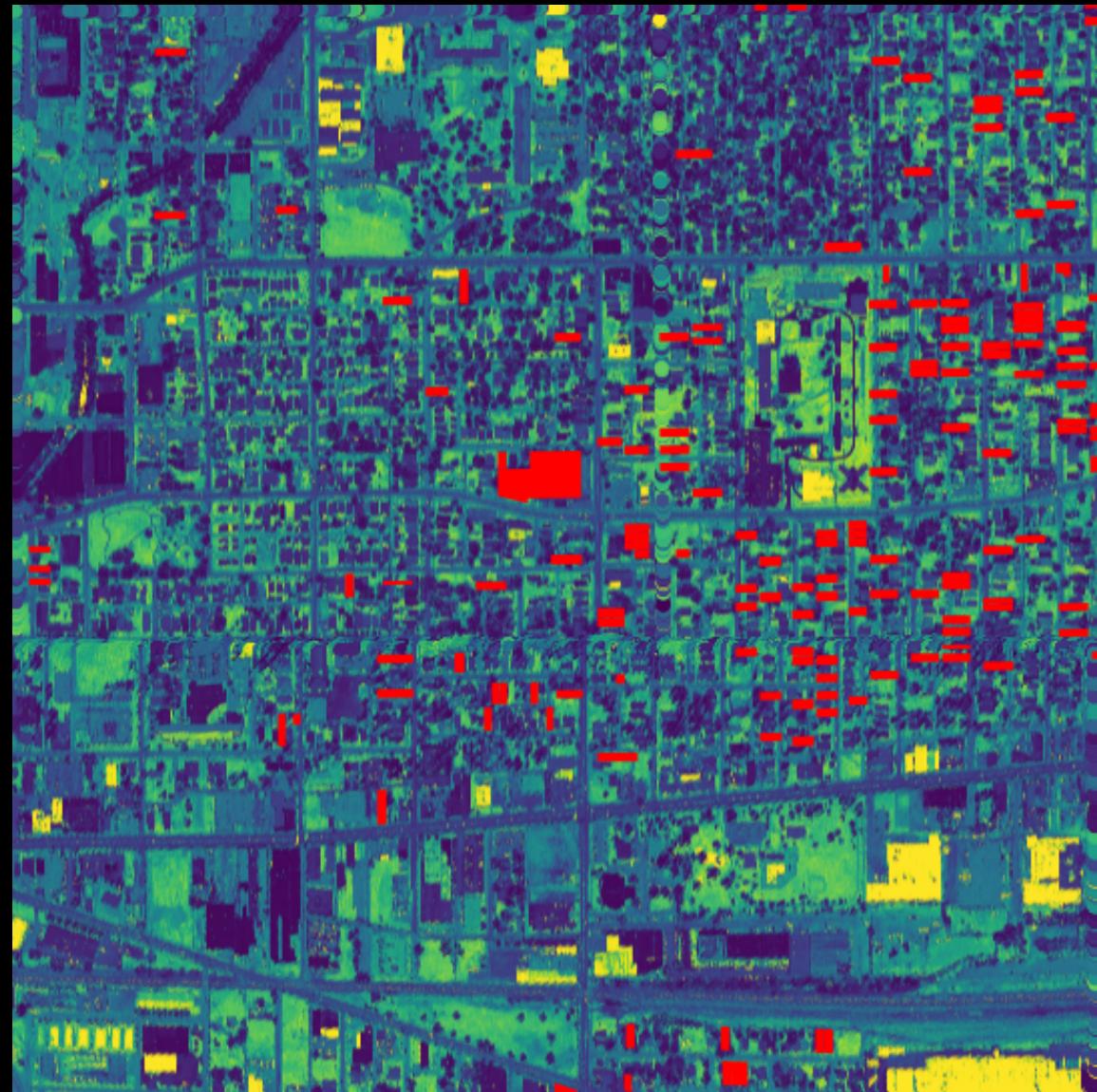


Identifying Abandoned Buildings In Aerial Imagery



Zachary Brown, Data Scientist







Problem Statement

- Train a model that takes aerial imagery of Indianapolis, IN and classifies a building as either occupied or vacant. Improve upon the baseline accuracy.



