CAPSULE CORP

Future of All Pill Dispensers

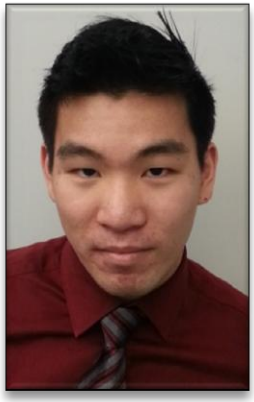
April 22, 2013

Overview

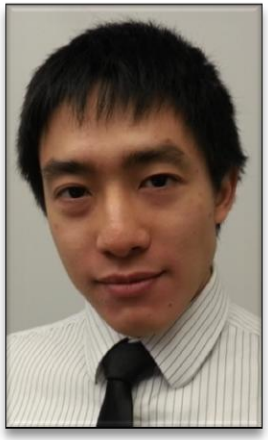
1. Introduction
    1. Team
    2. Motivation and Background
2. System Overview
3. Prototype Specification
4. Timeline
5. Business Aspect
6. Conclusion
7. Questions

Introduction – Team

- Izaak Lee
  - CEO, Hardware Engineer

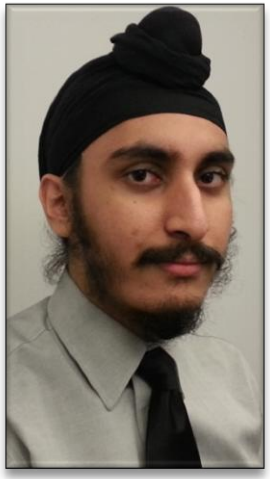


- Clark Hsieh
  - CFO, Hardware Engineer

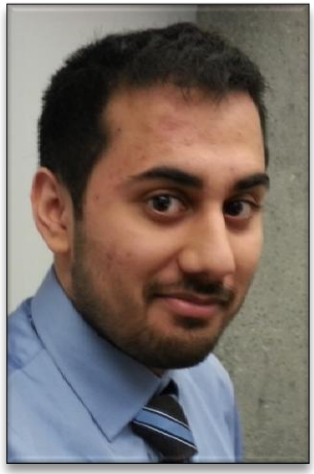


Introduction – Team

- Gurinder Dhaliwal
  - CTO, Software Developer



- Charanpreet Parmar
  - CDO, Firmware Developer



Motivation and Background

- Wanted to make something that helps people
- PillPal:
  - Complex Medication Schedules
  - Stressful Dealing with taking correct medication at the correct time

Motivation and Background

- Adults – Busy Lives
  - Work 9am – 5pm
  - Traveling
- Children – Carefree
  - Watching TV
  - Homework
  - Sports
  - Games

Motivation and Background

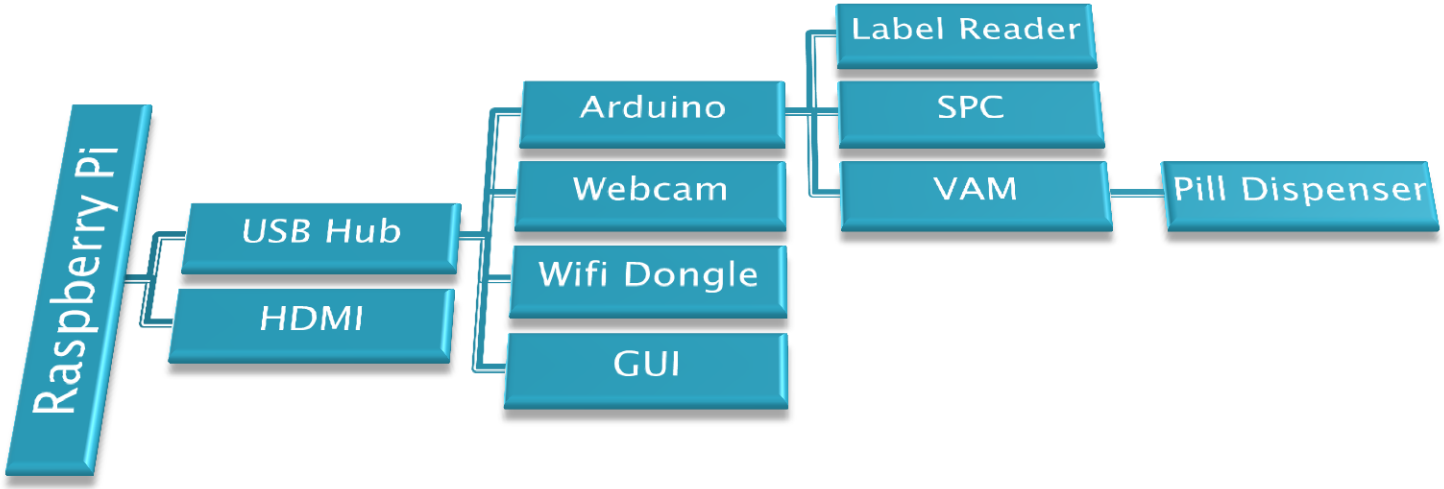
- “Although these medications are effective in combating disease, their full benefits are often not realized because approximately 50% of patients do not take their medications as prescribed”

  – Brown and Bussell, 2011

System Overview

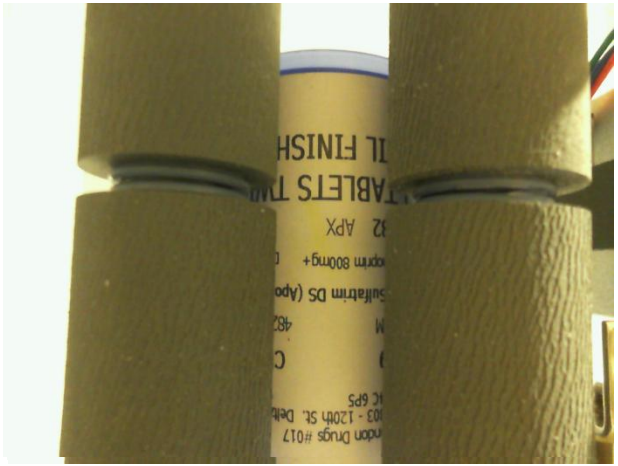
- 4 Modules
  - Label Reader
  - Smart Pill Dispenser (SPC)
  - Vacuum Arm Manipulator (VAM)
  - Graphical User Interface (GUI)

System Overview

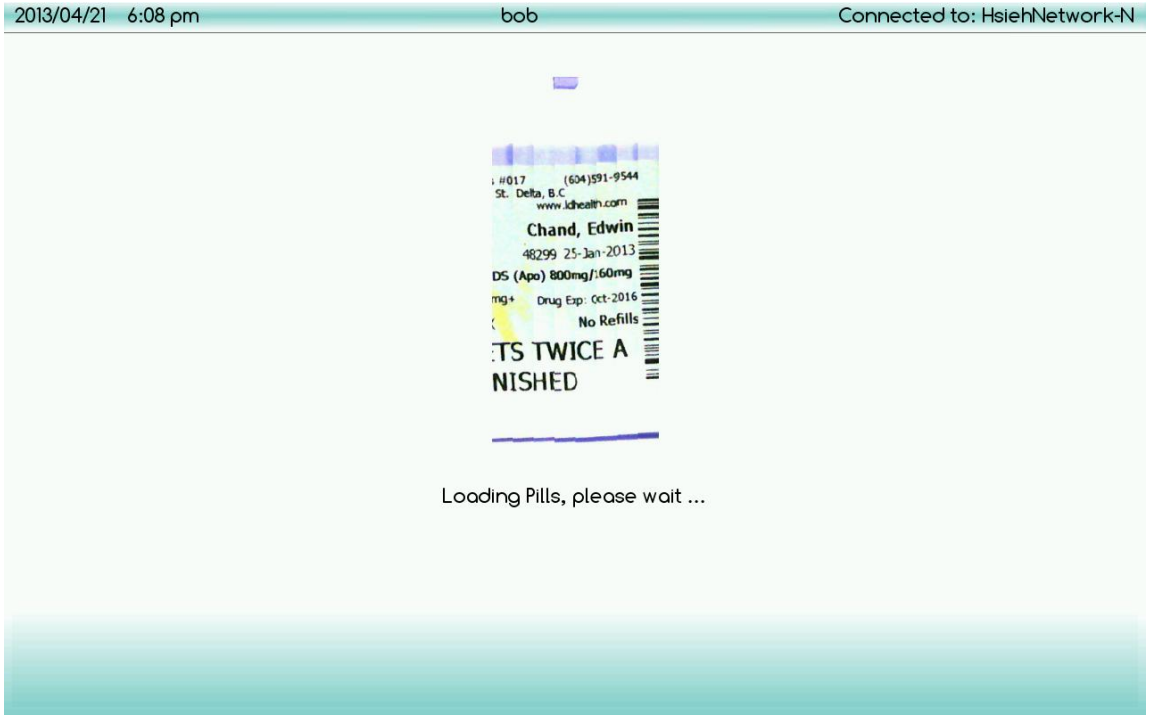


Design – Label Reader

- Label Reader
  - Rotates Pill Bottle and Take picture



Design – Label Reader



LONDON DRUGS

London Drugs #017 (604)591-9544
7303 - 120th St. Delta, B.C
V4C 6P5 www.ldhealth.com

Keep Out Of The Reach Of Children

Rx: 75907649 Chand, Edwin

Dr. Teskey, Luke M 48299 25-Jan-2013

40 TAB Sulfatrim DS (Apo) 800mg/160mg

Sulfamethox/Trimethoprim 800mg+ Drug Exp: Oct-2016

DIN: 00445282 APX No Refills

TAKE 2 TABLETS TWICE A DAY UNTIL FINISHED

F-1

⇒ Avoid prolonged or excessive exposure to direct and/or artificial sunlight while taking this medicine

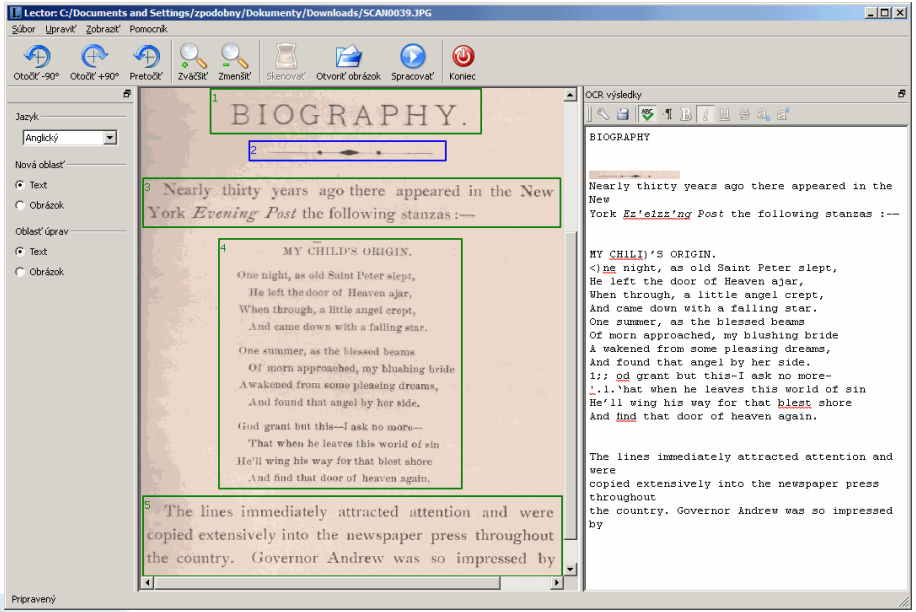
Medicine should be taken with plenty of water.

