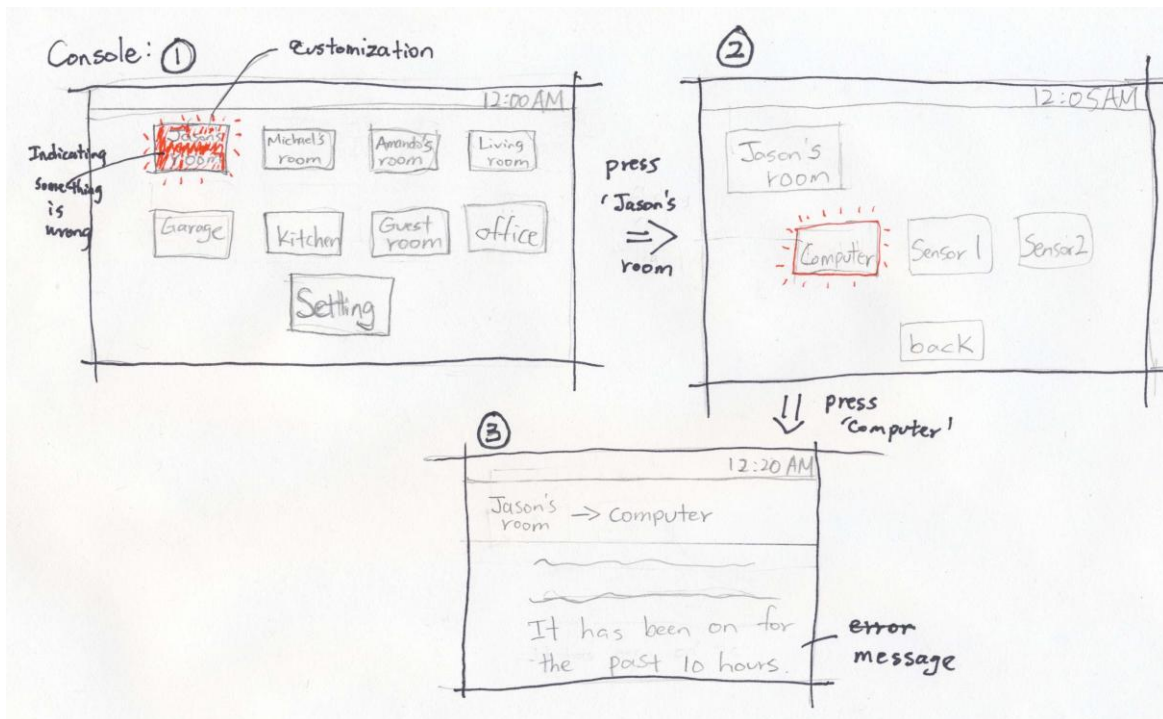ON   ●   ○

OFF   ○   ●

Looking at doors' event logs

Room-centered design

Tabs for each floor of house

11:23 AM

First floor

Second floor

Basement

front door

Kitchen

back door

'tabs are customizable

First floor

Second floor

Basement

GO
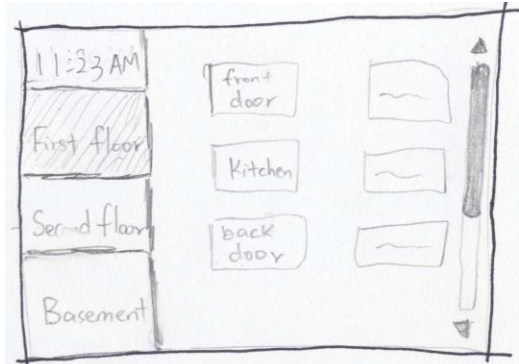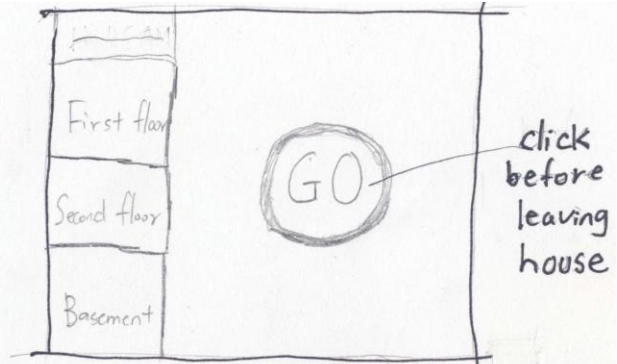
click before leaving house

press 'GO' and press 'First floor'
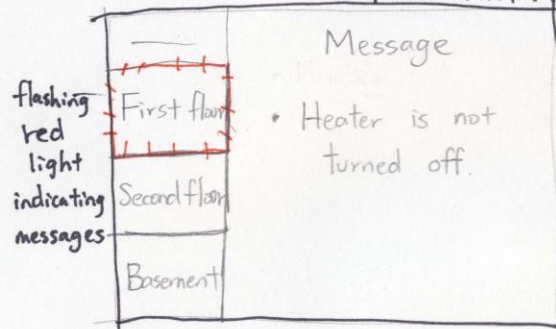
flashing red light indicating messages

First floor

Second floor

Basement

Message

• Heater is not turned off.

Text summary of statuses

07:30 AM

Ready to go?

Go

Press
GO
=>

07:30 AM

• Heater is on

• Computer is on

:

Kid's room   11:00 PM

Computer light - - -

ON   ○   ○

OFF   ●   ●

hour
later
=>

Kid's room   12:05 AM

Computer light ...

ON   ●   ○

OFF   ○   ●

Front Door	Back Door	Living room

Log
2011-4-18
:

03:45 AM
    Door was opened...
03:46 AM
    Door was closed...
: