Internship Wrap-Up

WEDNESDAY, JULY 19, 2017
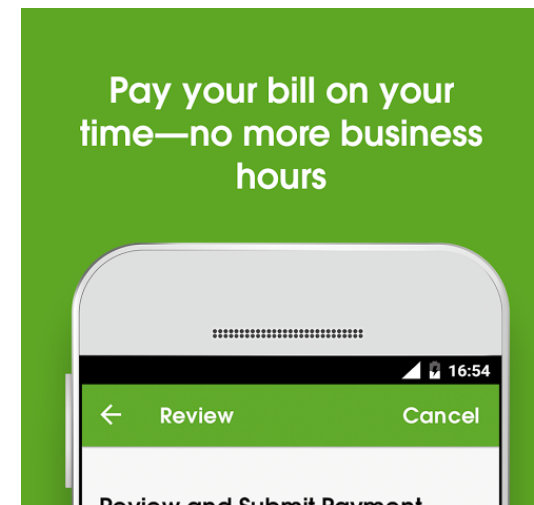
PETER JOHN
STUDENT INTERN

Introduction

Peter John

- BS in Computer Engineering, Georgia Tech
  – Graduating December 2017

Self-Service Platforms
  – Chris Morris – Director
  – Team Responsibilities
    - Cricket Website
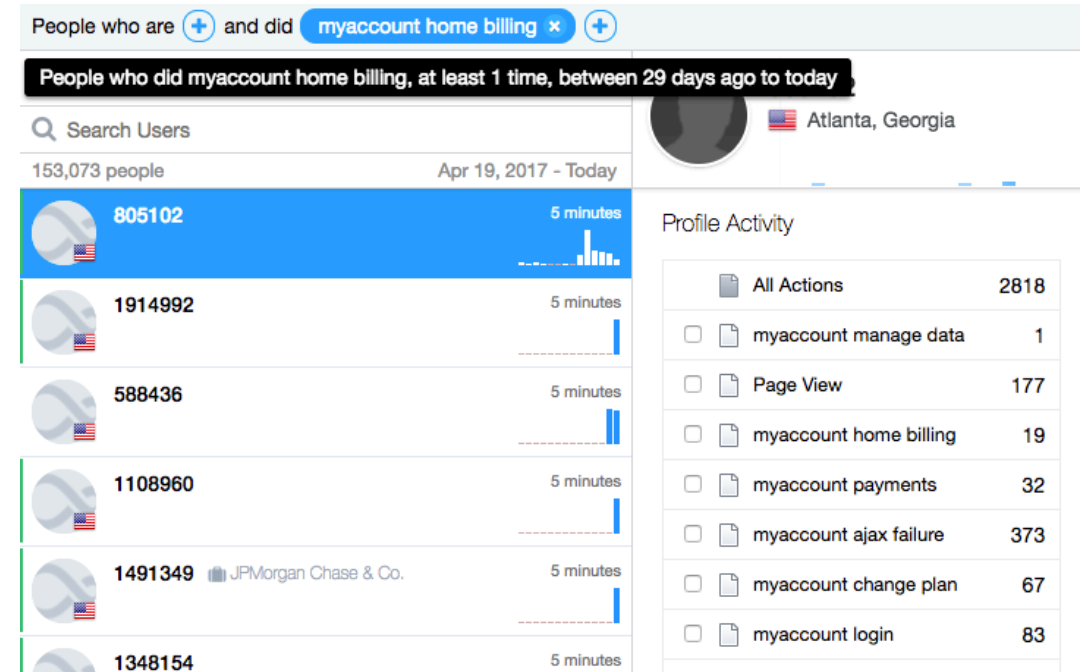   - myCricket App
    - Internal Onboarding Tools

Pay your bill on your time—no more business hours

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Project Goals

Aim towards Simple, Smarter, and Better Analytics

Woopra- Analytics for Self-Service Applications

• Tracks visitors and events

• Searchable through a web interface

• Does not provide
  - Context for each user's visits
  - "Unusual activity" detection
    • Can be useful to find unintended app interactions
  - Smarter user grouping outside of individual fields
    • Operating system, app version, browser, etc..