⇒ Do not use this medication if you are pregnant, plan to become pregant, or are breastfeeding.

⇒ IMPORTANT: Finish all medicine unless otherwise directed.

Design – Label Reader

- Optical Character recognition (OCR)
  - Create schedule based on characters recognized.



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g Rx: 75907649 VChand, Edwin
§|Dr- Teskev. Luke H 48299 25~Jan-2013
E40 TAB S4|fatrim DS (Apo) 800mgl160mg
fisurfmthox/Irmemprrn 800m9+ Drug Exp: Oct-2016
;_n)1N: 00445232 APX No Refills

ETAKE 2 TABLETS TWICE A
§1DAY UNTIL FINISHED

Kee

LDOND0fl Lgadon  ~o17 (504)591-9544
R 7.3- 1 St. De|ta,B.C
UGS V‘ 595 www.lch◦arth.corn
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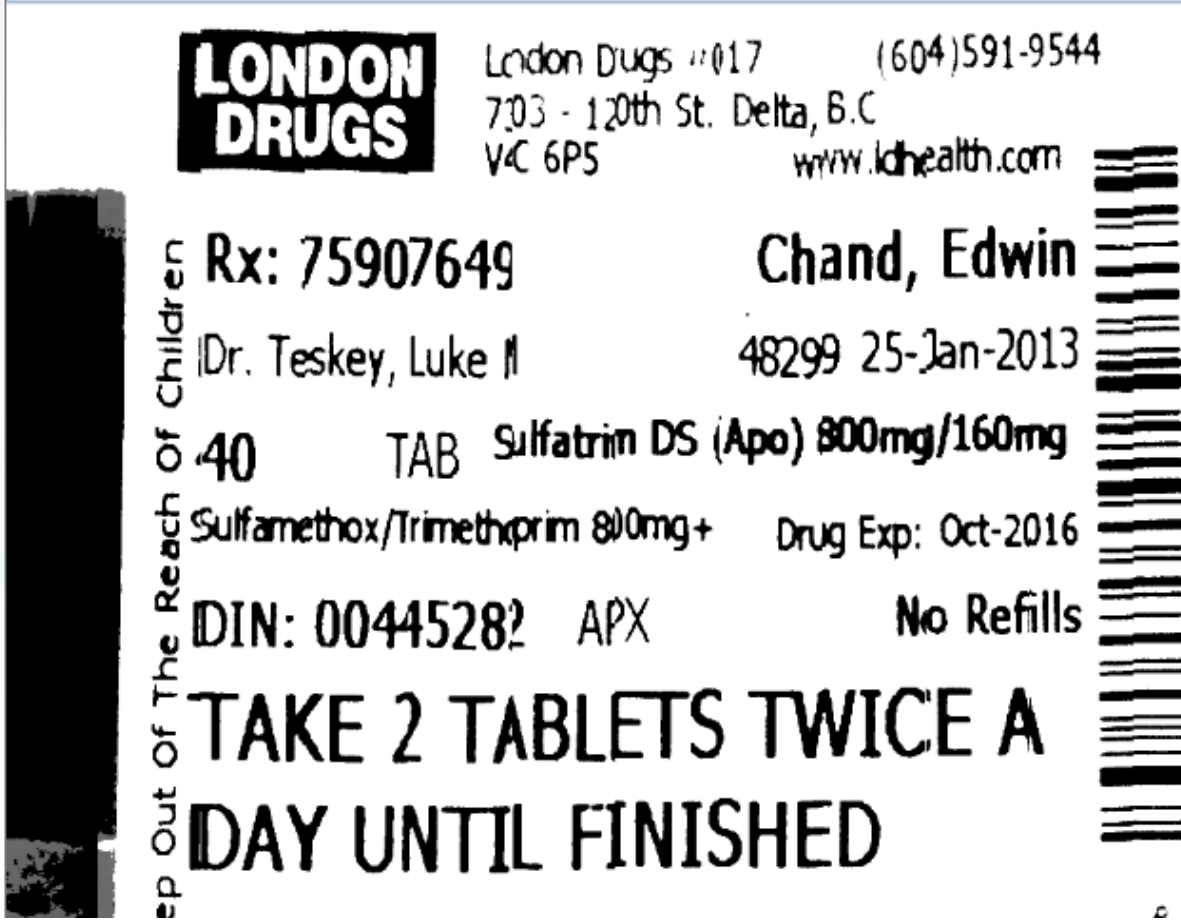

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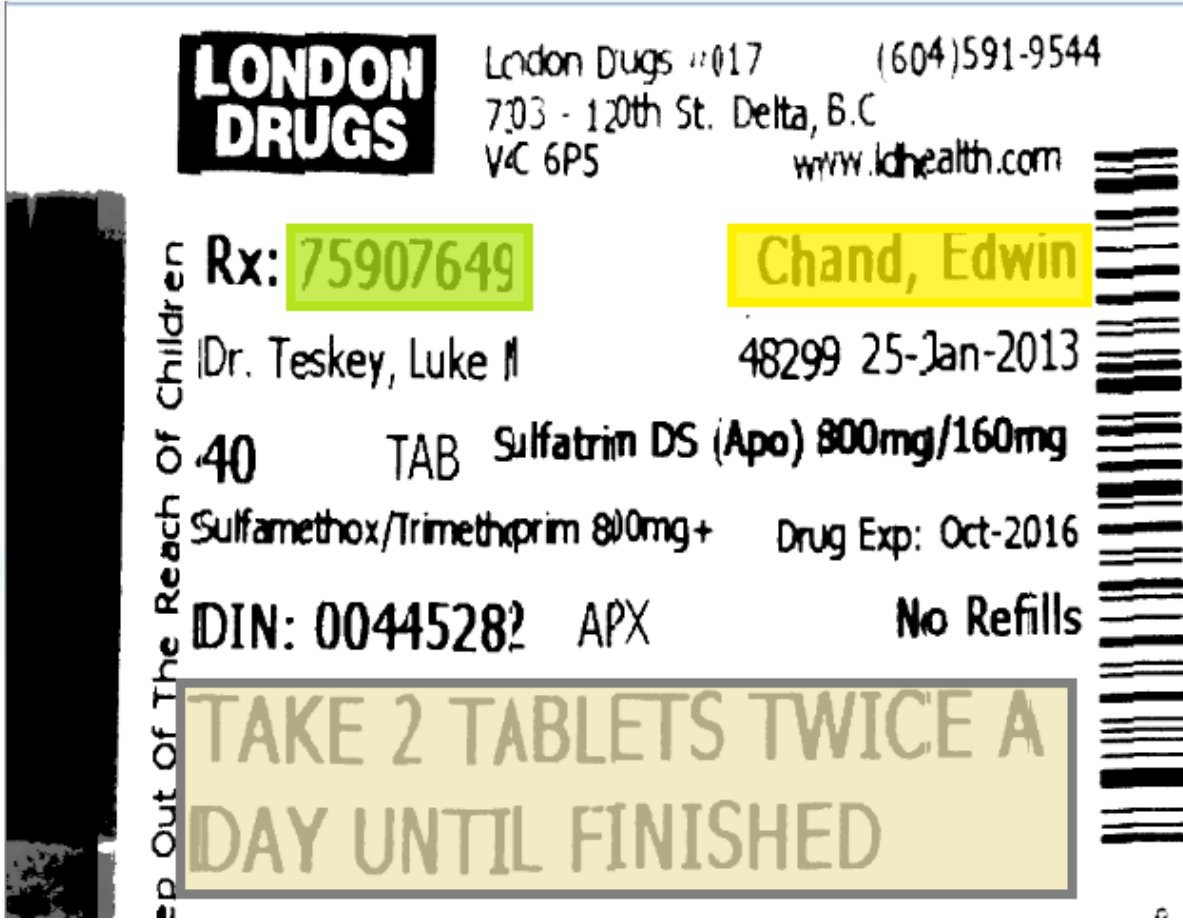
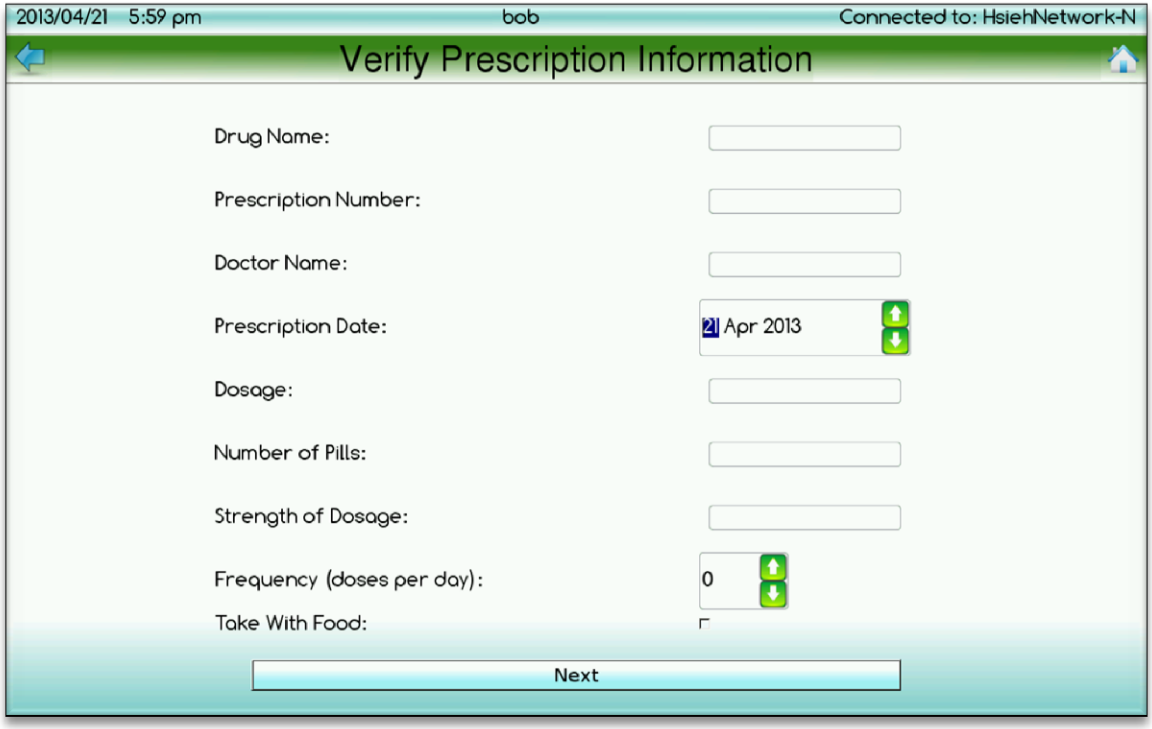
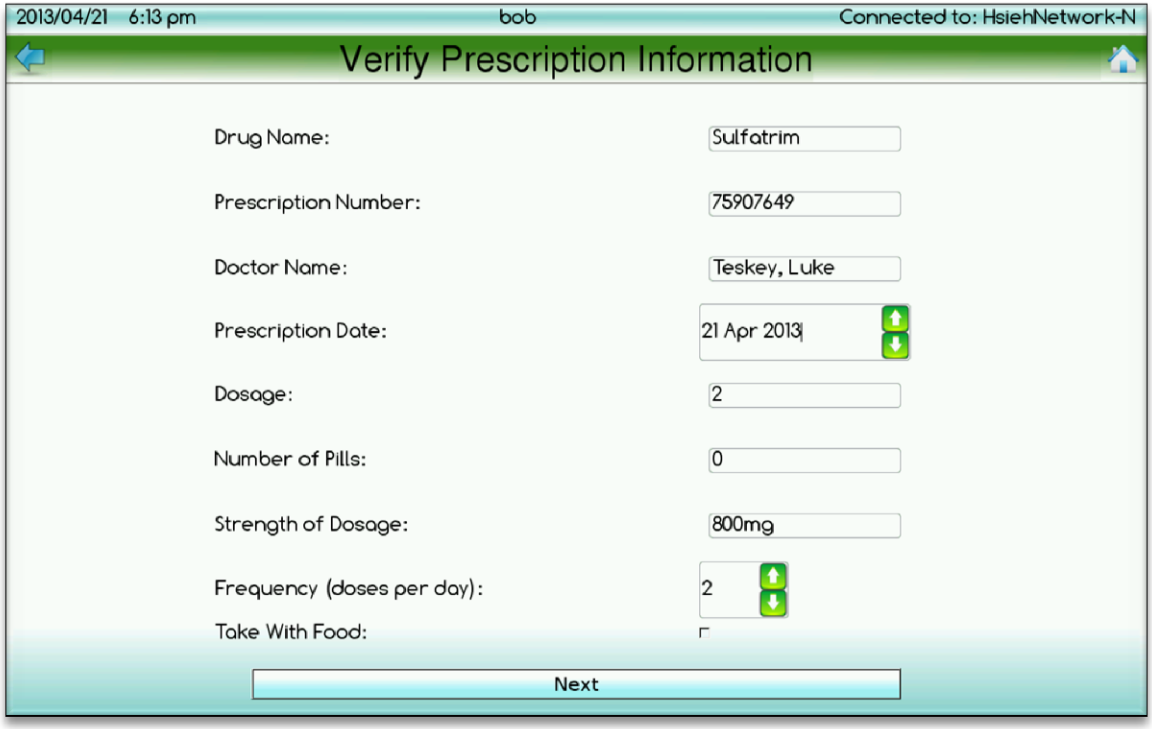


