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Task Analysis



Problem and Solution Overview

The City of Seattle currently uses centralized, receipt-printing, parking pay-stations for 9,000 parking spots around the city. This has resulted in increased paper usage and frustrations due to personal time constraints and vandalism. Our solution, ezMeter, allows drivers to pay for parking by registering their license plate number with a specific duration of time that they would like to park for. After parking their car at any available spot, they can signal ezMeter to begin deducting the parking time that they have registered for using their smart phone or a nearby pay-station. Verifying whether a driver has paid for parking involves a simple look-up to check if the license plate number is associated with a parking time and has the means to pay for the time. This eliminates the need for paper receipts and brings the convenience and ease of prepayment to street parking.



Task Analysis Questions

Who is going to use the system?

People who park occasionally or park often will use the system. Parking enforcement officers will also use the system to validate parking. Those who are usually in a hurry will find our system to be useful. People who choose to prepay for parking will need to have a mobile phone.

What task do they now perform?

We observed, from our contextual inquiry that those who use street parking need to buy a parking receipt from the parking meters. They park their vehicle, walk to the parking meter, pay using an accepted method of payment, and wait for the receipt to print before returning to their vehicle. Once they return they remove and dispose of any old receipts before affixing the new receipt onto their window.

What tasks are desired?

The desired process of street parking would be to park their vehicle, start the parking time, and leave -- all of which would be done as quickly and easily as possible. During that process, there would be no need to print any receipts, which reduces waste and saves money. Those who park should also be able to easily view information about parking rates and restrictions.

How are the tasks learned?

Visual diagrams in multiple languages help people learn how to use the system. Additionally, the current machines have large buttons and an intuitive interface. Every parking area has signs indicating that paying for parking is to be done at one of the multiple pay-stations situated around the parking area. The pay-stations each have simple and clear instructions and indicate other information, such as cost and maximum parking time.

Where are the tasks performed?

The tasks are performed on any street in Seattle that requires payment for street parking. The general hours of paid street parking are from 8AM to 6PM.

What is the relationship between customer and data?

The customer has to abide by parking regulations and agree to pay for the time that they have chosen to park for. Therefore, there is a distinct relationship between the amount that the customer pays for parking and the time that they park for. Information about the customer is encrypted and stored privately on a secure database. The customer also needs to know of information pertaining to how much the parking is and whether or not there are any parking restrictions.

What other tools does the customer have?

Customers currently have access to a phone number that can be called in the case of a malfunction with the parking meter. Other than that, there are not many other tools to help customers pay for parking. To pay for parking, customers only have one option and that is to use the pay-stations. The receipt that they receive is the only tool they have for indicating that they have paid for parking and what time their parking expires. However, if they have a disabled parking permit, they can park their vehicle in practically any street spot.

How do customers communicate with each other?

In the event that customers do communicate with each other, it is usually to: ask for help, warn others of a broken parking meter, or calling customer support to report a malfunctioning meter. Sometimes customers will also interact with a parking enforcement officer to dispute a parking violation or ask questions that they have regarding street parking.

How often are the tasks performed?

The frequency of which a customer pays for parking varies widely. Some people park once a year, while others park 2 to 3 times a day. There are also customers who spontaneously park without a regular schedule.

What are the time constraints on the tasks?

Time constraints usually come from the customers directly and not from the tasks. Many people we observed were impatient and in a hurry to get to their destination. As a result, they usually did not have time to wait for the machines to print parking receipts.

What happens when things go wrong?

There is little to nothing that can be done when something goes wrong. Meters that are broken simply become unresponsive and usually have no indication that they are indeed broken. The customer can report the machine as malfunctioning. Although this will not fix the problem immediately, customers can pay for parking at another nearby working meter. Another trivial solution customers will try is to press all of the buttons on the machine in hopes that the machine will function properly again. If the customer's card is stuck in the machine or if the coins that they insert do not come out when requested, they will forcefully try to remove their card or surrender their coins completely.



Revised Tasks

We removed tasks two and three from our original contextual inquiry since it was very similar to task one. Instead, we decided to replace task two with the task of looking up parking information. We also decided to focus task three on the parking enforcement officers who will verify whether parking has been paid.

Paying for Parking (easy)

Ashley is a 21-year-old student at the University of Washington. Since she drives, she needs to pay for parking every day in the University district because of a class that runs for 110 minutes. She is usually always running late so she needs to be able to pay for parking within two minutes so she can get to class on time in order to secure a good seat. Since the maximum time allowed for parking is only two hours, she may need to renew her parking if she stops to talk to someone after class. Generally speaking, people are in a hurry and would like to park and pay as fast as they can. Getting back to their vehicle before their paid time expires is a priority for drivers that do not want to be written up by parking enforcement officers. Although sometimes, a driver may need to add more time to their parking for unexpected reasons.

Checking Parking Information (medium)

Mark is new to the Seattle area. He is looking for a fun event to attend. Mark wants to avoid a lot of walking so he wishes to park near the event. To do so, he will need to figure out where he is allowed to park for a long period of time and whether the event will affect the parking in the area.

This particular task highlights the changing parking policies that most people become confused by when there is a special event or particular parking restrictions that affect an area on certain days. Signs may be helpful to a certain extent but, when a driver is in a rush, finding the right indication that it is okay to park in a particular spot may be frustrating and time costly.

Validating Parking (hard)

Jim is a Parking Enforcement Officer (PEO) for the City of Seattle. He is running his rounds near the U-district and needs to make sure that all vehicles parked along the busy street University Ave are properly parked and payed for. He looks for some proof of payment on each vehicle and motorcycle that is parked

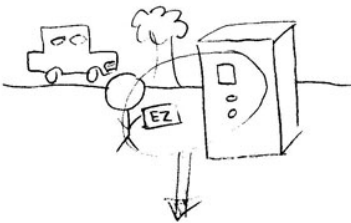
on the street. If there is a violation where a driver has not paid for parking, he will issue a parking ticket.

Storyboards

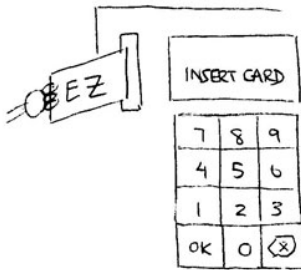
Proposal 1: ezMeter Card System

PAYING FOR PARKING

Via paystation:

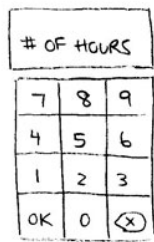


1.



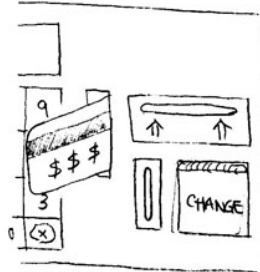
Insert the EZ card into the paystation to refill

2.



Enter the number of hours to park for and press ok

3.



Insert credit card or bills/coin to pay for parking. Then, pull out card and return to car.

4. Suction cup



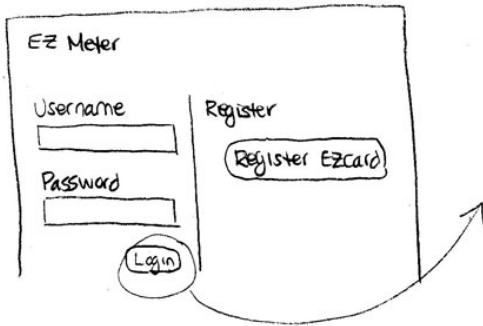
Insert the EZ card into device to activate parking time. Affix onto car window using suction cups.

