INSTAFIND

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Group 12

PROBLEM STATEMENT

- Losing items is a common occurrence and is extremely frustrating
- Easy to forget location of infrequently used items
- Want to help others minimize the frustration associated with losing things
- People are collecting more and more things

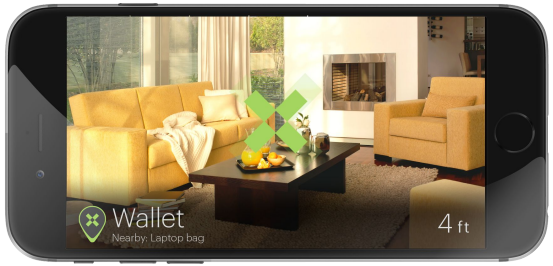
Guiding Question:

How might we aid users in managing their possessions and quickly locating them when lost?

State of the Art

Competitor strategies:

- Point on map
- Activated sound on tag
- “Hotter / Colder” game
- Pointer on camera



OUR SOLUTION

Identify

- Users identify landmarks inside their home

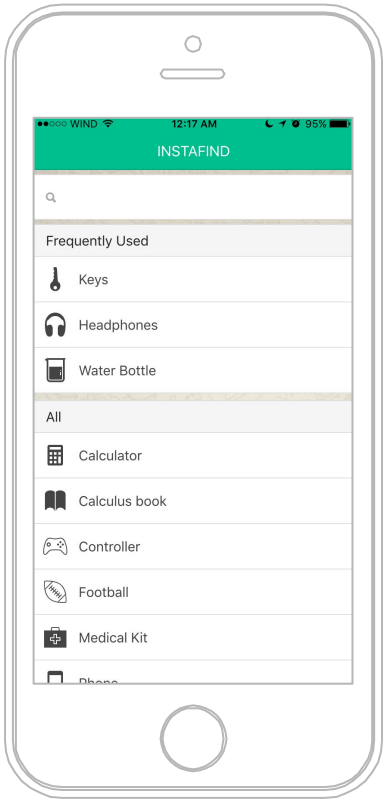
Tag

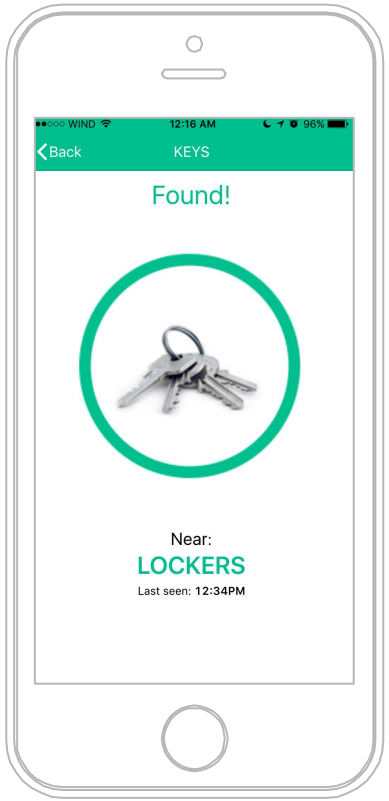
- Tag objects they wish to keep track of
- Tags are inexpensive, allowing for the tagging of many items

Find

- Location is relative to landmarks
  - “Near the Family Room TV”
  - “On the Dining Room Table”
- Search through mobile interface to find item

Prototype 1: INTERFACE





Landmarks for furniture

Tag for objects

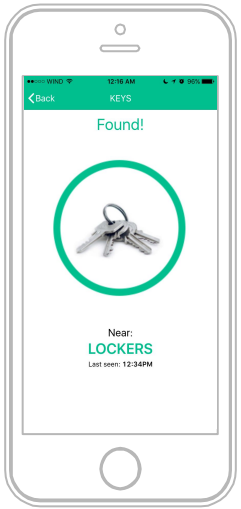
INTERVIEW TAKEAWAYS

Changes:

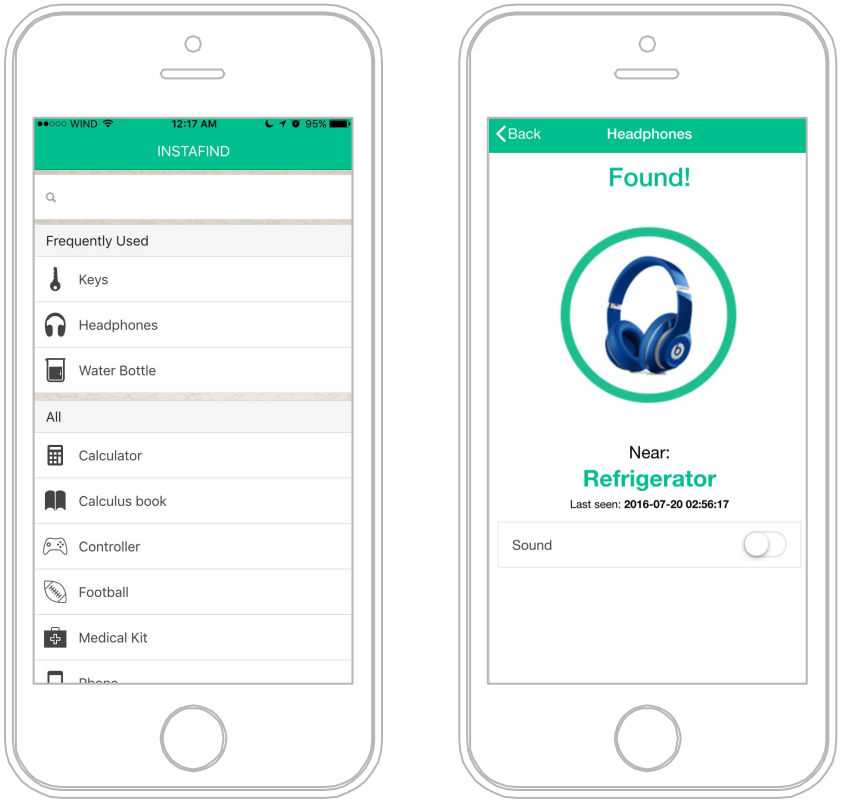
- Add sound for precise locationing
- Tag reusability
- Confusing “Found!” terminology in app

Most Important to Users:

- Cost per tag
- Tag form factor



Prototype 2 (MVP): Full Functionality



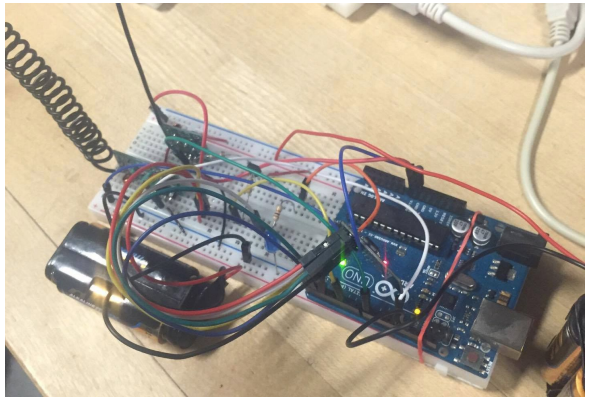
Includes:

- Fully functional final design
- Auditory feedback on tags

PHYSICAL COMPONENTS

HUB:

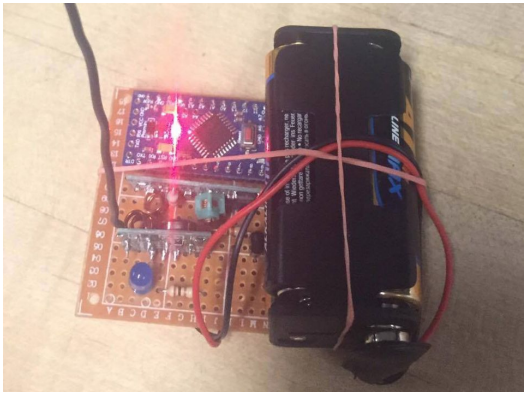
- Centralized processing unit
- Controls all RF communication
- Manages communication with the app



PHYSICAL COMPONENTS

LANDMARKS:

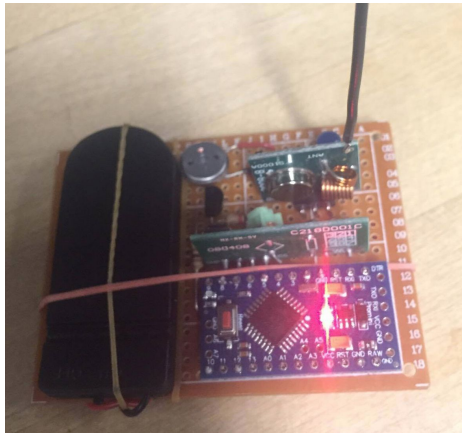
- Provide reference points for all tags
- Receive RF signals from nearby tags and relay information to the hub



PHYSICAL COMPONENTS

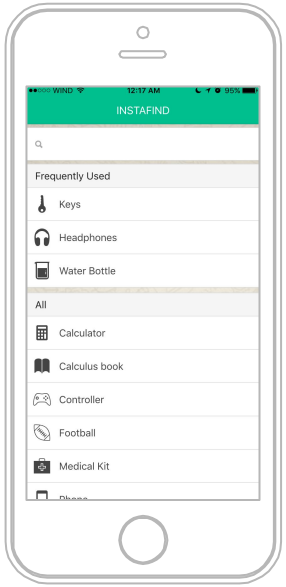
TAGS:

