Satellite Image Classification for Navigation Software in SageMaker

Laura Catano, Mark Chen,
Callie Page, Weizhong Yao

Today's Agenda

01 SageMaker and S3

02 Big Data, Satellite Images and Navigation Software

03 Using SageMaker and S3 to Build Navigation Software

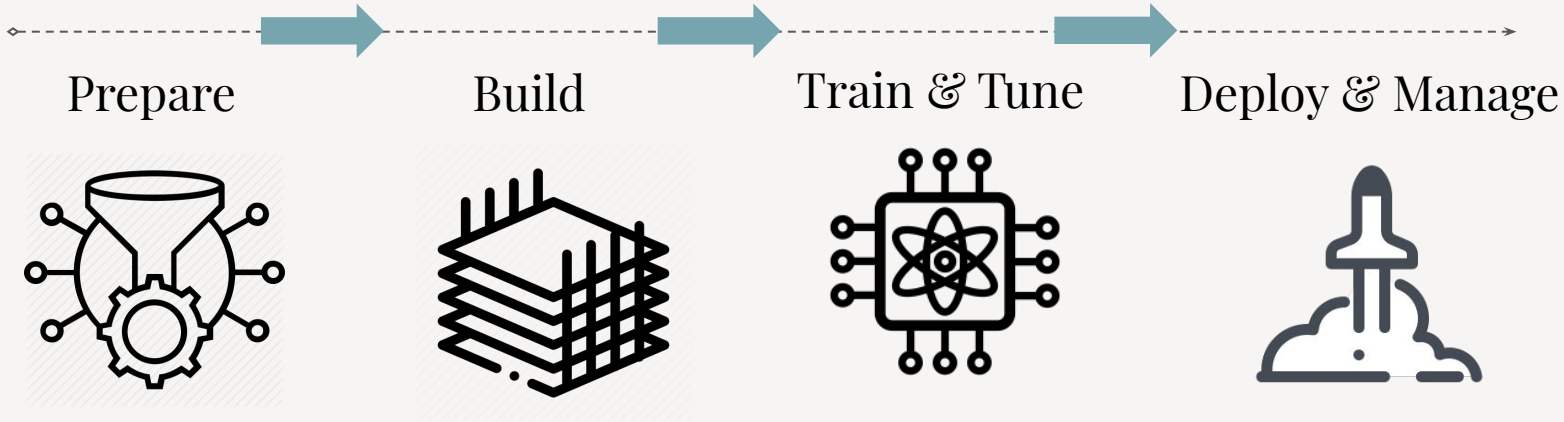
04 Conclusion

01

SageMaker and S3

Amazon Sagemaker Is An Efficient Cloud Machine Learning Platform

Amazon SageMaker



https://aws.amazon.com/sagemaker/

SageMaker Increases Productivity and Reduces Cost

Amazon SageMaker