Design – Label Reader



Design – Label Reader



Design – SPC

- Smart Pill Dispenser
  - Custom designed pill holder
  - Holds pills and rotates containers to the correct position
  - Provides pill access to the label reader and VAM (Vacuum Arm Manipulator)

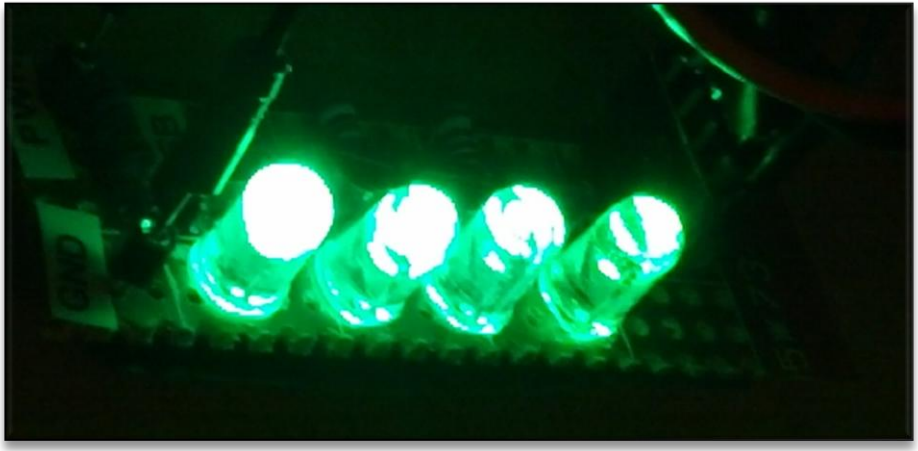
Design – SPC

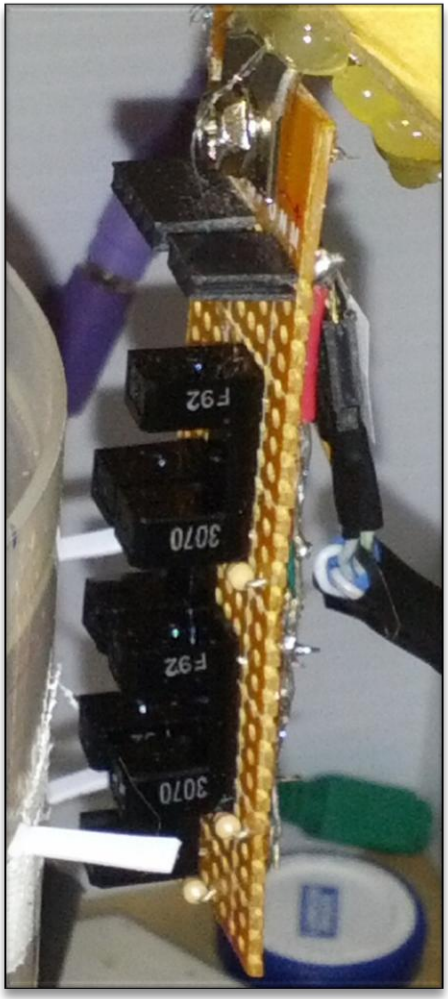
- Parts List
  - 6mm RPVC pipe
  - CD case closure
  - Plastic colander
  - 3/16” steel rod
  - 3/16” RC car bearings
  - Servo motor
  - Plastic gears
  - Microphotosensor
  - Ethernet cable
  - Plastic Tabs

Design – SPC

- Binary Detector
  - Photomicrosensor – Internal optical interruption detector
    - Reads “Dogs” to determine location of pill containers
- Debugging Circuit

Design – SPC



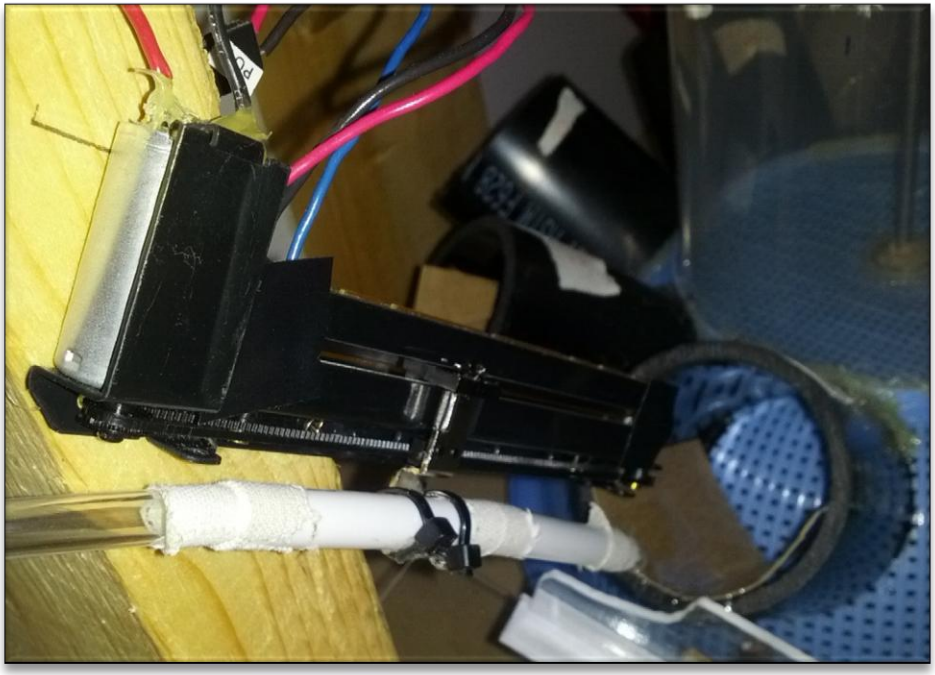


Design – VAM

- Vacuum Arm Manipulator
  - Picks single pills up from specified container by using vacuum power
  - Photo diode feedback
  - Two way dispenser