Figure 1

PAYING FOR PARKING

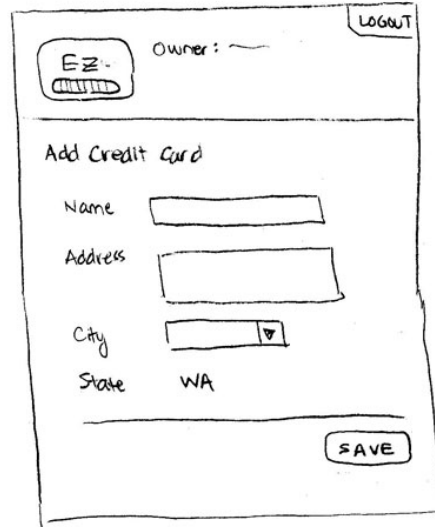
Via web:

1.



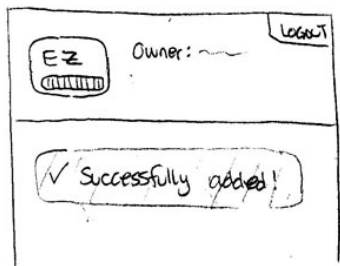
Open the EZMeter website and login using an existing account. Or, if necessary, register for an account.

2.



Associate a credit card with an account by entering credit card information.

3.

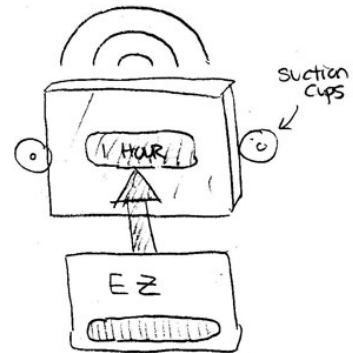


A confirmation message is shown and the EZ card now can be used to pay for parking.

4.



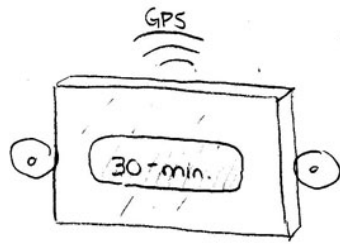
5.



Insert the EZ card into device to activate parking time. Affix onto car window using suction cups

Figure 2

ALERTS/PARKING INFO



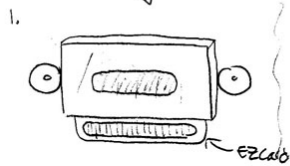
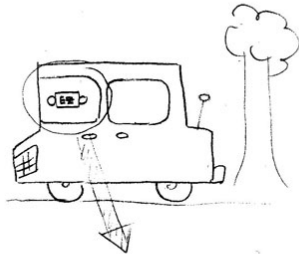
A display on the device will show parking information, which is pulled using GPS



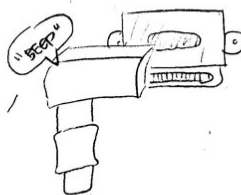
If paying for parking is not needed, the display will show that parking is free and the display will blink when an EZ card is inserted.