10X

Increase in team productivity

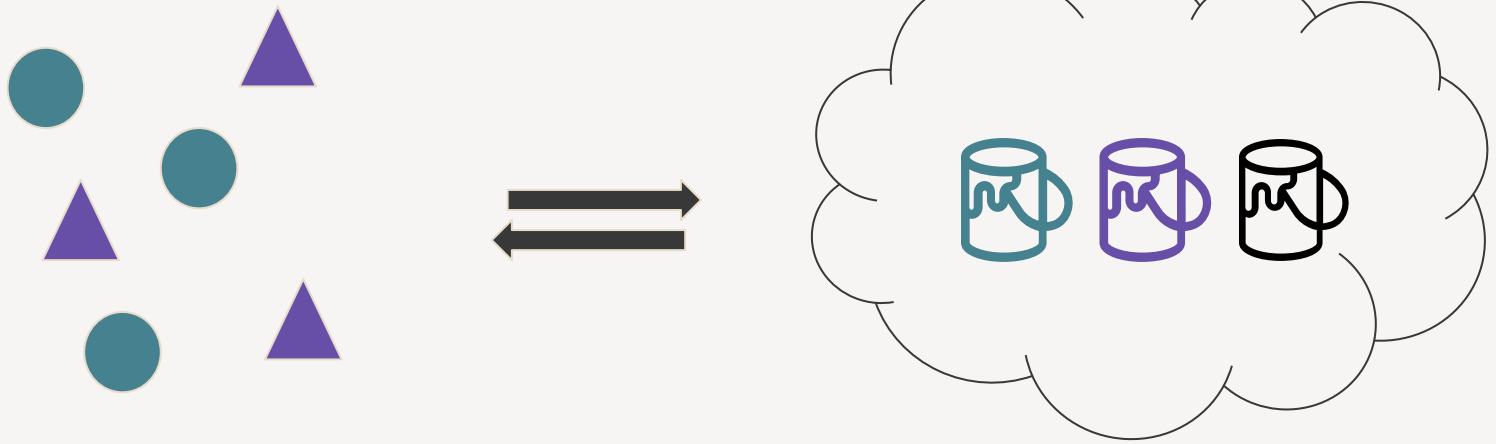
90%

Cost reduction with managed spot training

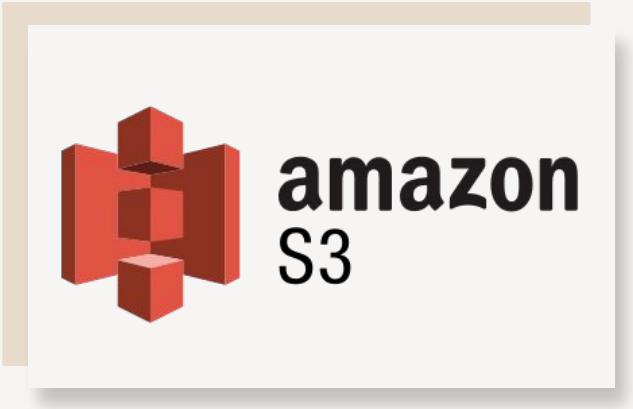
70%

Reduction in data labeling costs

An introduction to Amazon S3



There are many benefits to using S3 for data storage



Scalability

Easy and inexpensive to scale up or down

Durability

Amazon S3 provides **99.99999999%** durability of objects

Latency

Significantly lower latency

02

Big Data, Satellite Images, and Navigation Software