- Always on standby; waiting for RF communication
- Play sound upon request
- Broadcast location to landmarks



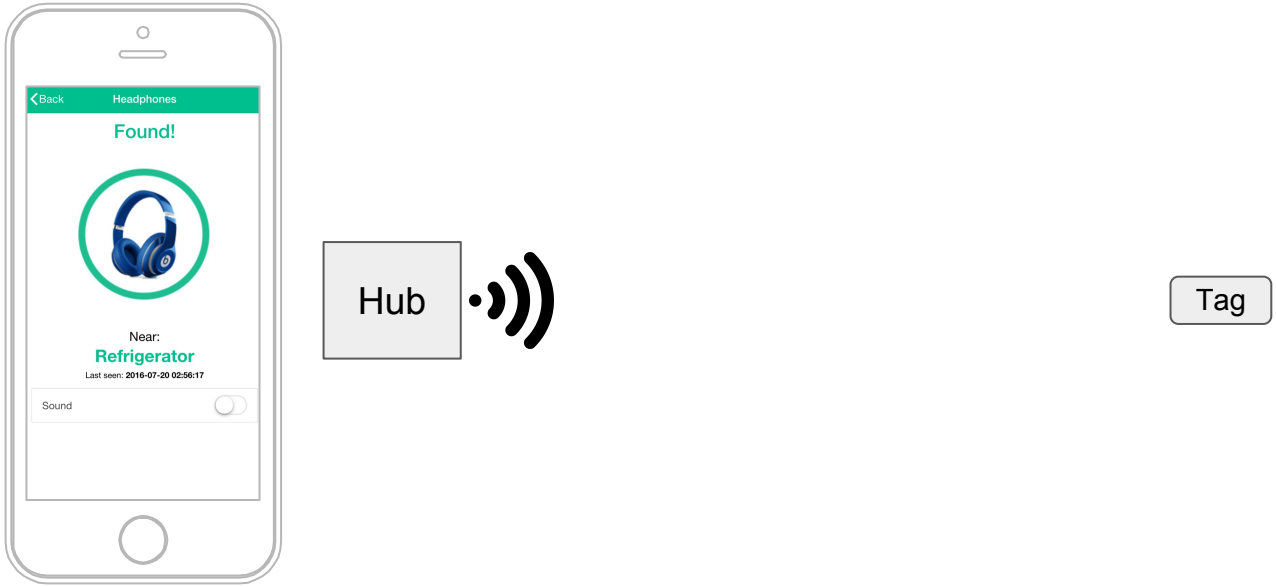
HOW INSTAFIND WORKS

1. User searches for item on the app which triggers the hub to send out a signal to search for the tag



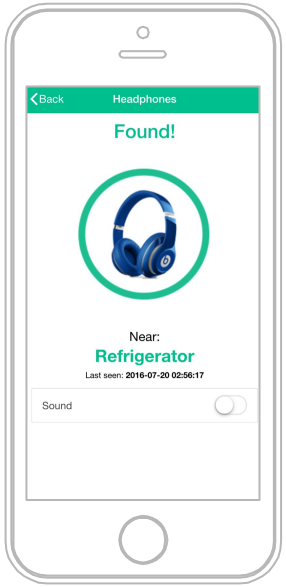
HOW INSTAFIND WORKS

2. Hub sends signal to individual tag being searched for



HOW INSTAFIND WORKS

3. Tag alerts all landmarks in range



Hub

Landmark

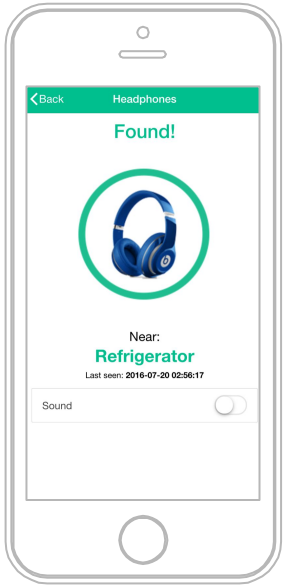
Landmark

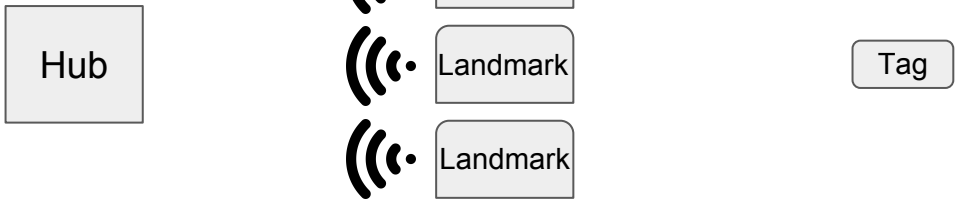
Landmark

Tag

HOW INSTAFIND WORKS

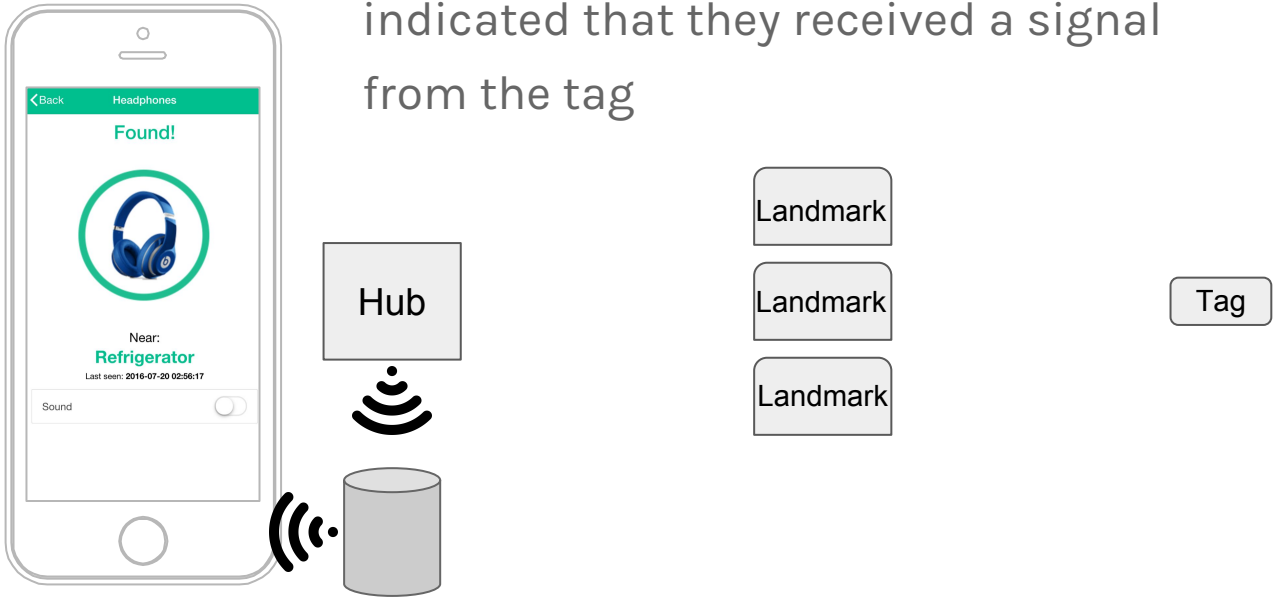
4. Landmarks that are in range that have received the tag's signal indicate to the hub that the item is near





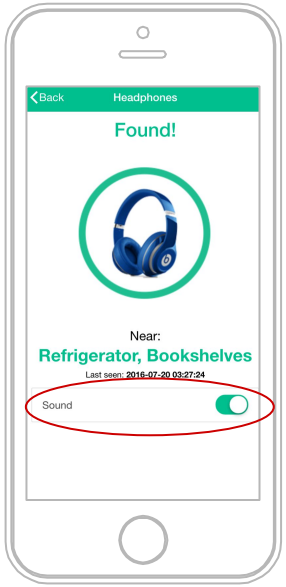
HOW INSTAFIND WORKS

5. Hub updates app to show landmarks that have indicated that they received a signal from the tag



HOW INSTAFIND WORKS

6. User has the ability to toggle sound ON-OFF, enabling precise locationing with an audio signal



Engineering Challenges

Cost/Benefit of Adding Sound to Tags

- **Benefit**: Auditory feedback
- **Cost**: Increased tag size, cost, and battery consumption due to additional hardware

Cost/Benefit of Creating Inexpensive Tags:

- **Benefit**: Price to tag many items minimized
- **Cost**: Upfront hardware price increased

Engineering Challenges

Precision of Tag Locationing

- Optimized the balance of location precision **vs** battery life, hardware cost, and tag size

Distributed Hardware:

- Moved the ‘heavy lifting’ from the tags to centralized devices (hub, landmarks)
- Decreased tag size, cost, and battery consumption

Ergonomic Analysis

Tag Form-factor:

- Must be small enough to stay ‘out of the way’
- Must be shaped to be handled comfortably
- Optimal result is a tag size of ~2.5-3 cm^3
- Potentially limited by hardware constraints

Heuristic Evaluation

User Centered Design

- Guided by Nielsen's 10 Rules of Heuristics
- Highlight: Match the user's mental model of how they search for and keep track of their possessions
- Highlight: Sort order and dialog confirmations in app

FUTURE ITERATIONS

- Custom PCB and plastic casings for hub, landmarks, and tags
- Minimize cost through mass manufacturing and hardware optimization
- Improve battery life through hardware optimization
- Manage multiple hubs (i.e. work and home)
- Possibly unlimited numbers of tags and landmarks