Figure 3

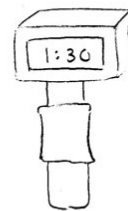
VERIFYING PARKING



1. Locate the car parked and locate the barcode on the EZ card.



2. Scan the barcode using a Scanner



3. A display on the back of the scanner shows the time the car has available to park for.

Figure 4

Proposal 2: License Plate System

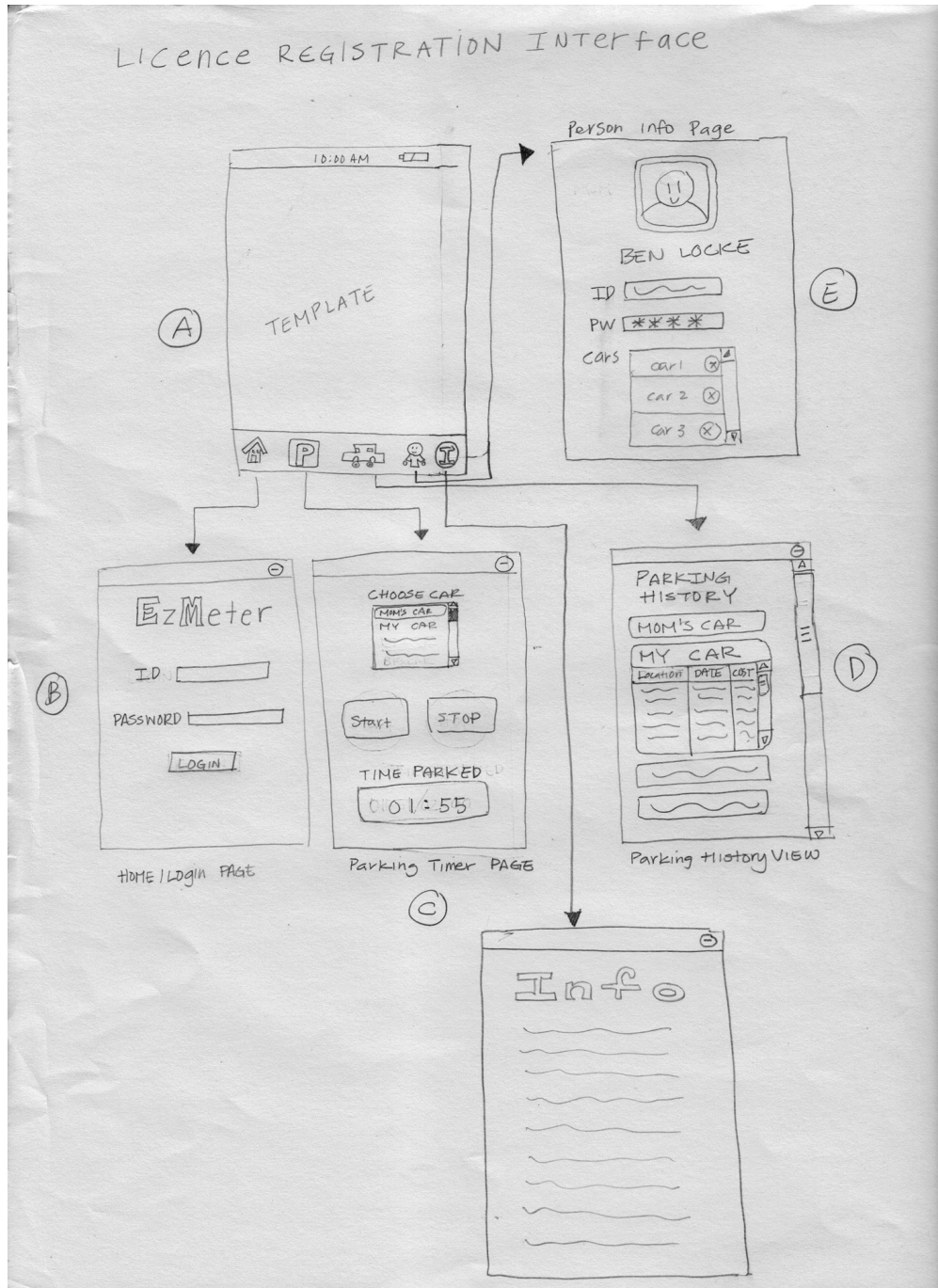


Figure 5

Proposal 3: ezMeter Timer System

