A look into LAFD Response Time

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Background

LAFD admits exaggerating response times

Department statisticians have been calculating responses using 6-minute formula, even though federal guidelines use 5-minute standard

Mar 13, 2012

L.A. NOW LOCAL

No progress on LAFD 911 response times, new data show

By BEN WELSH OCT 23, 2014 | 3:54 PM

L.A. Fire Department admits exaggerating response times

MARCH 10, 2012 | 8:44 AM

City Defends LAFD Response Times

Mayor calls for city controller review

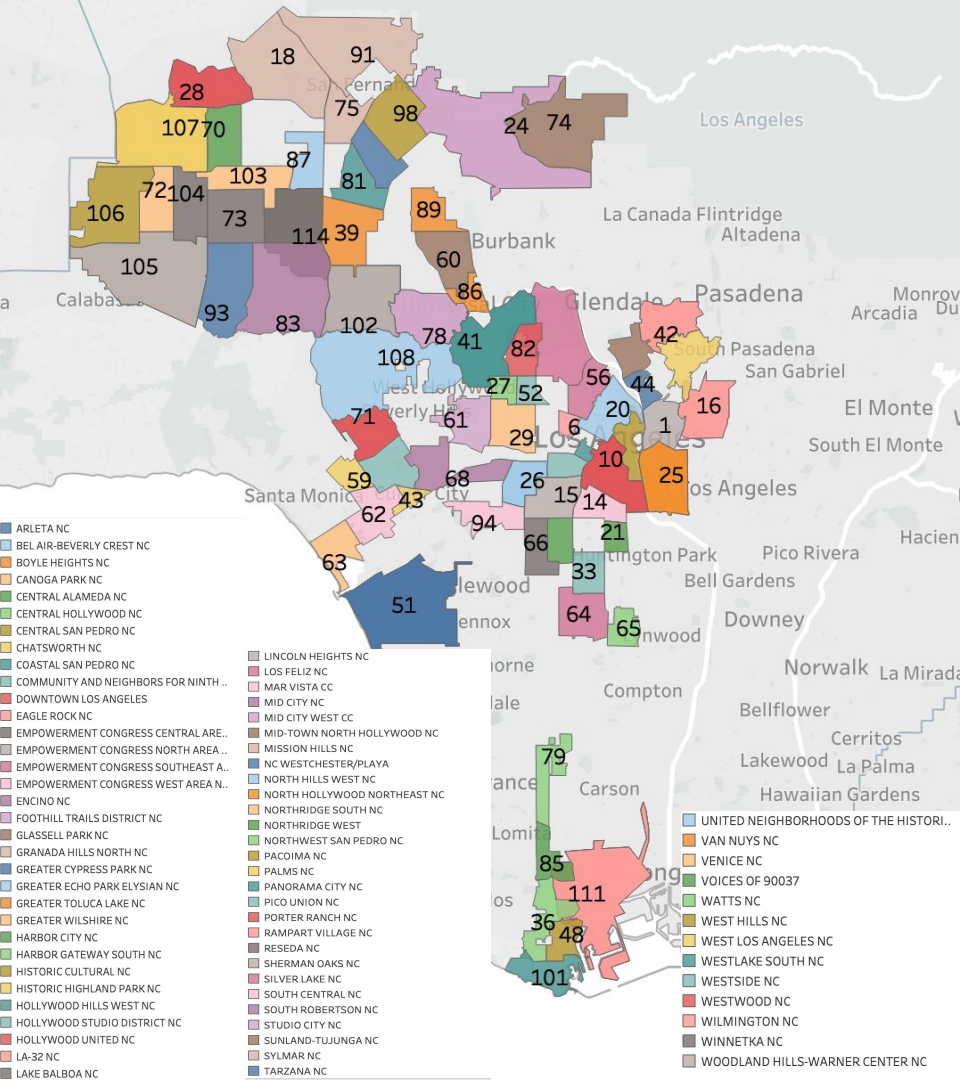
By Olsen Ebright and Robert Kovacik

Published Mar 13, 2012 at 2:38 PM | Updated at 12:04 PM PDT on Mar 14, 2012

- LAFD admitted that they exaggerated the data to make it appear that firefighters were responding to emergencies quicker than they actually were.
- "Federal guidelines call for first responders to arrive on scene in under five minutes 90% of the time." - Source
- Recent years, LAFD Response Times increased
- Use Cases:
  - LA County Residents → better understanding on LAFD potential response times in their neighborhood based on certain factors
  - City of LA → determine what areas/factors need evaluation/improvement

Overview:

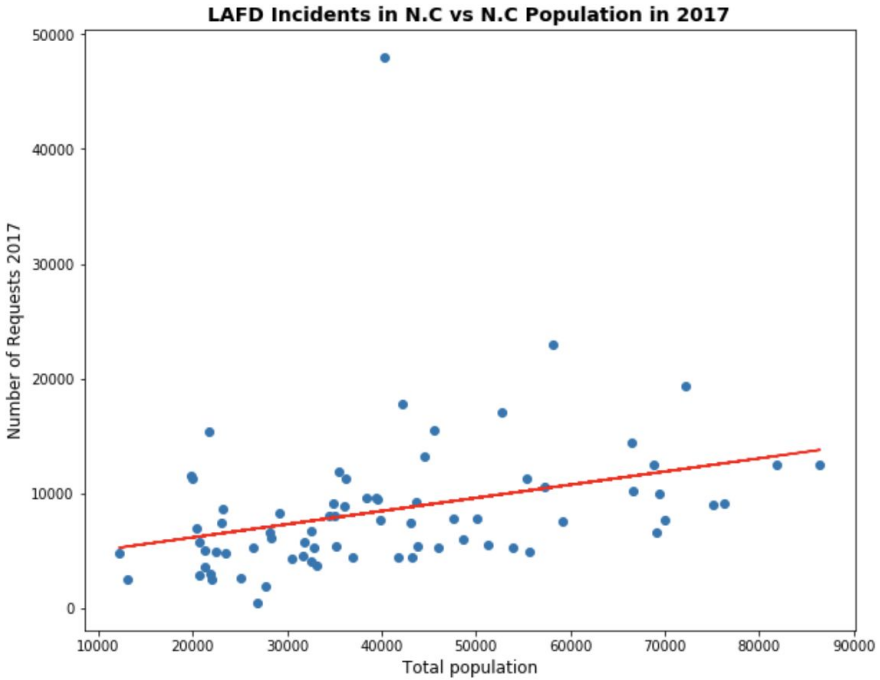
1. Problem Statements
2. Datasets Introduction
3. Data Exploration Analysis
4. Predictive Models
5. Recommendations & Future Works



Data Introduction

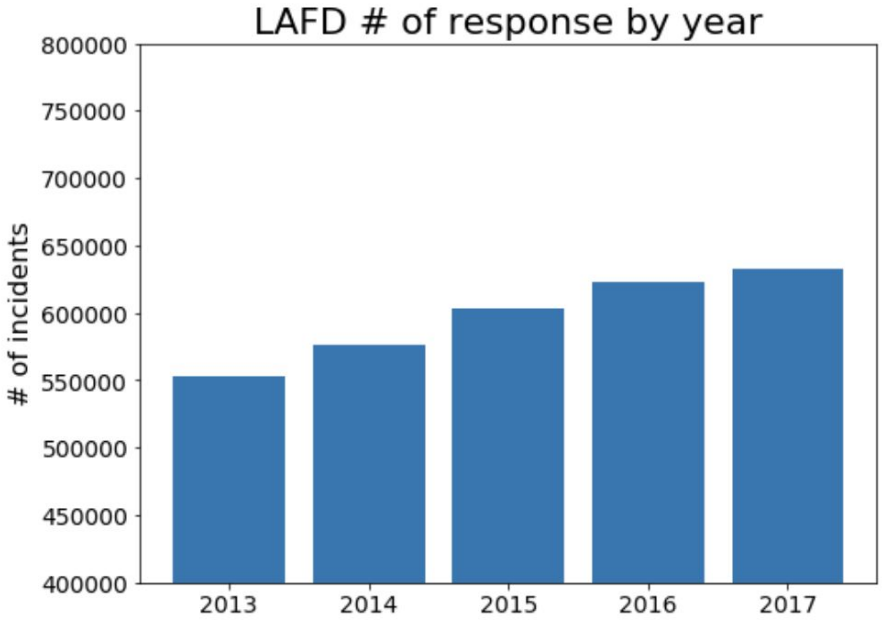
- LAFD Response Metrics Raw Data
  - +4 MM emergency reports (11 metrics)
- Census Data by Neighborhood Councils
  - 97 Neighborhood Councils (13 metrics)
- All Stations Response Metric
  - All LA County Fire-stations avg. response
- LA County Fire-Station Locations
  - Geospatial data (geojson)
- Neighborhood Councils Boundaries
  - Geospatial data (geojson)