Project Inspiration

- Association with violent crime¹
- Current approach is time and resource intensive

1) Branas, C. C., Rubin, D., & Guo, W. (2012). Vacant properties and violence in neighborhoods. https://repository.upenn.edu/cgi/viewcontent.cgi?article=1004&context=cml_papers

Challenges

- Find the data
- Merge separate datasets
- Model choice and tuning



Challenge #1

Finding the Data

■ Government

- Indianapolis, IN
- 2021

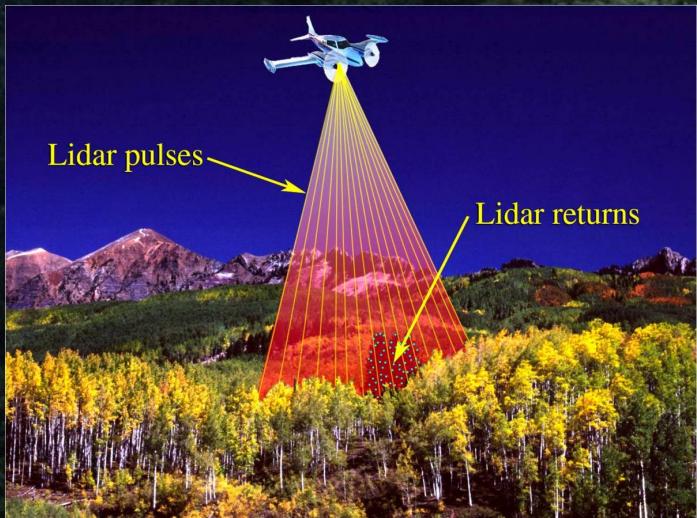


Challenge #1

Finding the Data

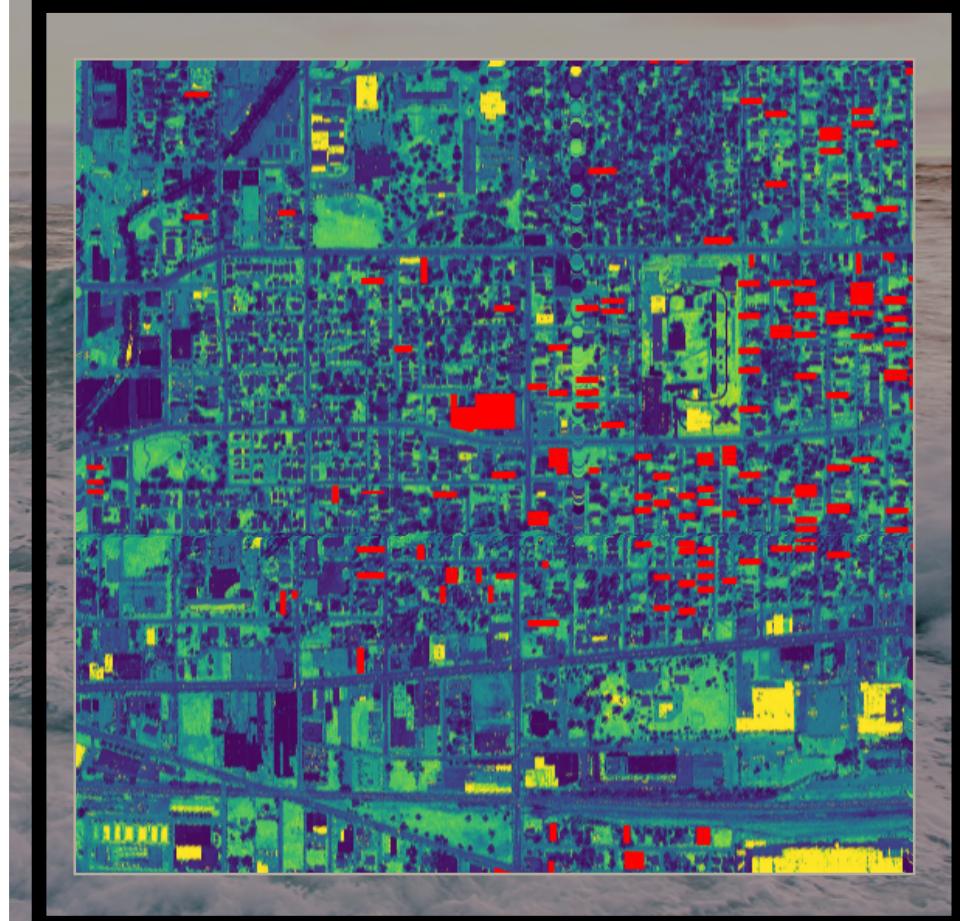
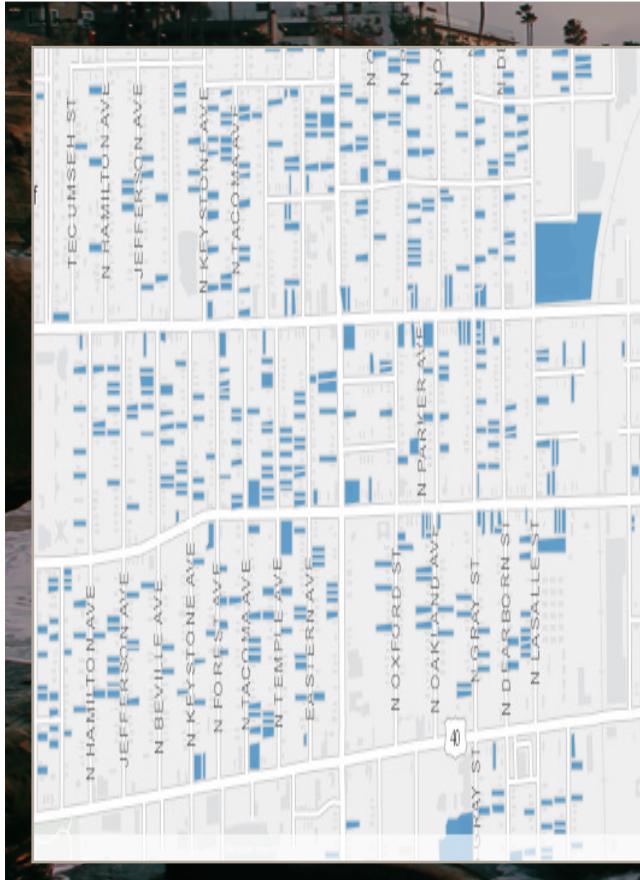
■ Building imagery

- LiDAR
- US Dept. of Agriculture
- 2016



Challenge #2

Merging the Data



Challenge #2

Merging the Data

- Transform Coordinate Reference System
- Check 11.3 million points
- Geopandas, Shapely, Laspy