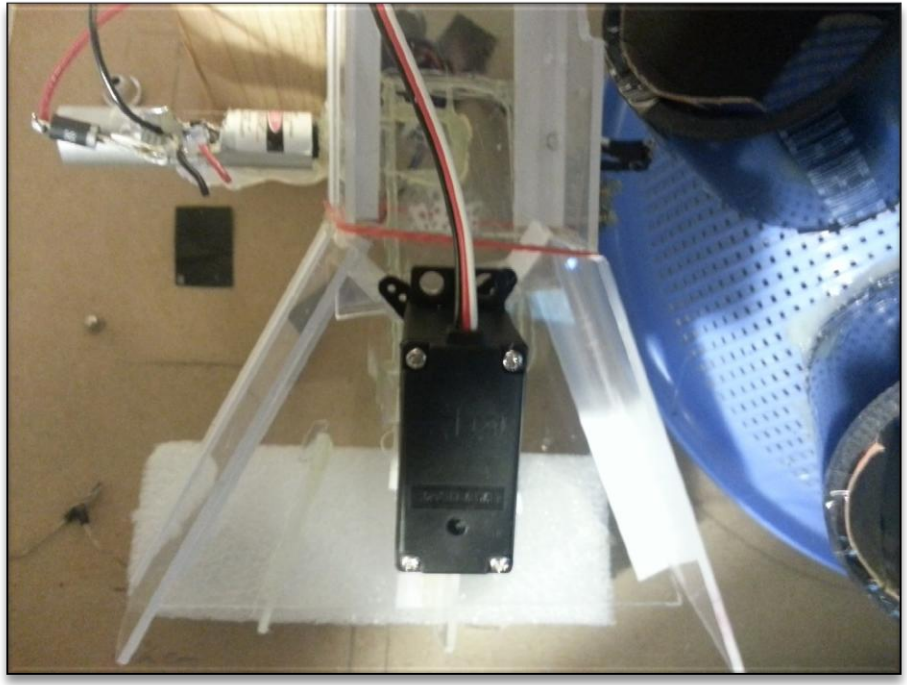
Design – VAM

- Parts List
  - 2mm Plastic Tube
  - BIC Pen enclosure
  - Linear Motor completed with feedback
  - H-Bridge DIP Chip



Design – VAM

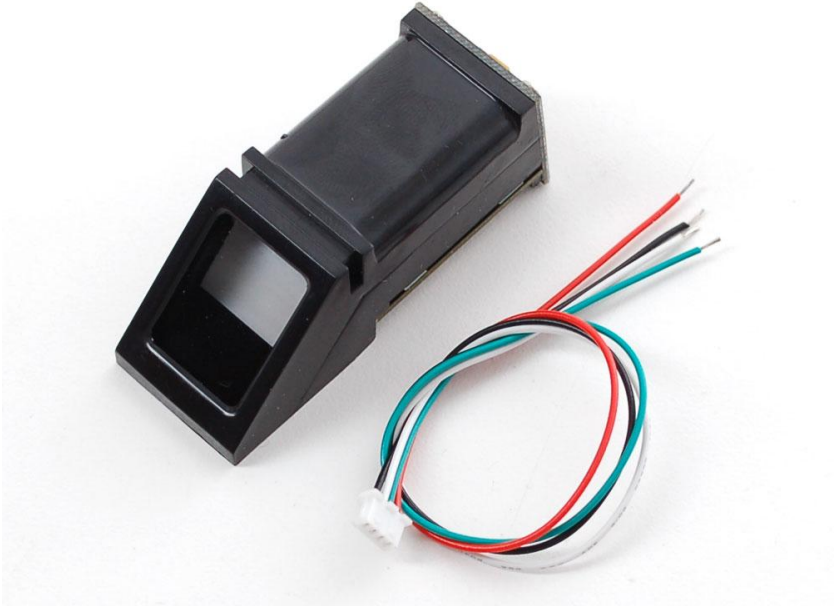
- Parts List
  - Plexi glass
  - Servo Motor
  - Photo Diode
  - Generic Laser pointer
  - Styrofoam



Design – VAM

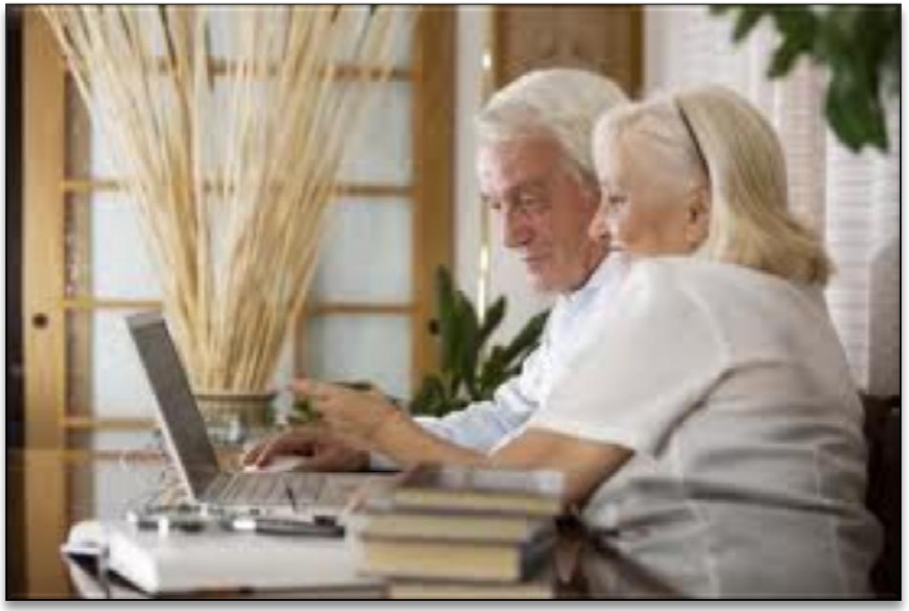
- Pill Dispenser
  - Dispenses pills when finger reader acknowledges the patient
- Pill Cup
  - Indicates to patients that pill cup is not present