Satellite images provide a lot of business value that is difficult to extract

Complex

0.3 GB per 100 sq km.
Twin Cities: **70 GB**
The World: **186 TB**

Interpretation is difficult

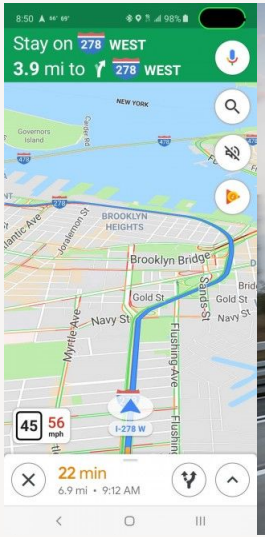
Expensive

Takes long time to process

Information from satellite image is useful for navigation software

Road map

Speed limit

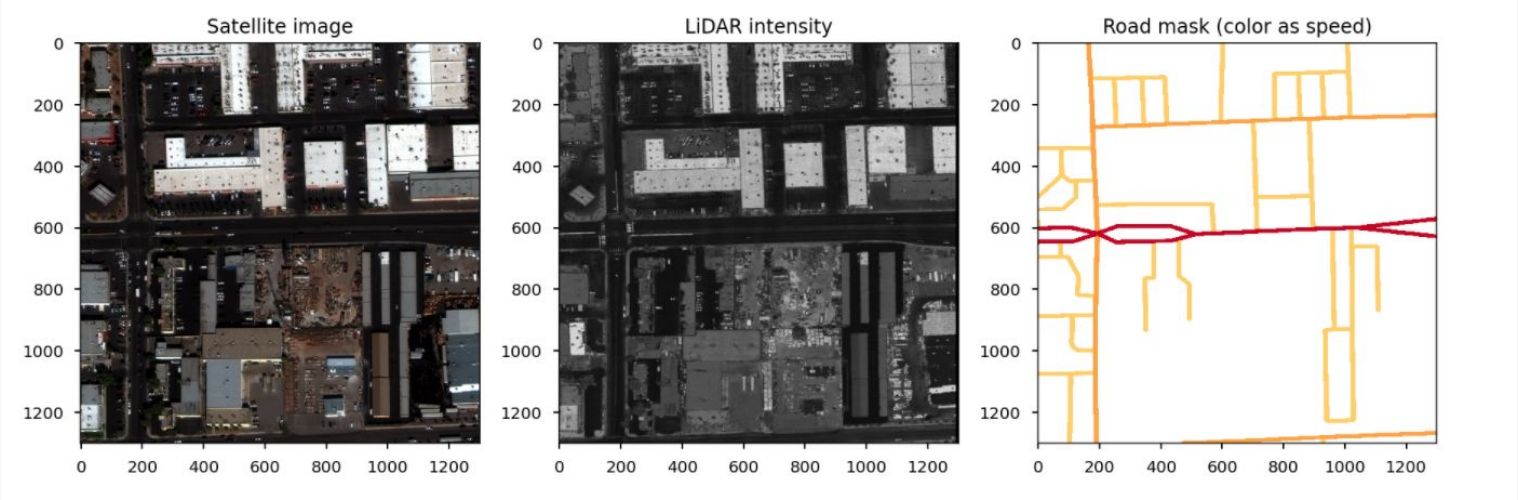


03

Building Navigation Software with SageMaker and S3

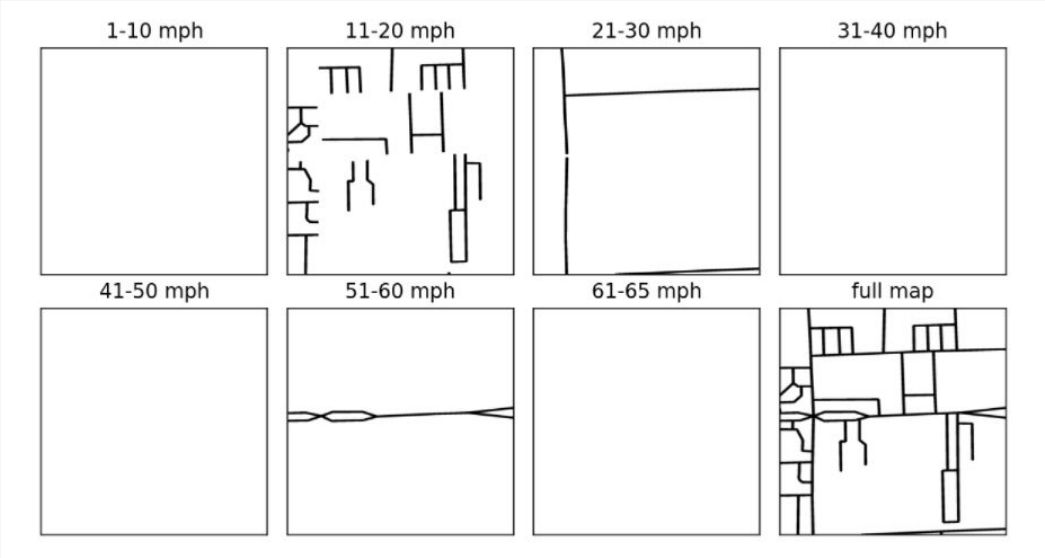
We used three different types of data for this model