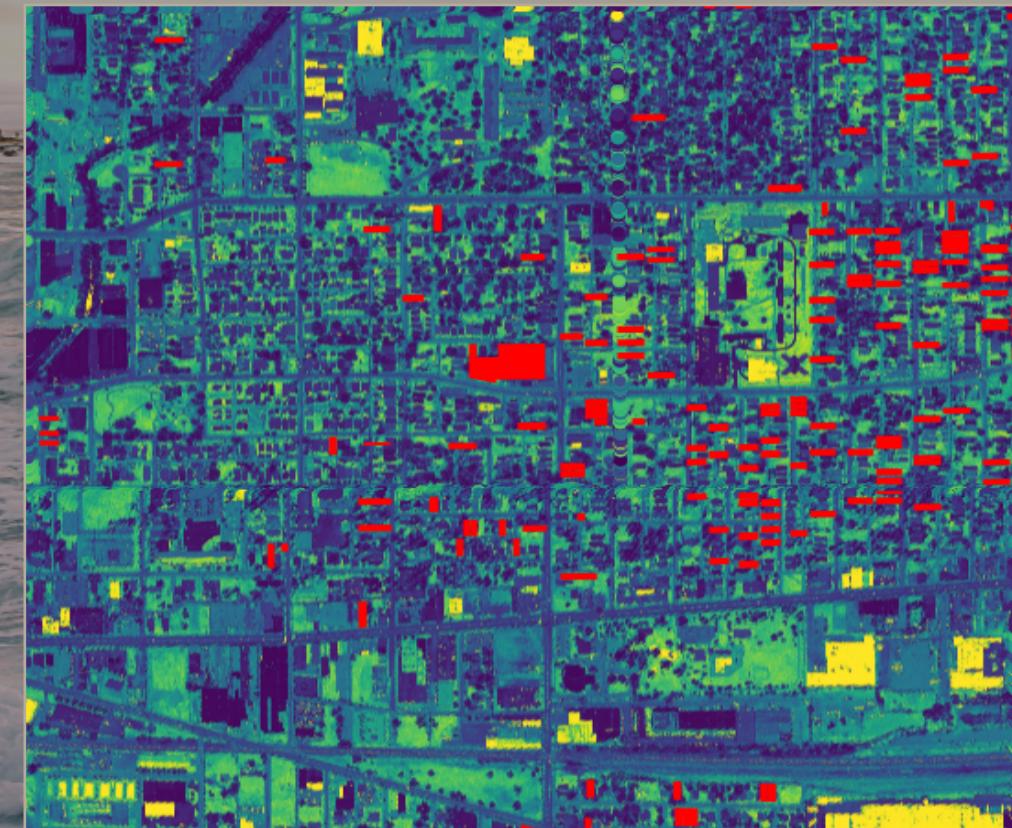


Image Segmentation

- Autonomous cars
- Medical imaging
- Building and tree identification



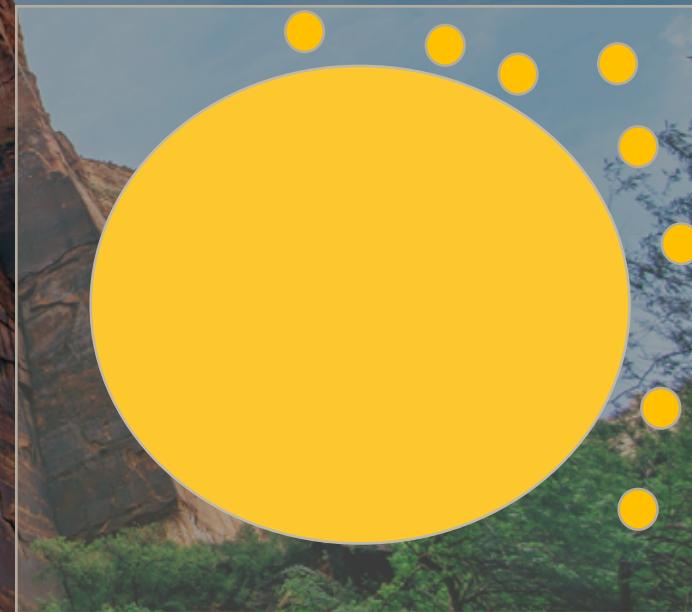
Challenge #3

Modeling

■ 294,848 Pixels

■ Accuracy

■ Sensitivity



Training

Accuracy % change

Sensitivity

K-means	-3.92 %	4.75 %
MLP Classifier	0 %	0 %
SVC	0 %	0.26 %

Testing

Accuracy % change

Sensitivity

K-means	-0.14 %	0 %
MLP Classifier	-0.63 %	0 %
SVC	-0.62 %	0 %

CREDITS

Special thanks to all people who made and shared these awesome resources for free:

- Presentation template designed by powerpointify.com
- Photographs by unsplash.com
- Graphics by freepik.com

LiDAR image: https://archaeologicalphotorelief.files.wordpress.com/2014/07/how_lidar_works.jpg

Airplane image: <https://www.technocrazed.com/wp-content/uploads/2015/12/Airplane-wallpaper-123.jpg>

Airplane view: <http://mariuszjeglinski.com/blog/wp-content/uploads/2016/06/New-York-City-2.jpg>

Image segmentation: https://miro.medium.com/max/4800/1*rZ1vDrOBWqISFiNL5OMEbg.jpeg

Fred Flintstone: <https://www.deviantart.com/rovertarthead/art/Fred-Flintstone-thinks-377430958>

NYC: <https://cdn.businessinsider.de/wp-content/uploads/2019/06/new-york-city-manhattan.jpg>