Design – VAM

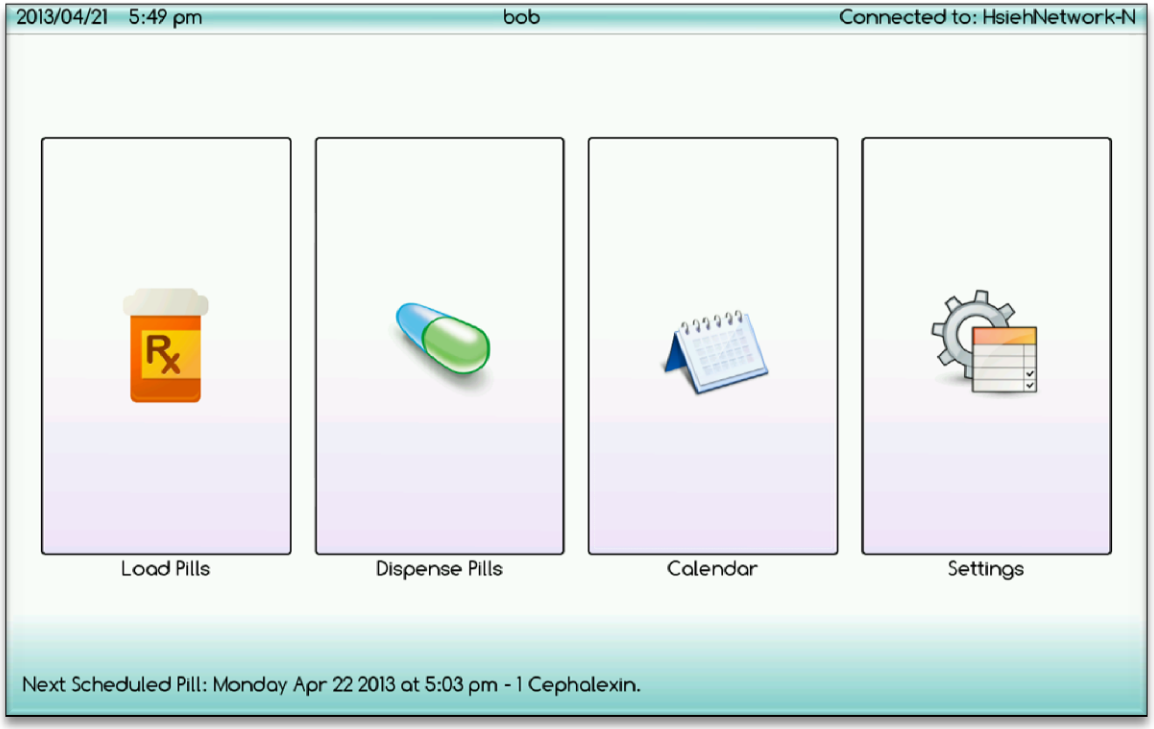


GUI

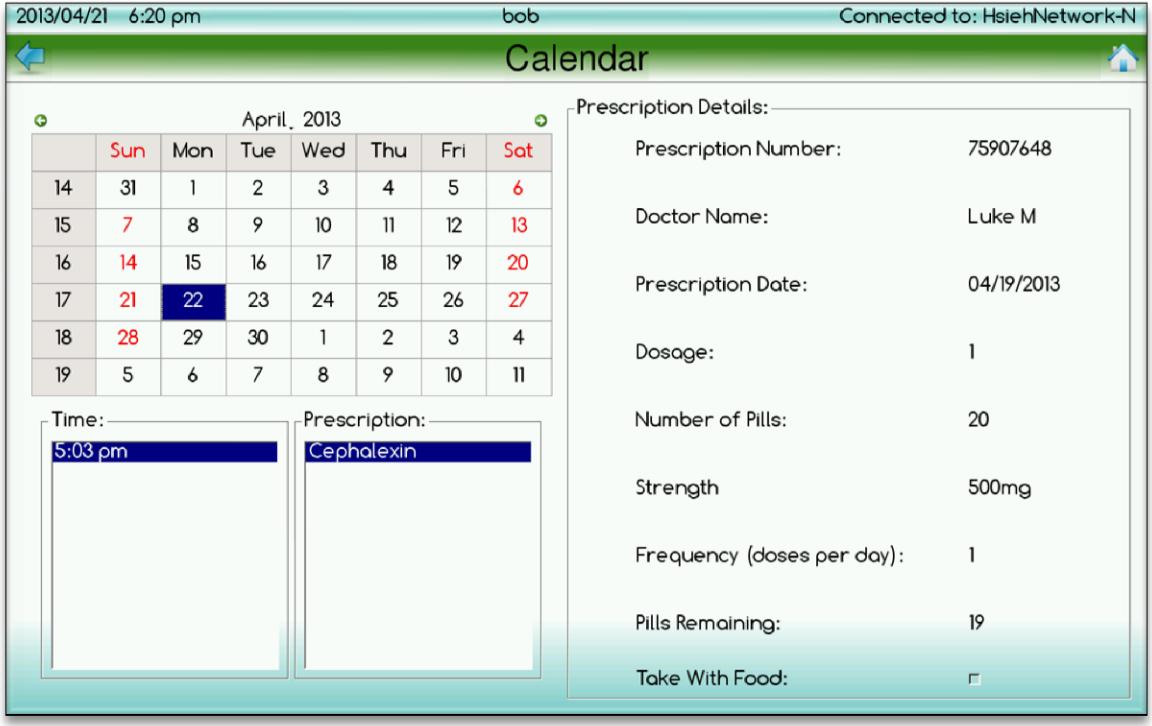
- Usability
- Reliability
- Ease of use



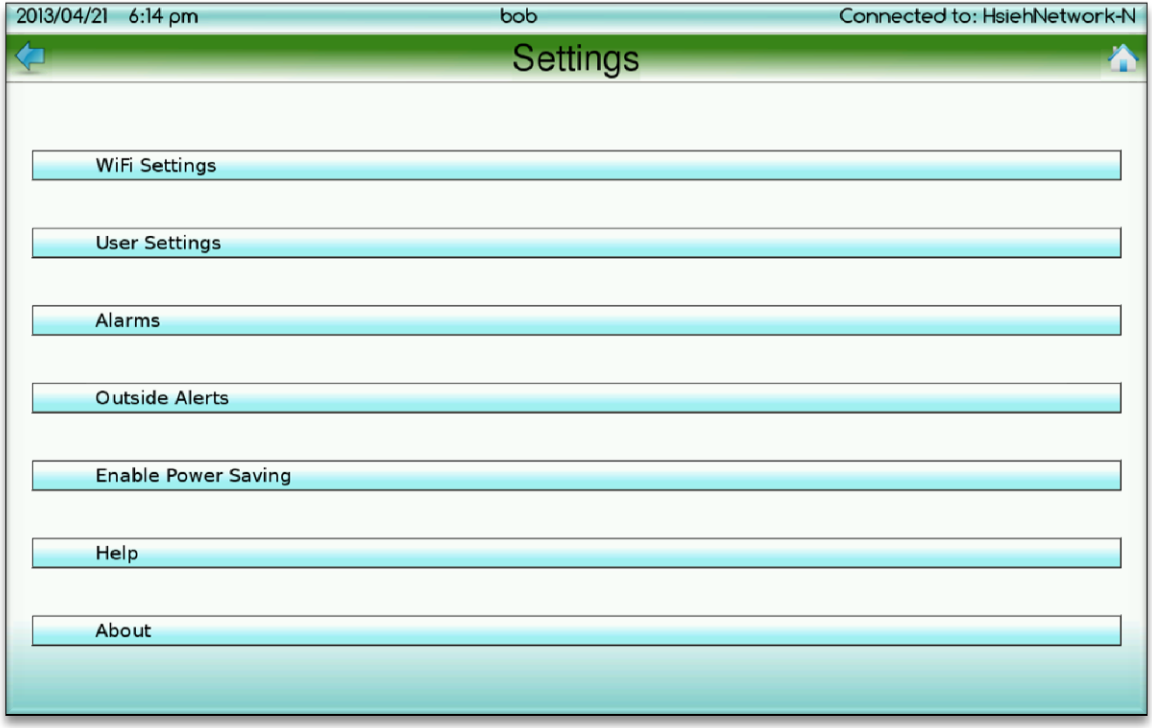
GUI – Home Menu



GUI – Calendar



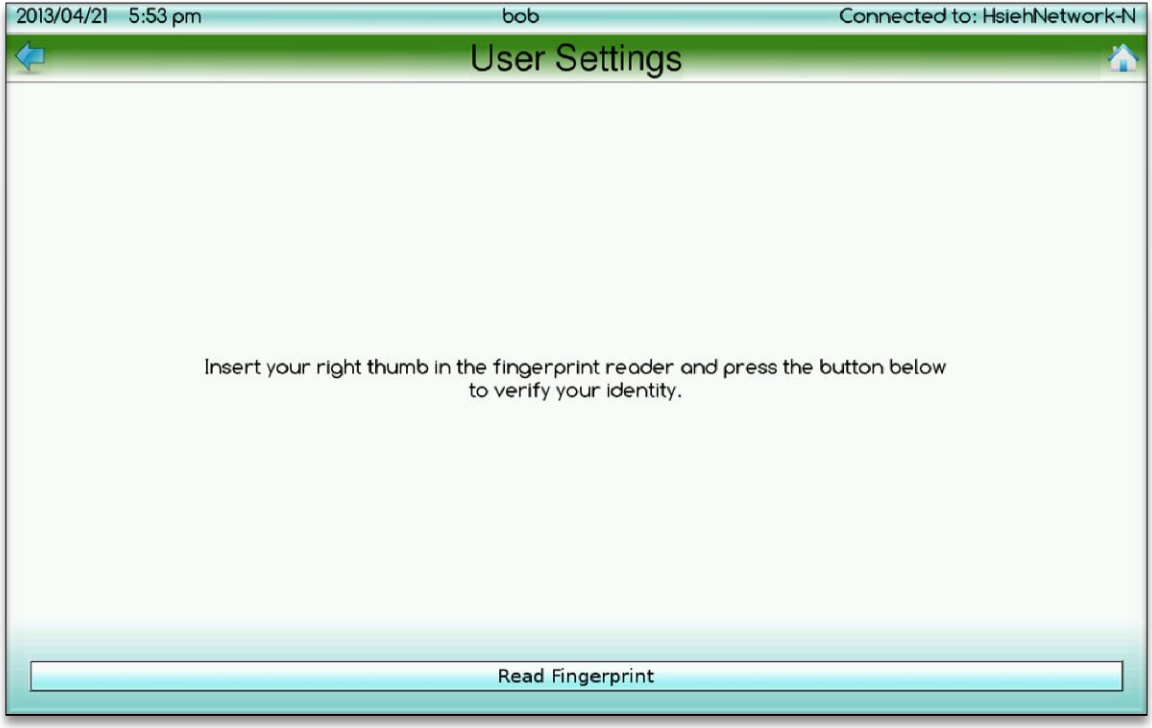
GUI – Settings



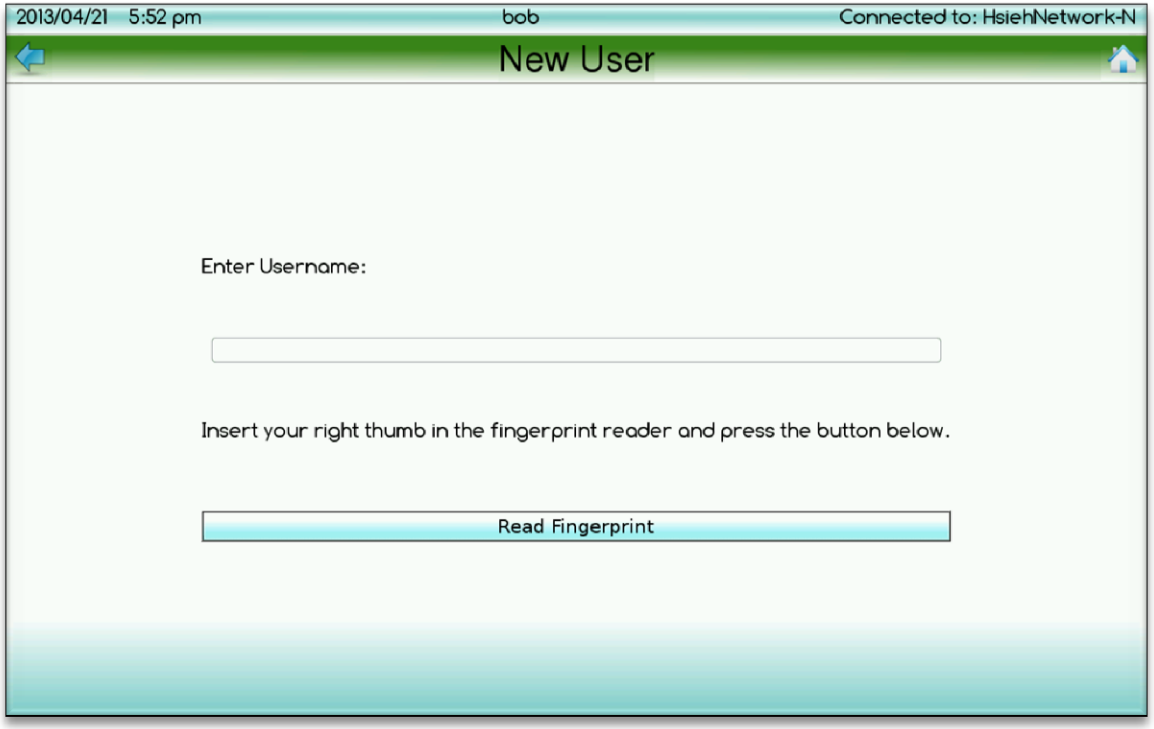
Security

- Fingerprint authorization for user sign-in and pill dispensing

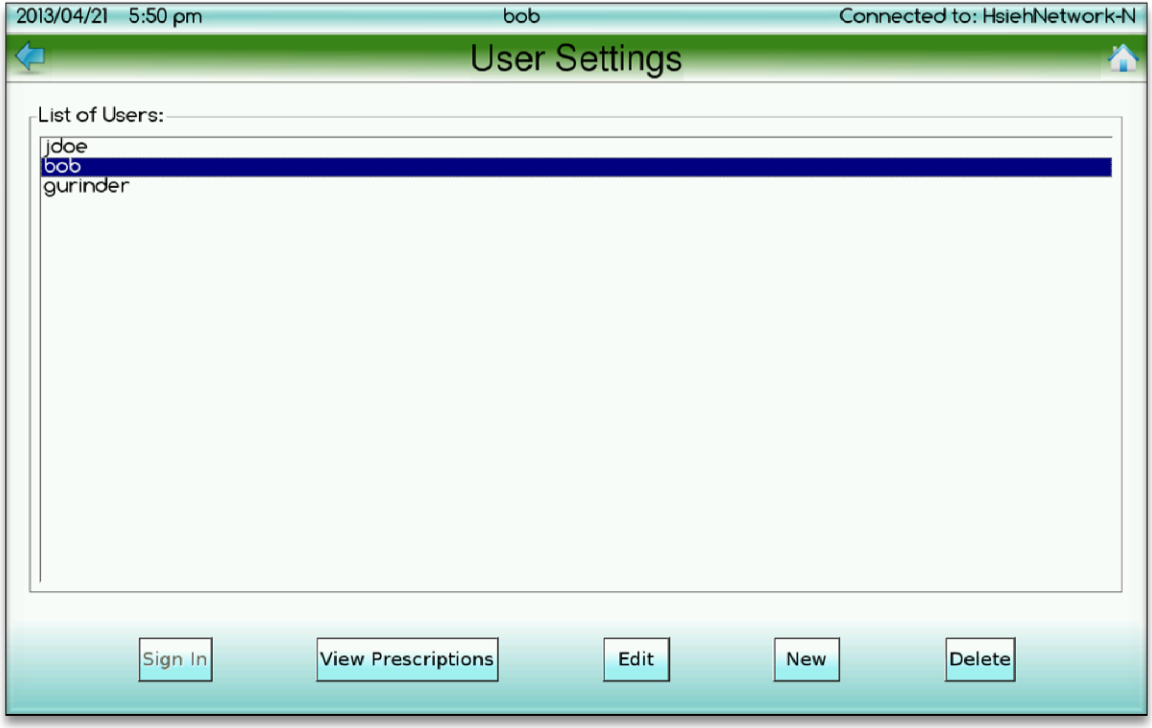