Goal: Interact with the Woopra API and use Machine Learning to address these issues

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High Level Approach

Woopra HTTP API

Dataset Preprocessing Web Application **(siren-db)**

Dataset HTTP API

Machine Learning Task Manager Web Application **(siren-ml)**

Visitor clustering algorithm

Machine Learning HTTP API

```
{
  "refreshed_at": "2017-07-17 15:18:08.989877",
  "visits": [
    {
      "events": {
        "count": 3,
        ...
        "usage screen"
    ],
    [
      1500304388153,
      3851,
```

```
{
  "num_clusters": 4,
  "platfo...
  "refres...
  "result...
    {
      "ac...
      "ev...
      ...
      23,
      "change ...
      24,
```

How many users are experiencing trouble with chat on iOS today?

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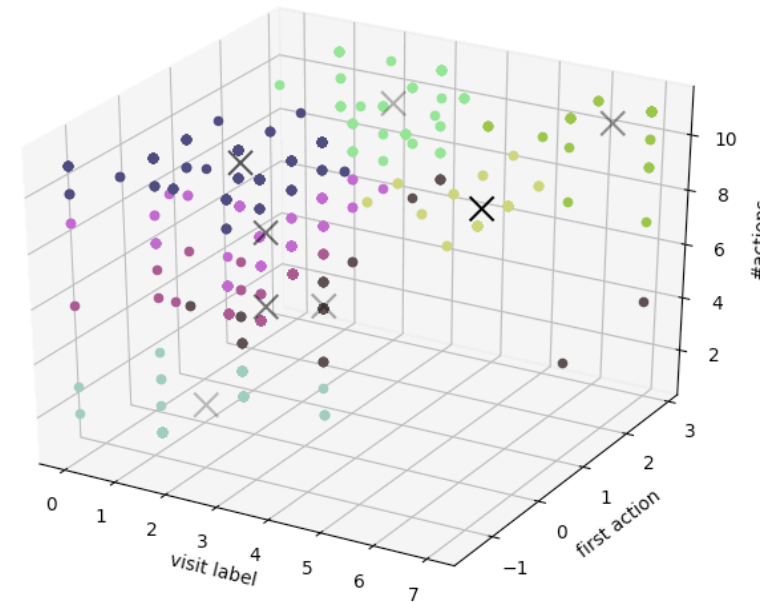
Machine Learning

How do I automatically categorize visitors?

Model Properties

- Unsupervised k-means organizes unclassified data automatically by using chosen features

- "two-action" sequences used to distinguish between activity purposes

- Most common "two-action sequences", number of actions performed, and the first action of each visit is used to cluster visits
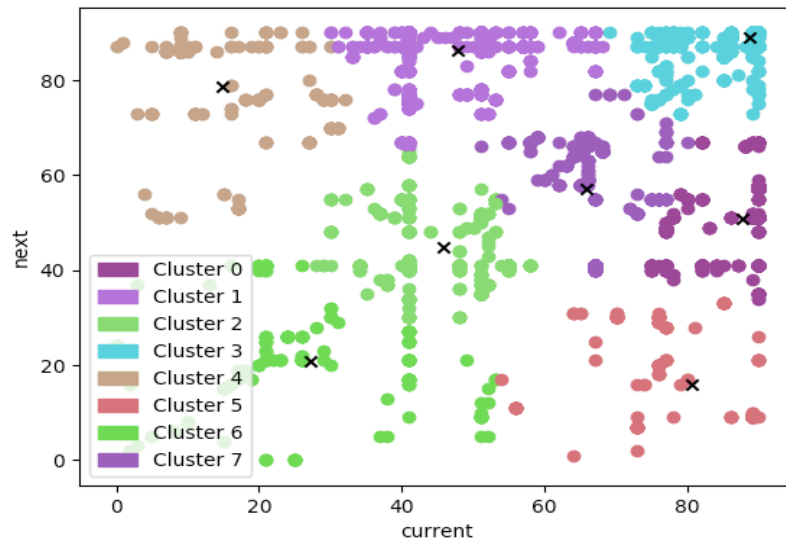
Clustered "two-action" sequences

Clustered Visitors

Web APIs

Dataset Preprocessing JSON API(siren-db)

