Hey,
how can we make your life easier & smarter?

Team 11
Can microwaves know how to cook food items without the help of humans?

It’s so cold! It’s so hot! Can houses know what’s the best temperature for me?

Can vacuums be smarter?
Can we make the lightbulbs turn on automatically when it is dark out?

Wouldn’t it be really nice if we could check what’s in the refrigerator when we’re at the farmers’ market on Sundays?
SOPHIRE
Make your home easy

Semantic semi-Autonomous Processing Household repertoire
Our Goal

Voice Commands

Notifications
Our Target

Google Glass or Other Wearable Device Users

S'PHIRE
Make your home easy

Smart Device Owners
How do we stand out?
How did we make this happen?
1. The SAPHIRE Server system, deployment & Data Communication Mechanisms
2. The Simulator Framework & iRobot connection
3. Database Implementation

1. Front-End Implementation
2. Simulation Space Development
3. Product Design

1. GlassHouse Application Design and Development
2. Connection to SAPHIRE

1. User Interface Testing
2. Product Research
3. QR Code Development
System Organization
The Google Glass
Front-end App

The Framework

Simulators
(Virtual & Physical)

GlassHouse

System Organization

SOPHIRE
Make your home easy
“Cook **this**”
(and then puts in a hot pocket in the microwave)

* Assuming that this microwave has the network connectivity
Using the microwave in the kitchen that is available now, which is 900-watt, microwave the hot pocket for 3 minutes.
System Structure
The whole picture

- SAPHIRE Simulator Space
- Object & Device Store
- SAPHIRE Server

System Structure

- iRobot beaglebone
- GLASS
- Socket.io
- HTML & CSS
- Bootstrap
- jQuery
- MongoDB
- Amazon EC2
- Amazon S3
- Elastic Beanstalk

Notification

Voice Command

Done!

Cook this

The whole picture
SAPHIRE Server
Object & Device Store
SAPHIRE Simulator Space
GLASS
socket.io
GLASS
Cook this
Done!
Notification
Voice Command
**SAPHIRE Simulator Space**

- GLASS
- Notification

**Object & Device Store**

**SAPHIRE Server**

- Cook this
- Voice Command

* For virtual microwave, refrigerator, and washer models
SAPHIRE Virtual Simulation Space
SAPHIRE Real-world Simulation Space
Object & Device Store
Glass-House

Key Design Properties & Technologies
Key Design Properties:
- Reliability
- Speed
- Scalability
SAPHIRE Virtual Simulation Space

SAPHIRE Real-world Simulation Space

Object & Device Store

Glass-House

Key Design Properties:
- Usability
- Unobtrusiveness
Object & Device Store

SAPHIRE
Virtual Simulation Space

SAPHIRE
Real-world Simulation Space

Key Design Properties:
- Availability
- Time constraint

Glass-House

iRobot
Object & Device Store

SAPHIRE

Virtual Simulation Space

SAPHIRE

Real-world Simulation Space

Glass-House

Key Design Properties:
• Realness
• Accessibility
• The amount of already existing design assets

HTML & CSS
Bootstrap
jQuery
Object & Device Store

Glass-House

SAPHIRE

SAPHIRE Virtual Simulation Space

SAPHIRE Real-world Simulation Space

Key Design Properties:
- Timeliness
- Extensibility
- Scalability
Technical Challenges
The Thin Structure between Persuasiveness and Fantasy

- An open-ended question: what? Design, how?
- Finding the common case is tricky!
- But after all, the future is an aggregate of probabilities, so why not risk bold? 😊

The Difficulty in Incorporating QR Reading

- The libraries available for incorporating QR reading (ZXing) were difficult to handle

The Communication Mechanism Problem

- Figuring out the right HTTP requests from the Google Glass app to SAPHIRE & choosing the system design took time
- The iRobot Create has a server written in C. Combining that to the javascript-based SAPHIRE’s framework was/is hard!

Thoughts: LLVM/javascript ↔ C cross compilation, Google V8, rewriting the whole iRobot server in js, utilizing some BeagleBone Black i2c library (not that great)

- How to efficiently manage the conflict between the SSL/TLC layer and the transport layer HTTP
Where to go from here?

A window for automatic information retrieval

Many more connected things

Smarter, more personalized
Thank You!