GUI – Fingerprint Verify



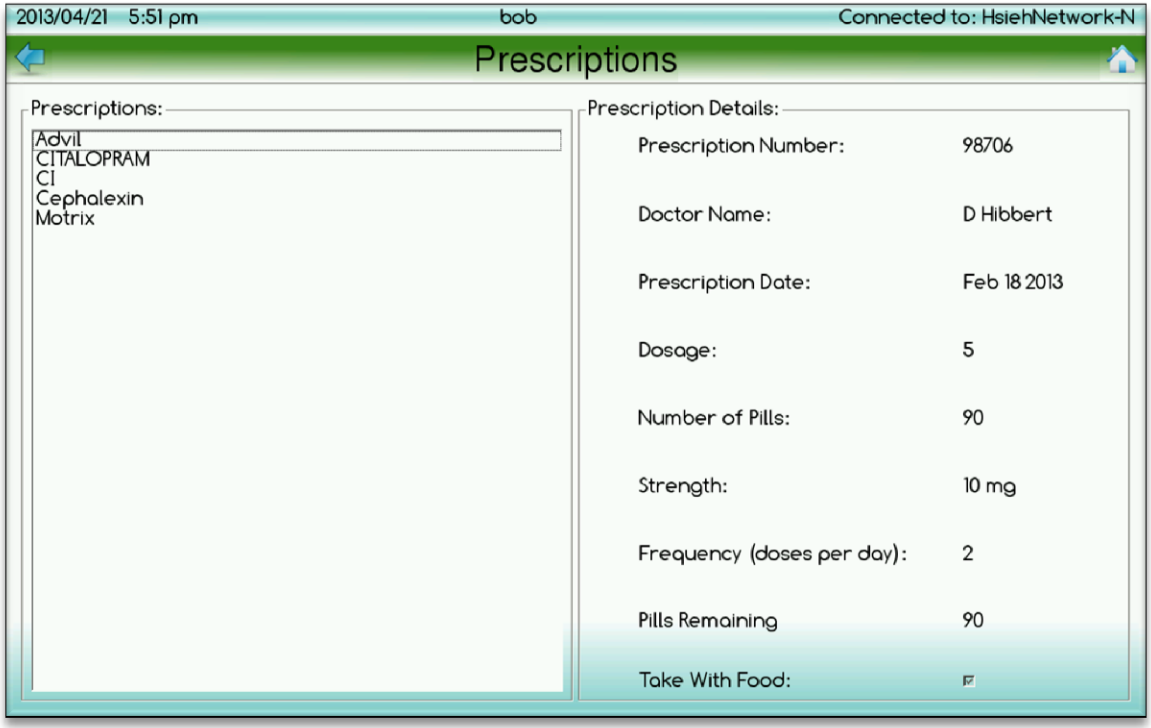
GUI – New User


2013/04/21 5:52 pm
bob
Connected to: HsiehNetwork-N
New User
Enter Username:
Insert your right thumb in the fingerprint reader and press the button below.
Read Fingerprint

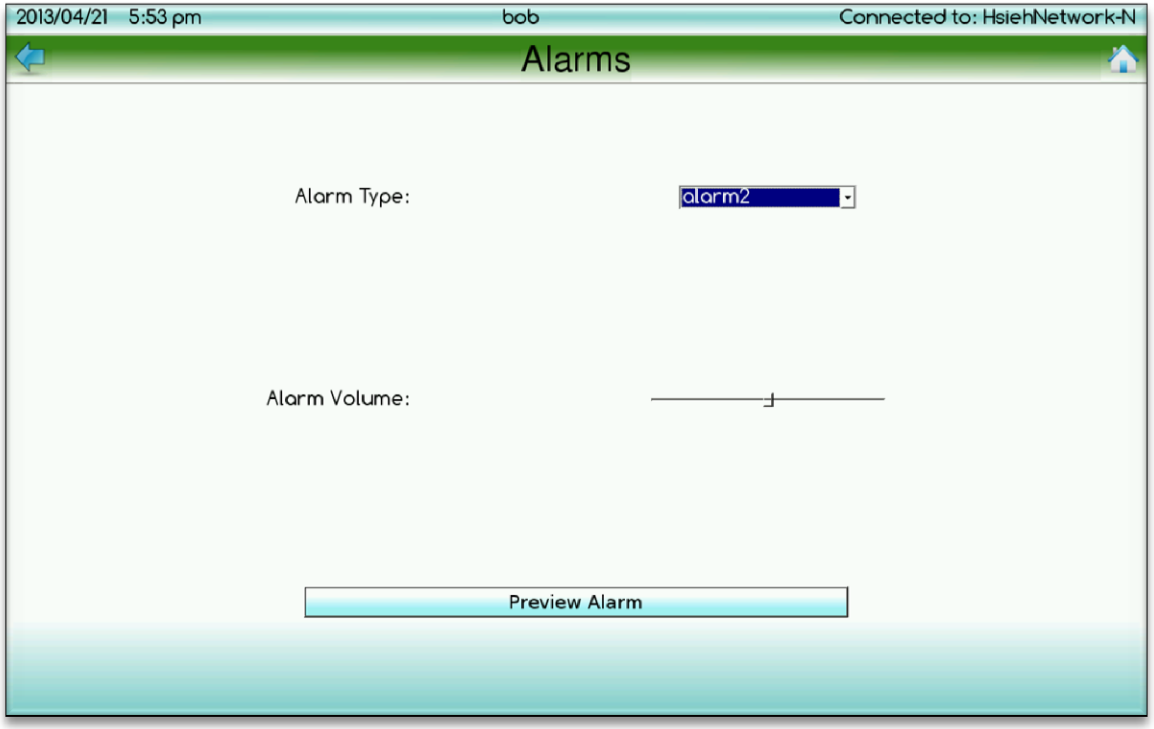
GUI – Users


2013/04/21 5:50 pm
bob
Connected to: HsiehNetwork-N
User Settings
List of Users:
jdoe
bob
gurinder
Sign In
View Prescriptions
Edit
New
Delete