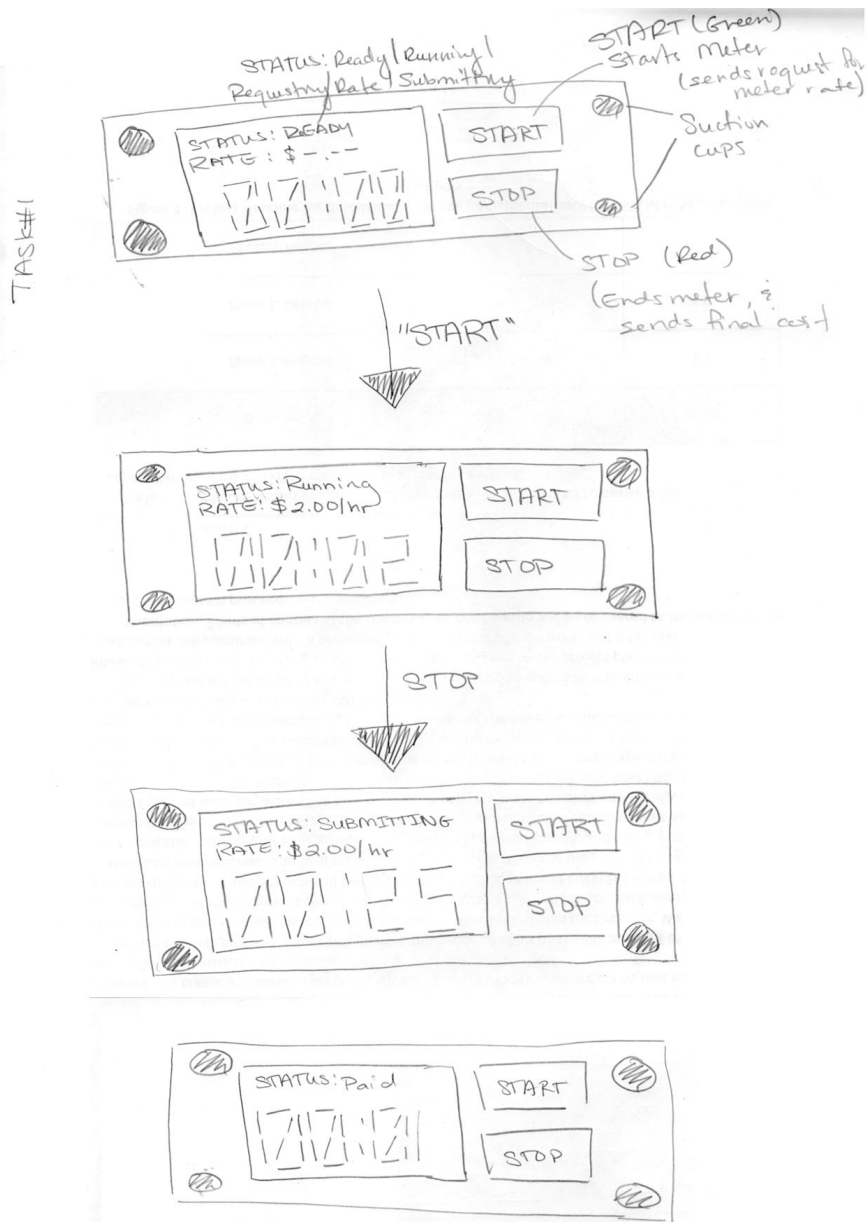


Figure 6

Task # 2

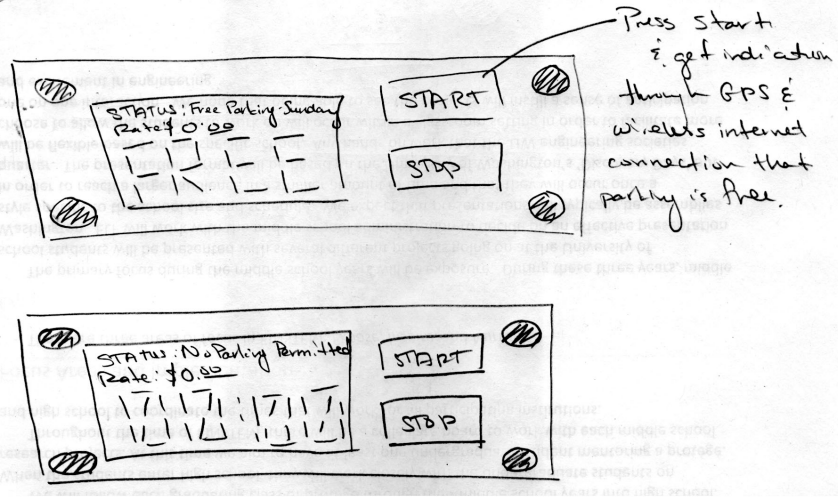


Figure 7

EZMeter Website - Refilling



Figure 8

EZMeter

Have a Device

Current Balance: \$35.28

Last Used: 04/24/11

ReFill:

Select Device | Fred's EZmeter ▼

Form of Payment | VISA ▼

Card #: 0000000000014466 current

Name: | Fredrick Boomhose

CID: | 444

Amount \$ | 100.00

EZMeter

Have a Device

Payment Received!