• Provides an easier interface for using Woopra API

  – Separates iOS/Android logs

  – Creates formatted datasets for machine learning web service

  – Flask for Python for API endpoints, MongoDB to cache actions and indexes
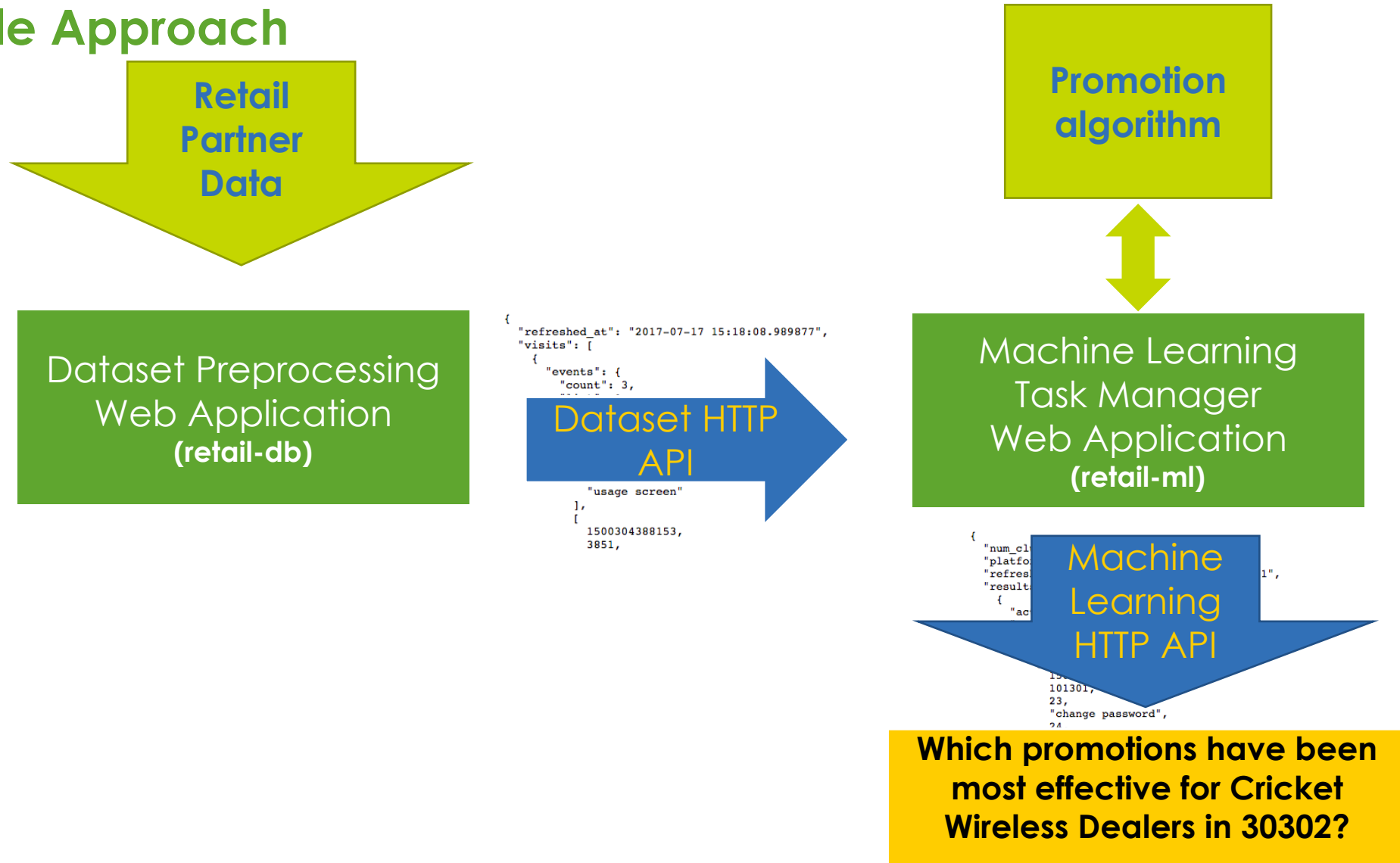
Machine Learning Task Manager(siren-ml)