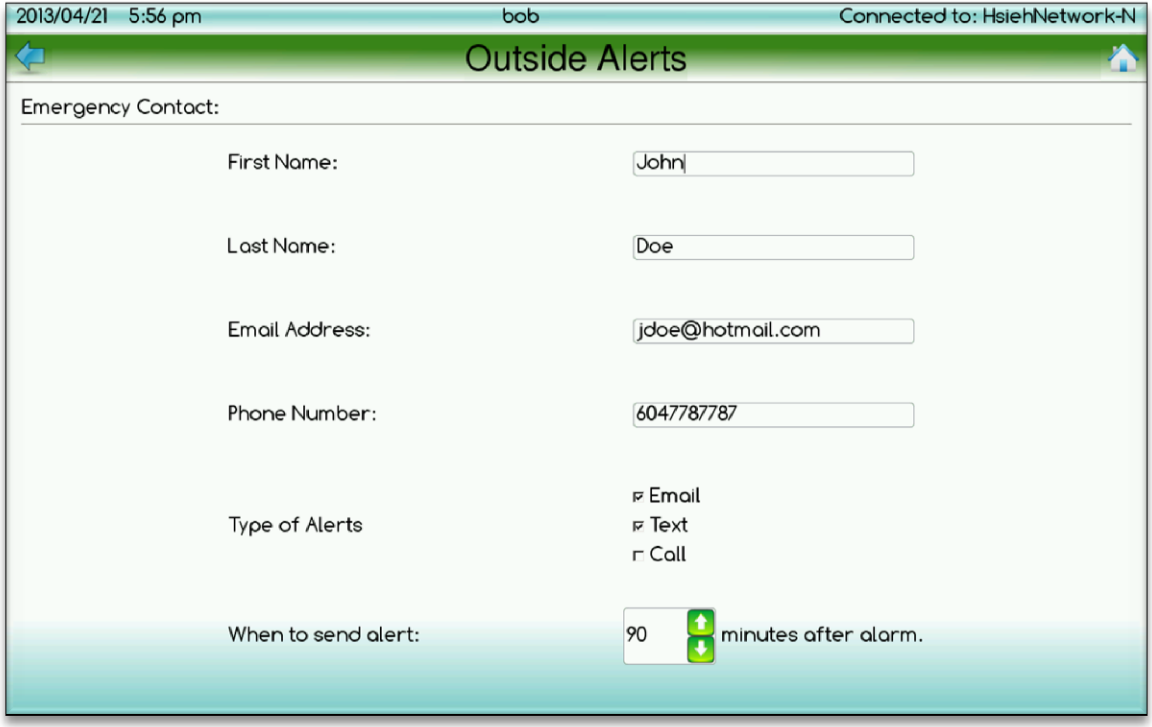
GUI – Prescriptions



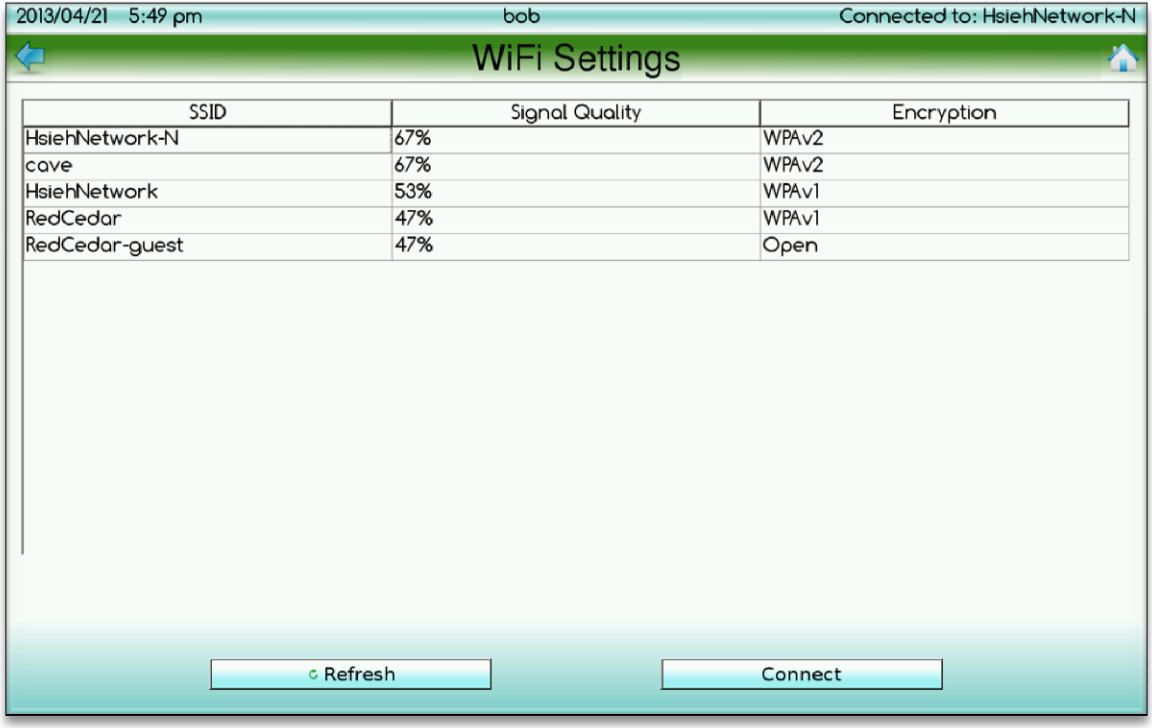
GUI – Alarms


2013/04/21 5:53 pm
bob
Connected to: HsiehNetwork-N
Alarms
Alarm Type:
alarm2
Alarm Volume:
Preview Alarm

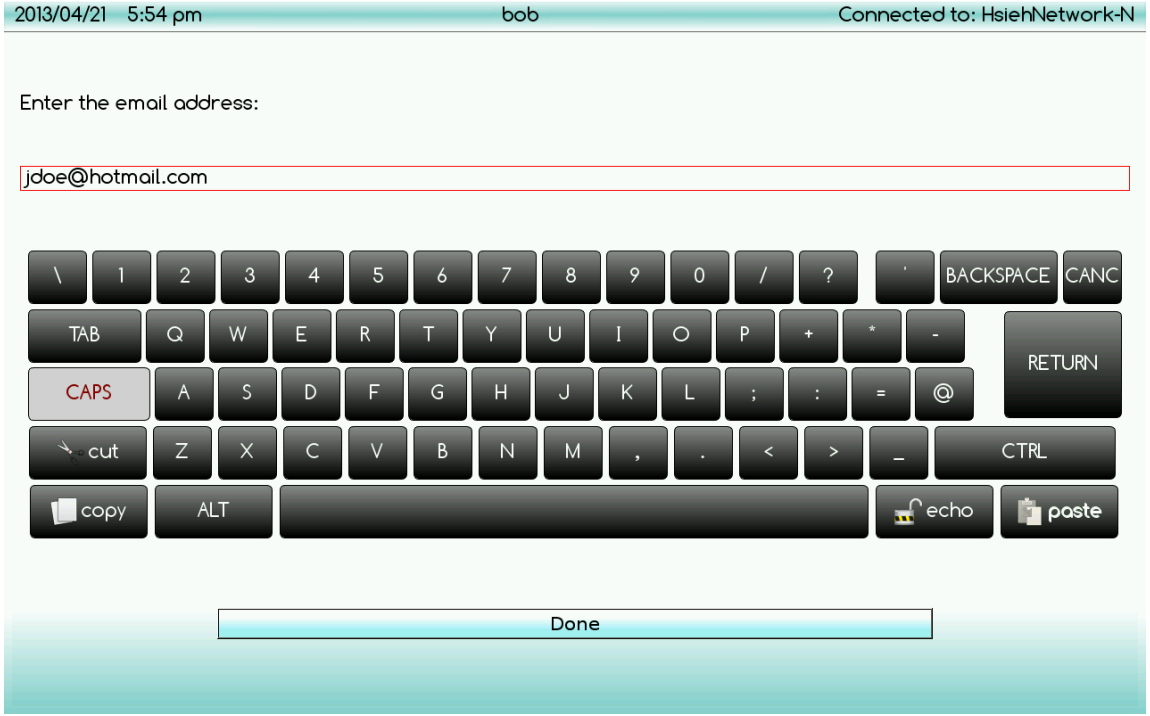
GUI – Alerts


2013/04/21 5:56 pm
bob
Connected to: HsiehNetwork-N
Outside Alerts
Emergency Contact:
First Name:
John
Last Name:
Doe
Email Address:
jdoe@hotmail.com
Phone Number:
6047787787
Type of Alerts
Email
Text
Call
When to send alert:
90
minutes after alarm.