Current Balance: \$135.28

Figure 9



Selected Interface

Rational

We chose this design based on the feedback we received from our contextual inquiry. The current meter system forces people to run back and forth from the parking meter to the driver's vehicle, which many people thought was a waste of time. Using ezMeter, you will only need to log into your ezMeter account after you park your vehicle, select the vehicle you are driving, and push the START button and you are all set. Also, since this design only has three easy steps, we believe that it is comparable to the simplicity of the current system. Another reason why we chose this design is because you do not have to worry about malfunctioning meters. Lots of customers complained that meters were often unreliable and that carrying around coins was bothersome. With this design, customers can pay for parking without using coins, as long as they have a registered credit card on their ezMeter account. This design also enables people to easily check how long their vehicle has been parked, which means that they do not have to worry about being ticketed.

Description

Our chosen design consists of three interfaces targeting two sets of users: those who park and parking enforcement officers. The web and phone interface is designed for people who park. The web page (Figure 10) consists of four main sections: **Home** (Figure 10-B), **myEzMeter** (Figure 10-C), **Register** (Figure 10-D), and **Questions** (Figure 10-E).

The **Home** page introduces ezMeter to people when they first enter the site.

The **Register** page allows people to register for an ezMeter account and to be able to use ezMeter to pay for parking on the city's streets. Registration includes entering a username, password, email, credit card number, and vehicle's license plate number. The credit card number is charged whenever the driver parks and the license plate number is needed so parking enforcement officers can check if a vehicle has paid for parking. Once people have registered for an account, they may use the ezMeter with any of their registered vehicles.

The **myEzMeter** section is for people who already have a ezMeter account. This area is further divided into three sections.

1. The first section (Figure 10-C1) allows people to pay for parking online by selecting one of their registered vehicles and clicking the START button. A timer at the bottom of the page displays how long the vehicle has been parked for. A STOP button is provided to stop the timer once a person is done with parking. Subsequently, the person's credit card on their ezMeter account will be charged the cost of parking for that duration of time. If parking is free or if there is a restriction at the location that they are parking in, an alert page will be shown letting the user know about such an event.
2. The second section is the parking history (Figure 10-C2). This page displays the location, time or date, and cost of parking for each vehicle. Each registered vehicle is displayed as a button and, once clicked, a drop-down menu of parking history for that vehicle will be displayed with information.
3. The last section displays account information and allows users to register or delete vehicles from their account.

The **Help** page provides a short video tutorial on how to use ezMeter for those who are not familiar with the system.