• Returns cluster results per platform using datasets from siren-db

  – Flexible URL Parameters

  – Queue ML background tasks

  – API endpoints return JSON data

  – Flask for Python, scikit-learn for clustering, Redis Queue to manage tasks

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A Flexible Approach

Retail Partner Data

Promotion algorithm

Dataset Preprocessing Web Application **(retail-db)**

Dataset HTTP API

{
  "refreshed_at": "2017-07-17 15:18:08.989877",
  "visits": [
    {
      "events": {
        "count": 3,
        "usage screen"
      ],
      [
        1500304388153,
        3851,

Machine Learning Task Manager Web Application **(retail-ml)**

{
  "num_cl
  "platfo
  "refres
  "result
    {
      "ac
  101301,
  23,
  "change password",

Machine Learning HTTP API

Which promotions have been most effective for Cricket Wireless Dealers in 30302?

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The Internship Experience

Agile Development and Active Learning

Personal Background

- Previously exposed to basic machine learning and Python

- No prior experience with current project

Daily Work

- Agile Scrum

- Self-learning from documentation, existing code samples, communication with Cricket Wireless team members

  – Surveyed Academic Publications

  – Cricket Resources

  – Shared resources

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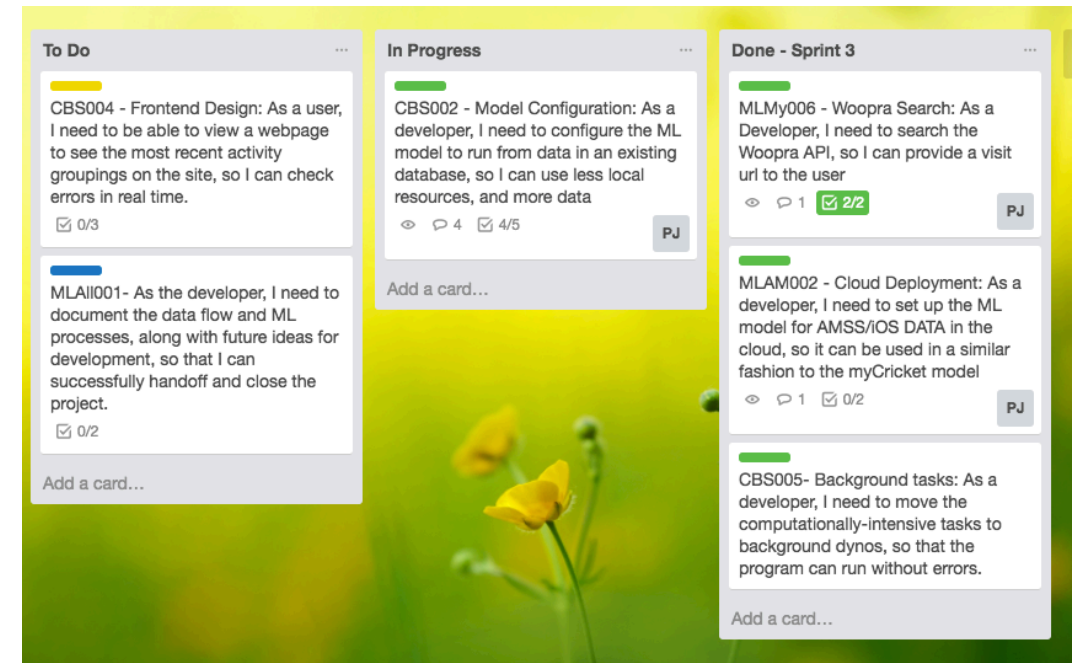
Personal Challenges

The rewarding aspects of my experience this summer.

Maximizing Impact while Limiting Scope

- Limited timeframe
- Easy to expand project without considering the time needed to complete or accommodate new features
- Scrum process was very helpful

Reaching out to resources at Cricket Wireless

- "sandbox" project by nature, not as immediately applicable for Self-Service team members
- Received good feedback from team members
  - Database usage, Woopra support, Microservices

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Takeaways

- Exposed to Agile Process
  - Process overhead for single-person team
  - Perspective for future project management
- Immense growth in technical knowledge
  - Debugging and deploying applications that run on a PaaS
  - More involved version control
  - More consistent JSON API structure
  - Applicable for personal projects and future career search
    - Pursuing Node.js in spare time
    - Researched Microservices for larger scale applications

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