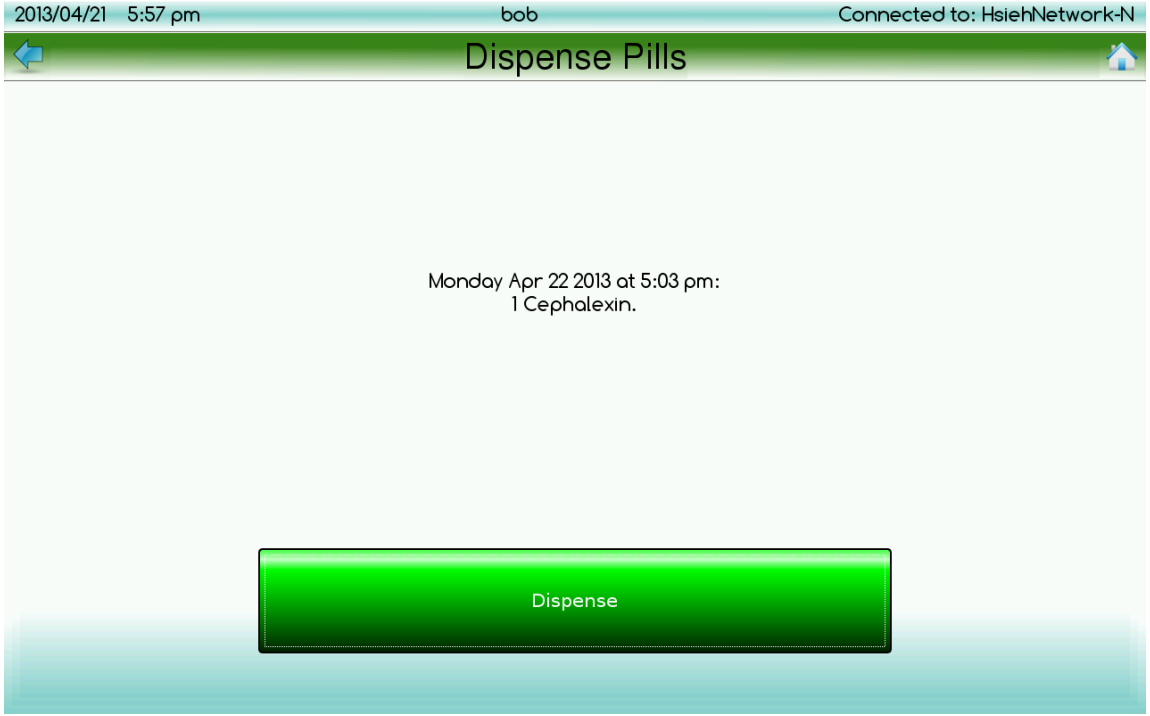
GUI – WiFi Connectivity



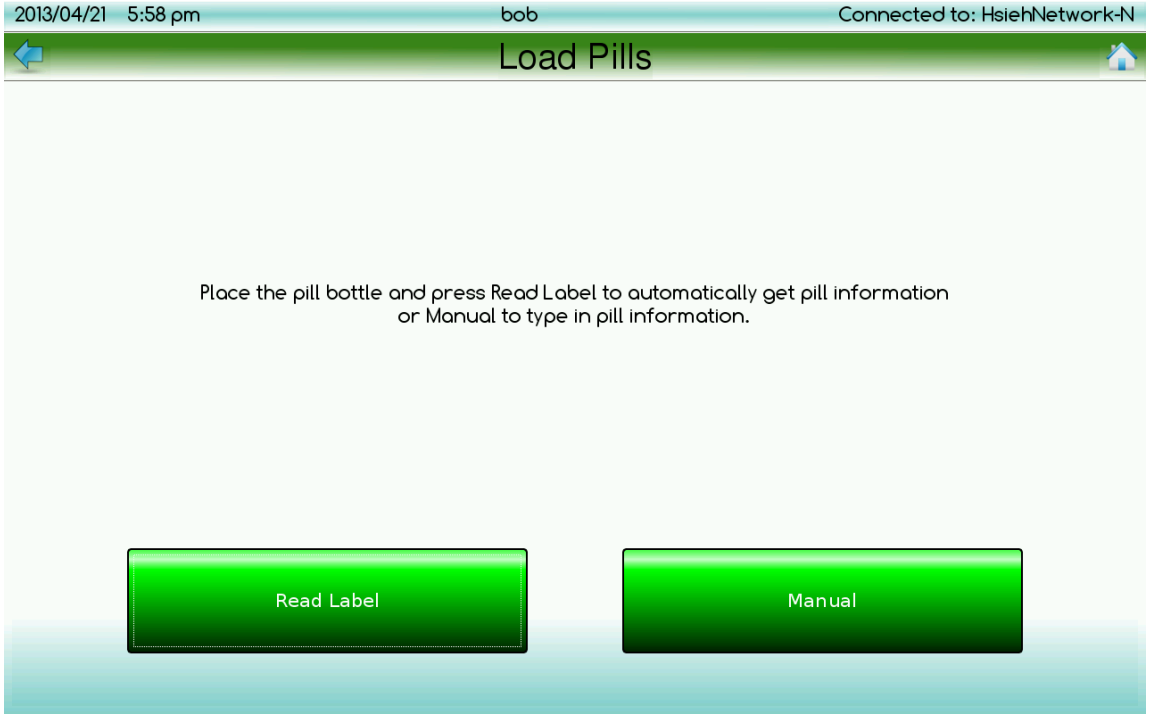
GUI – Keyboard



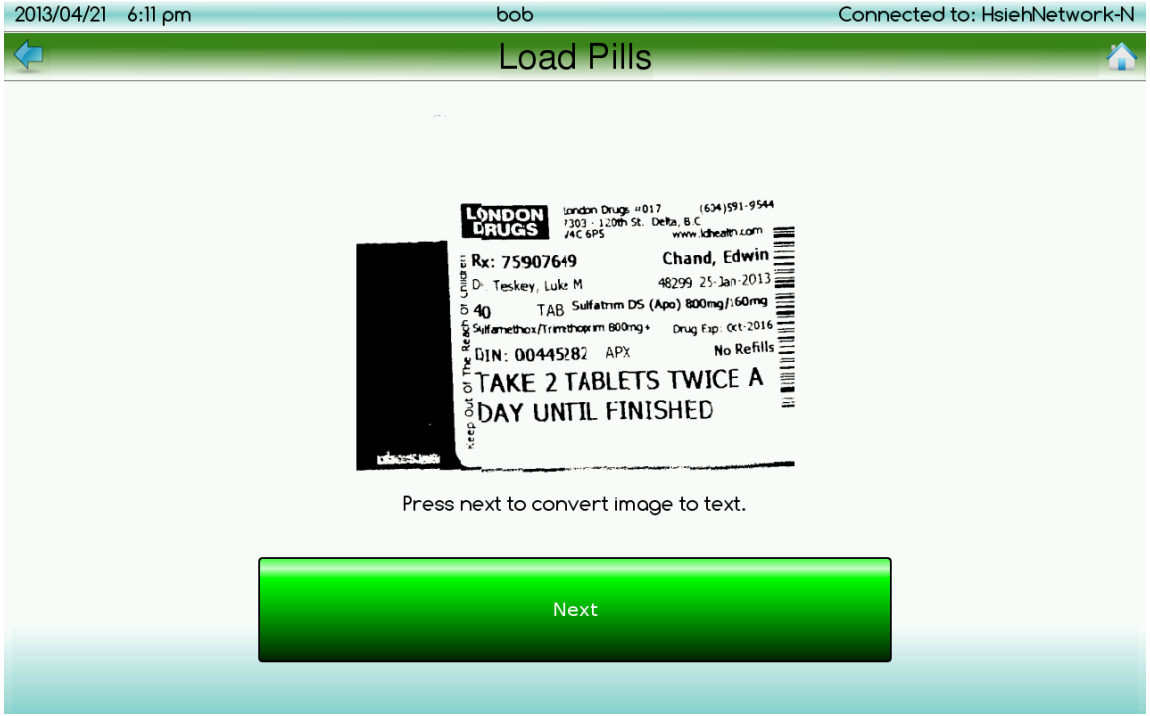
GUI – Dispense Menu



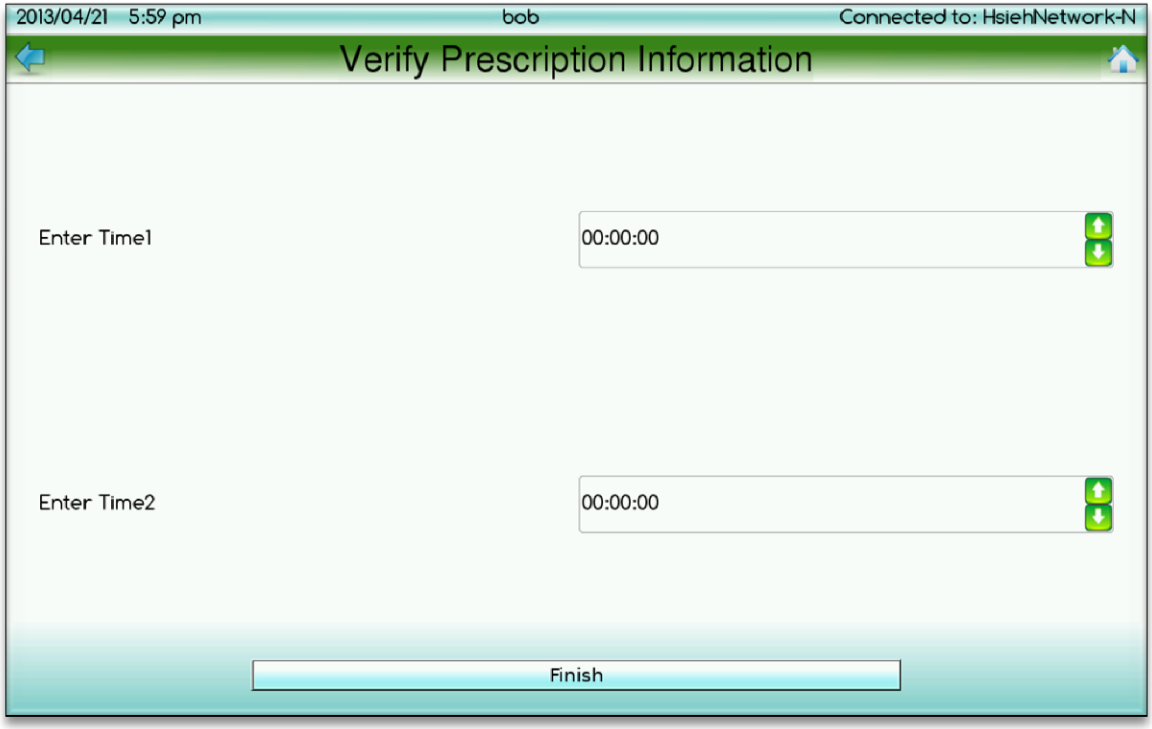
GUI – Load Menu



GUI – Image Results



GUI – Entering Pill Times



Schedule

ID	Task Name	Start	Finish	Duration
1	Project Proposal	1/7/2013	1/21/2013	15d
2	Research/Project Planning	12/17/2012	2/17/2013	63d
3	Functional Specifications	1/22/2013	2/11/2013	21d
4	Design Specifications	2/12/2013	3/14/2013	31d
5	Expected Label Reader Development	2/12/2013	3/15/2013	32d
6	Actual Label Reader Development	2/12/2013	4/3/2013	51d
7	Expected SPC Development	2/12/2013	3/15/2013	32d
8	Actual SPC Development	2/12/2013	3/24/2013	41d
9	Expected GUI Development	2/12/2013	3/15/2013	32d
10	Actual GUI Development	2/12/2013	4/6/2013	54d
11	Expected VAM Development	2/12/2013	3/15/2013	32d
12	Actual VAM Development	2/12/2013	4/5/2013	53d
13	Expected System Integration	3/16/2013	4/1/2013	17d
14	Actual System Integration	4/4/2013	4/11/2013	8d
15	Expected Testing	3/16/2013	4/7/2013	23d
16	Actual Testing	4/4/2013	4/19/2013	16d

Target Audience

- Elderly
- Home Care patients
- Senior homes
- Special needs

Development Costs

- Initially projected $1000 prototyping
  - Expensive vacuum
  - HD – LCD Touch Screen

Costs

Hardware	Estimated Cost	Actual Cost
Building Misc	$-	$92.92
Building Materials -Misc	$132	$70.14
SPD-SI GEARS x6	$-	$40.83
Stepper and driver	$50	$46.31
Vacuum (for prototyping)	$205	$28.00
	$387.00	**$278.20**

Costs

Electronics and MCU & Pi Miscs	Estimated Cost	Actual Cost
Digi-KEY - Sensors and Miscs	$-	$107.75
Servo-City - Servo Gears /Mounting	$-	$111.14
SDHC 8GB- C10	$-	$7.83
WI-FI N USB	$15	$11.19
Finger Print Reader+ PI	$105	$128.25
Spark Fun - servo, Drivers, Miscs	$180	$112.88
Coaxial Power DC cable	$-	$8.35
OSEPP Uno R3 Plus	$-	$33.54
Touch Screen 10" LCD LVDS-PI	$169	$183.49
HP 3100 Webcam 720p	$11.64	$11.64
Belkin Hub 7 Port USB 2.0	$27.99	$27.99
PCB Board	$100	$-
RP-Electronics - Miscs	$-	$10.74
	$608.63	**$754.79**
Final Total	**$995.63**	**$1,032.99**

Business: Market

- Nearly 50% of caregivers say their loved ones need help taking medication properly*

- 50% of all prescription medication is taken incorrectly*

Financing

- Look for personal financing
- Venture capitalists to speed up development
- Private company

Competitor Pricing

- CompuMed MD3 – $895
  - 4 times a day, require pre-Allocated, locked
- MedSmart MD2 – $895
  - Calls/Texts Phone, emails
- Philips Medication Dispenser – $895

Competitive advantage

- Label Reading, automatically
- No need for pre-allocation of medication
- Big and intuitive touch screen

Improvements and changes

- Fine tune some user functionalities
- Test models for user, and gather feedback
- Performance optimization
- Specialized Vacuum
- Pill counter upgrade
- Precision machinery
- Upgrade in parts

Conclusion

- Very satisfied with product and accomplishments
- Future work is needed to fine tune the product
- Learnt a lot. Great learning experience.
- Not pursuing product further

Fin

Questions


Questions?

References

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