Packd

Evolution of a Product

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What is Packd?

- People counter
- Business analytics driven by store visitors
- API Platform for building IOT applications

The Problem

- You don’t know how crowded the gym is before you go.
- Customers need more information to choose between different restaurants, cafes, libraries, and more.
- People can’t plan *when* they should go to their favorite locations because there’s no prediction available to them.
- Businesses have no information on potential customers they might be losing.
- Businesses have variable peak hours, and lack accuracy in when exactly they occur each day.

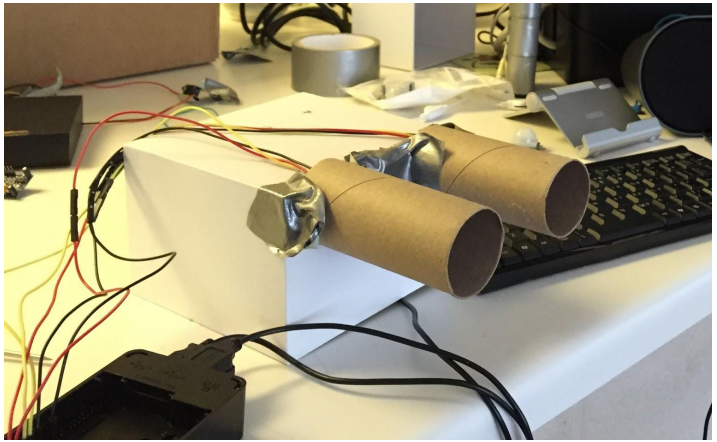
The Solution

- Realtime, accurate count system
- Keep track of history for analytics purposes
- Use statistics for predictions
- Keep track of unique devices (hashed) to anonymously identify unique customers.

Components

The Sensor

- First attempt at a solution
- In / out infrared sensor. Two sensors side by side to figure out direction of person walking.
- Idea: Place one of these at each entrance in a location.
- Problems:
  - How to detect multiple people walking in/out
  - Does not scale to places with many doors.
  - Lots easily breakable hardware.
  - Too difficult for a business owner to set up.



The Counter

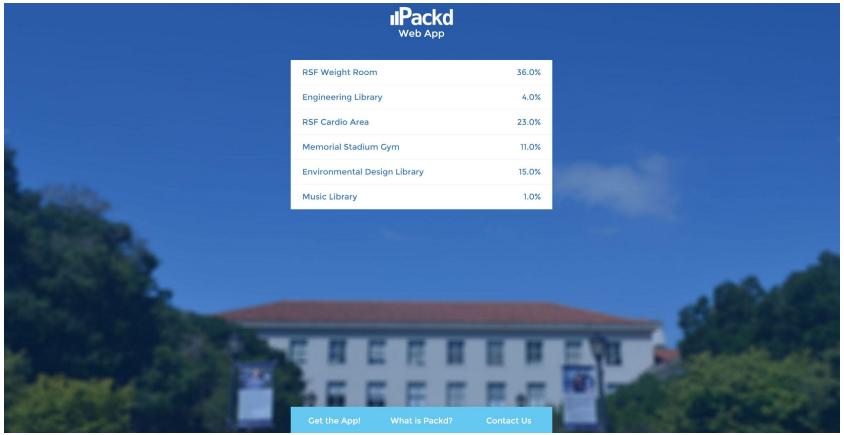
- Requirements: Realtime, uniquely identifying people, accurate, portable, easy install
- New solution: Raspberry Pi technology with wifi and packet sniffing.
- Probe request monitoring
- Over the air software updates using Git version control
  - Allowed easy conversion to major analytics update in May overnight
- Technologies: RPi, Python, Shell, Git
- Solves all the problems from the in / out sensor:
  - Scalable, easy to install, one per location, no complex hardware.

The API

- Core infrastructure. Must both serve content and accept content.
- Built in Django
- Central endpoints for Authentication, Traffic Posting, Sessions, and Analytics
- Predictions that learn over time using an exponential moving average
- Nightly analysis of business visitors, walk-bys, conversions, average stay times, and soon traffic flow between locations.

Web Application

- Frontend and backend written in Django
- Accesses API for consistency, just like mobile apps
- Separate modules for forward-facing consumer app and business-facing company dashboard.



iOS and Android Apps

- Forward-facing consumer apps so people can see their locations’ occupancies in real time.
- Live data now, predictions for the rest of the week.
- Soon to come: favorite locations, push notifications when a place isn’t crowded, coupons and loyalty rewards

Impact

At UC Berkeley

- Crowdedness is a problem students at Berkeley have been trying to solve for a long time. Now they finally have a solution.
- We are partnering with the library system to install at every library on campus as well as cafes and dining areas.
- Working with campus networking infrastructure to integrate with Berkeley's wifi for complete coverage.
- Thousands of app users per day during the semester driven only by word-of-mouth advertising of Packd.

Companies and Investors

- Interest from several investors and companies, including Samsung
- Offers to integrate with existing apps using our API
- Requests to install at campuses as far away as Missouri and NYC

The Future

Plug and Play

- We want to make a product that’s so compelling, businesses everywhere will want to buy it.
- This means we need to be able to scale, so we need to make our sensors easy to set up by people who have never coded before and don’t know what a Raspberry Pi is.
- Currently working on purchasing flows, set up, integration with store wifi, and automatic creation of predictions.

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