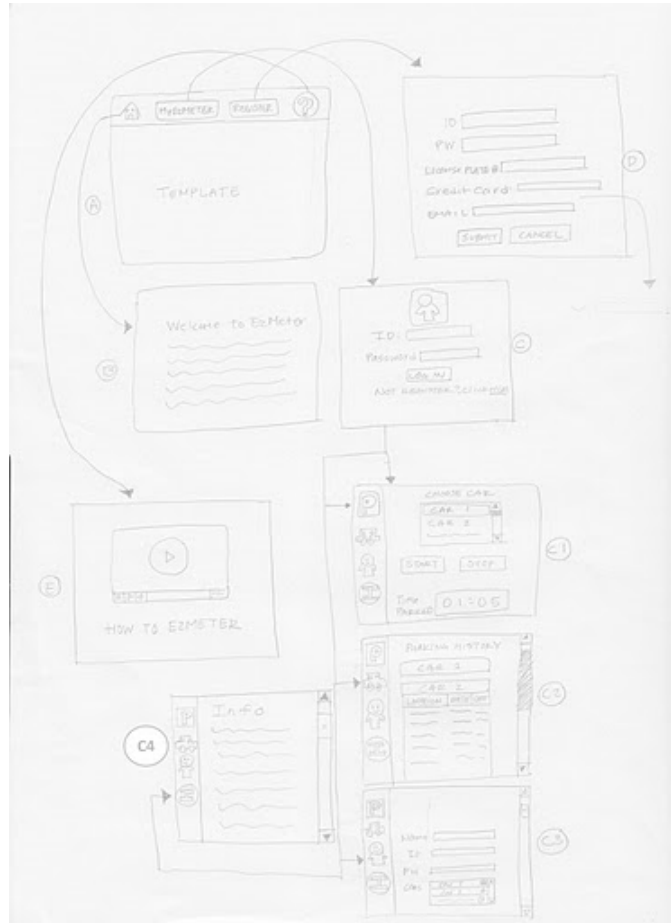


Figure 10

The phone interface is similar to the **myEzMeter** section of the ezMeter's web interface. With the phone interface, people can quickly log into their ezMeter account (Figure 5-B), select their vehicle, and start the parking timer (Figure 5-C). They can also check their parking history and account information. The phone interface is a more concise version of the web interface. It allows users to quickly start and stop their parking time, as well as check how long their vehicle has been parked for. Additionally, the phone interface includes a **Info** page that provides information such as parking restrictions, whether parking is free, or how much it will cost to park per hour.

The last interface is the interface for the Parking Enforcement Officer (Figure 11). This is also a phone interface. There are four menu options: the **Login** page (Figure 11-B), **Parking Verification** (Figure 11-C), **Ticket Tracking** (Figure 11-D), and **Help** (Figure 11-E).

The **Login** page is needed such that only verified enforcement officers can issue parking tickets.

The **Parking Verification** page allows officers to take a picture of a vehicle's license plate, which will convert the number into text, or enter the license plate number manually. Once the license plate number has been processed and checked by the ezMeter database, either an **OK** page or **Ticket** page will be shown. The **OK** page tells officers that the vehicle has been paid for and is under the time limit, while a **Ticket** page signals the officer that they need to issue a ticket.

There is also a **Ticket Tracking** Page, which list the history of tickets issued and information such as where the ticket was issued and at what time.

The **Help** page explains how to use the phone interface and answer any common questions that the officers may have.