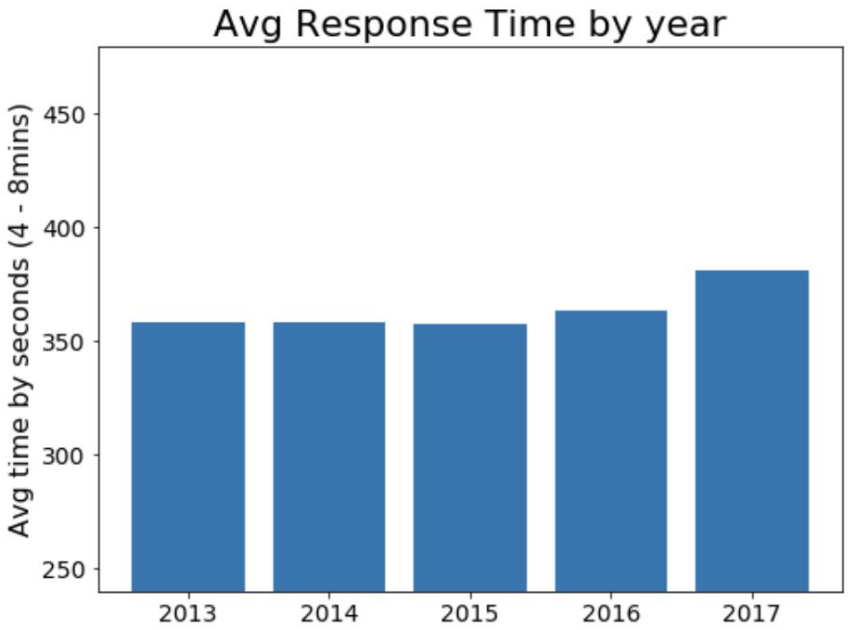
LAFD responses by Neighborhood Councils (2017)



- Linear Regression Results:
  - Slope = 0.11
  - R-value = 0.32
  - P-Value = 0.005
- Weak linear relationship