- 60+ GB of satellite image data from around Las Vegas



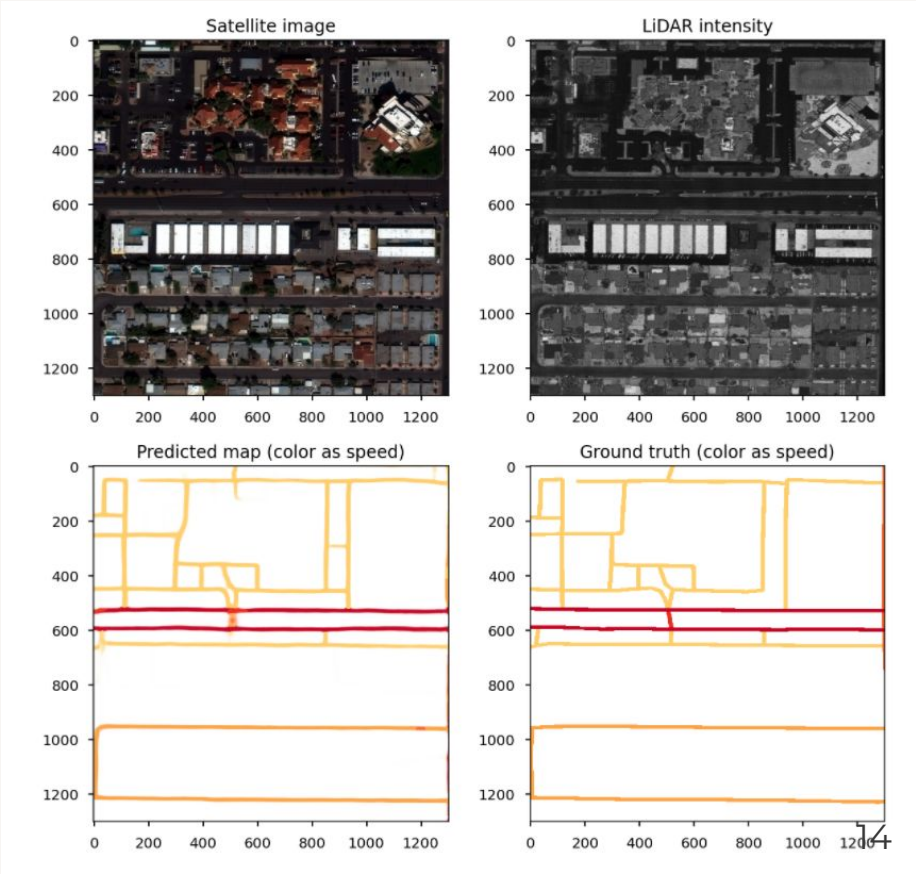
Breaking down the prediction problem

- Model predicts the maps in each speed category
- Training data is broken into 7 categories
- Predicted data is aggregated from 7 categories to 1 final map



The Road Prediction Model

- Train a ResNet-Unet Convolutional Neural Net model for $14.98 an hour
- Employ a pre-trained model for $2.77 an hour
- Model is able to isolate the roadways and speed limits



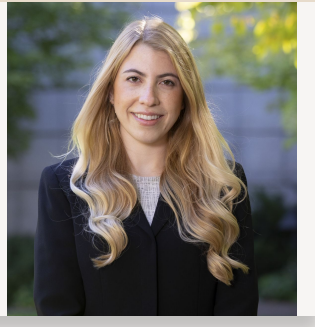
04

Conclusion

Conclusion

- Amazon S3 and Sagemaker are scalable solutions for large scale predictive modeling
- With these tools, satellite images can be analyzed for navigation software and future technologies

Thank You



Laura Catano
catan027@umn.edu

Mark Chen
chen6229@umn.edu

Callie Page
page0268@umn.edu

Weizhong Yao
yao00135@umn.edu

More information: github.com/calliepage/MSBA6330-Road-Speed-ID