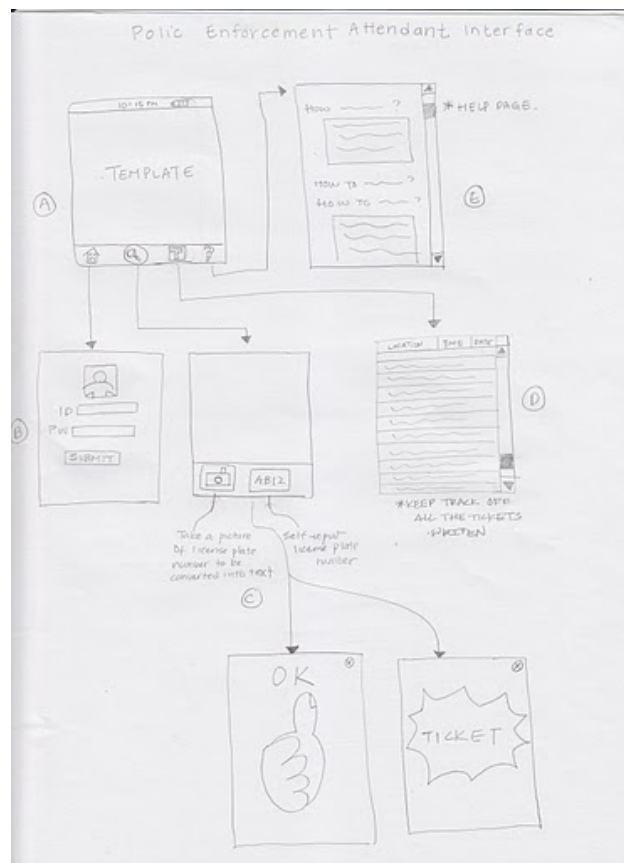


Figure 11



Scenarios

Regular, Scheduled Parking by UW Student

Ashley is a 21-year-old psychology student at the University of Washington. As a commuter, she travels from Shoreline to the U-District on a daily basis. Her schedule requires that she be on campus for a few hours at a time, while the rest of her time is spent at work in Bellevue or at her practicum site in South Seattle. When she is in the U-District for class, she finds street parking near her classroom. To expedite the process of paying for parking and getting to her classes, Ashley has joined the city's ezMeter system to pay for street parking. When Ashley signed up for her ezMeter account, she provided her license plate number and credit card information, which will be used to charge for any parking time she decides to acquire.

Today Ashley is running late and finds parking within a five-minute walking distance of her class. She jumps out of her car and, as she is running, pulls out her iPhone and starts her ezMeter parking application. Using the ezMeter application, she quickly hits the start button next to her license plate number to start the meter.

Ashley's class lecture is 110 minutes. She can typically return to her car without violating the two-hour maximum at the spot she is parked at. However, today she needs to speak with her professor. Right before the end of lecture, Ashley brings up the ezMeter application and restarts her meter. Her first two hours have been charged to her credit card and her second time interval has begun. Thirty minutes later, Ashley returns to her car and again opens up the ezMeter parking application on her phone to stop the meter. The meter notifies her of how much her total parking cost is.

Obtaining Parking Information

It's Sunday afternoon and Mark is heading to a festival at Seattle Center. He is new to Seattle and has been checking out various events across the city that he is interested in. He wants to visit an event at the Space Needle so he decides to drive to Seattle Center. Upon arrival, he searches for street parking since he only plans to stay for around an hour or two. He is unfamiliar with the city's parking policy but he knew that, when he moved to Seattle, ezMeter would allow him to conveniently pay for street parking.

Mark finally parks his car and, as he exits his car, he opens up the ezMeter parking application on his

iPhone. ezMeter obtains the GPS location of Mark and his car and informs him that he does not need to pay for parking today. Mark has struck gold, as Seattle offers free parking on Sunday. However, he is also informed by ezMeter that he will need to move his car in 3 hours because the street will be closed for an event later that night related to the festival he is headed to.

Mark goes and enjoys the event and, thanks to ezMeter, returns to his car in time and avoids having his car towed for being in a now no-parking zone.

Parking validation by Seattle Parking Enforcement Officer

Jim is a Parking Enforcement Officer for the City of Seattle. He carries a smartphone provided to him by the city to use for parking enforcement. Jim has gotten into many altercations with drivers in Seattle because of issues with past parking systems, which resulted in the city losing money because of ambiguities with verifying whether the parking was valid or not.

Jim is making his usual rounds in the U-District, a place notorious for parking violations. He starts at 45th Ave NE and makes his way down University Way. He has the ezMeter parking enforcement application pulled up on his phone and takes a photo of the license plate of each vehicle he is checking. The application automatically gives him an “OK” message if the vehicle is not in violation. If the vehicle is in violation, the application automatically goes to a screen where he can issue a ticket.

The third vehicle on the street is in violation and, when the ticket screen comes up, Jim issues a ticket, which is wirelessly sent to a device attached to his belt that prints tickets.

The fifth vehicle has a license plate that is not registered with ezMeter. He realizes that it is a rental car and checks the car window to see if it has one of the temporary parking receipts that are still available but not as widely used. Unfortunately, there is not and so Jim needs to issue a ticket. Using the ezMeter application, Jim manually tickets the car like he did a year ago before ezMeter was implemented.