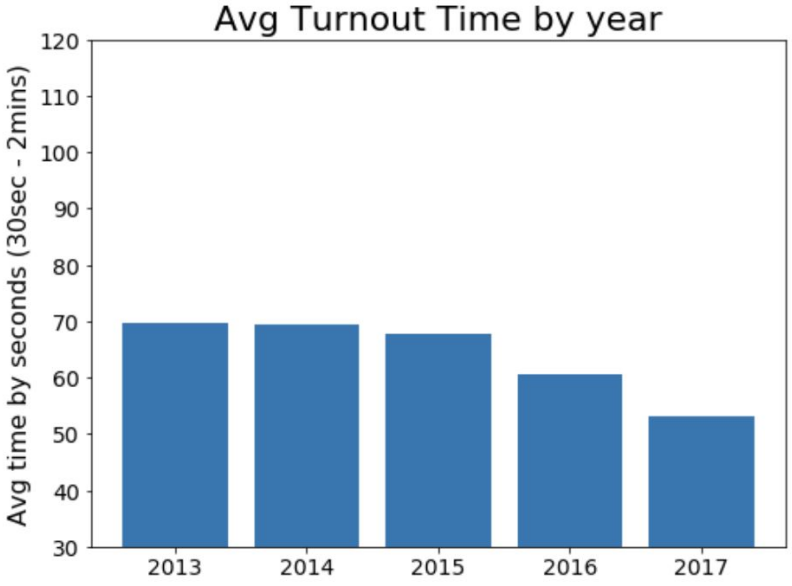
LAFD Response over the years

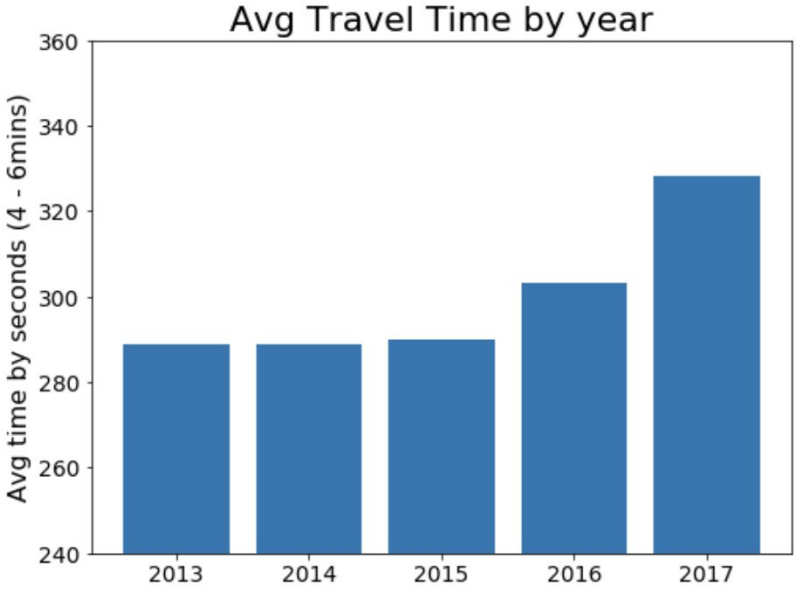




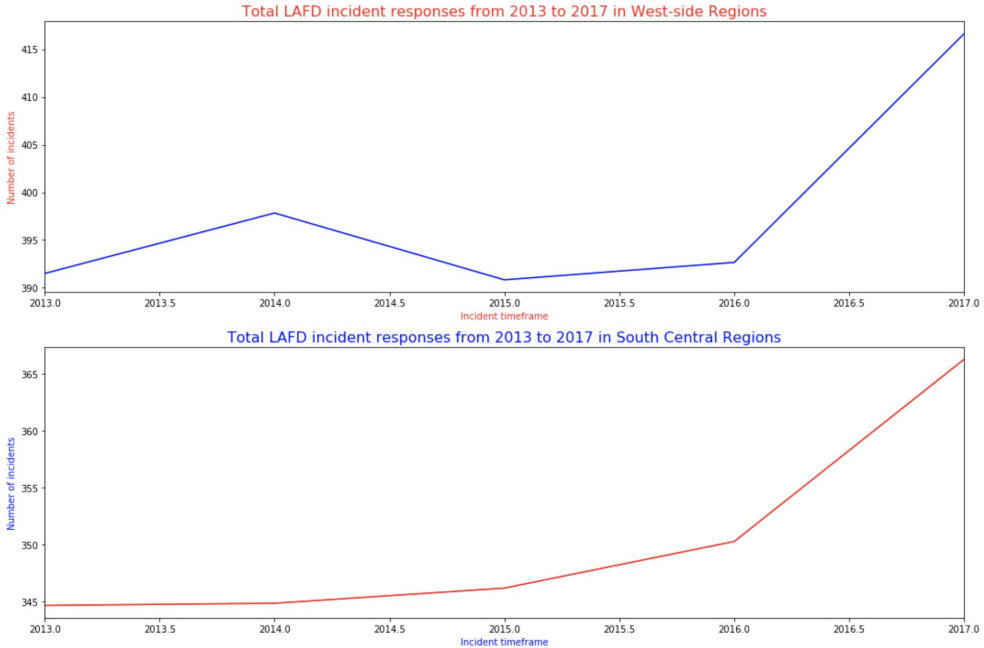
LAFD Response Times over the years

- *Turn-Out Time → time b/t activation of station alert to when first responders start en-route*
- *Travel Time → time b/t when first responders are en-route up until their arrival on scene*





West LA vs South Central LA

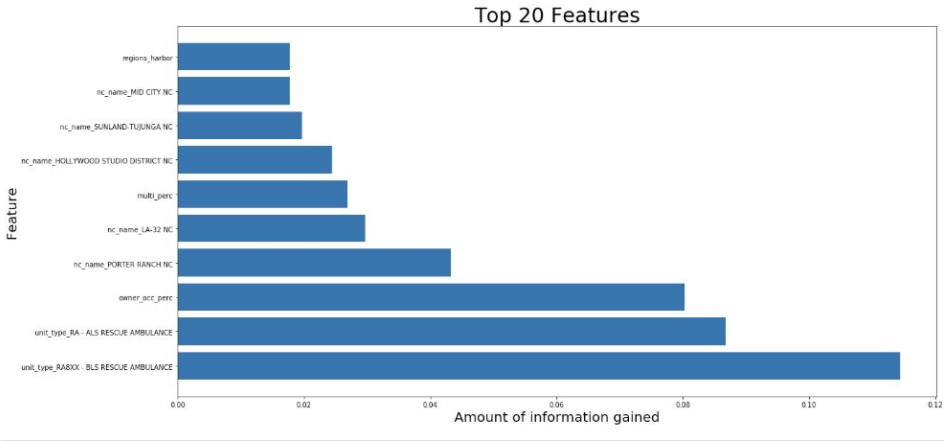


- West LA:
  - Avg→ 6 min 38 sec
- South Central LA:
  - Avg → 5 min 50 sec

Predictive Models

- Baseline:
  - RMSE → 221.7
  - R2 Score → 0.0%

1. Linear Regression Model
   a. Test R2 Score → 16%
2. Random Forest Regressor Model
   a. Train R2 Score → 61%
   b. Test R2 Score → 6%
3. XGBoost Regressor Model
   a. Test R2 Score → 23%
   b. RMSE → 0.434



Recommendation

- BLS (Basic Life Support) Rescue Ambulance [# 827]
  - 435 sec on average (response time)
  - +100 K response calls per year

- ALS (Advanced Life Support) Rescue Ambulance [# 27]
  - 379 sec on average (response time)
  - +200 K response calls per year
- **INCREASE ALS > BLS**

Future Steps

- Conduct a study to see if the decrease in BLS & increase in ALS ambulances will decrease ALS response times
- Role of idle ambulances, old equipments, inefficient systems and the impact it has in response times
- Impact that traffic & topography has on response times