Capstone for Arthrex

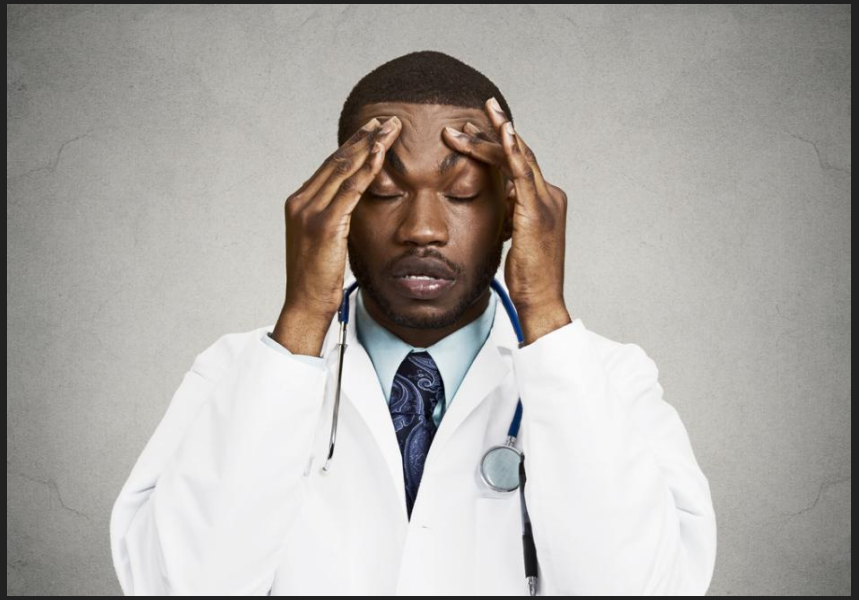
ASSIST MD

Problems faced by Medical Personnel

Record Patient/Event annotations

PA transcription of records

Malpractice and legal defenses



What does Assist-MD do?

Real-time tracking of medical Instruments

Generate stats of surgical events

How can Assist-MD Help the Medical Industry?

Effortless documentation and extremely accurate surgery event indexing

Medical personnel receive analytics that could improve their performance

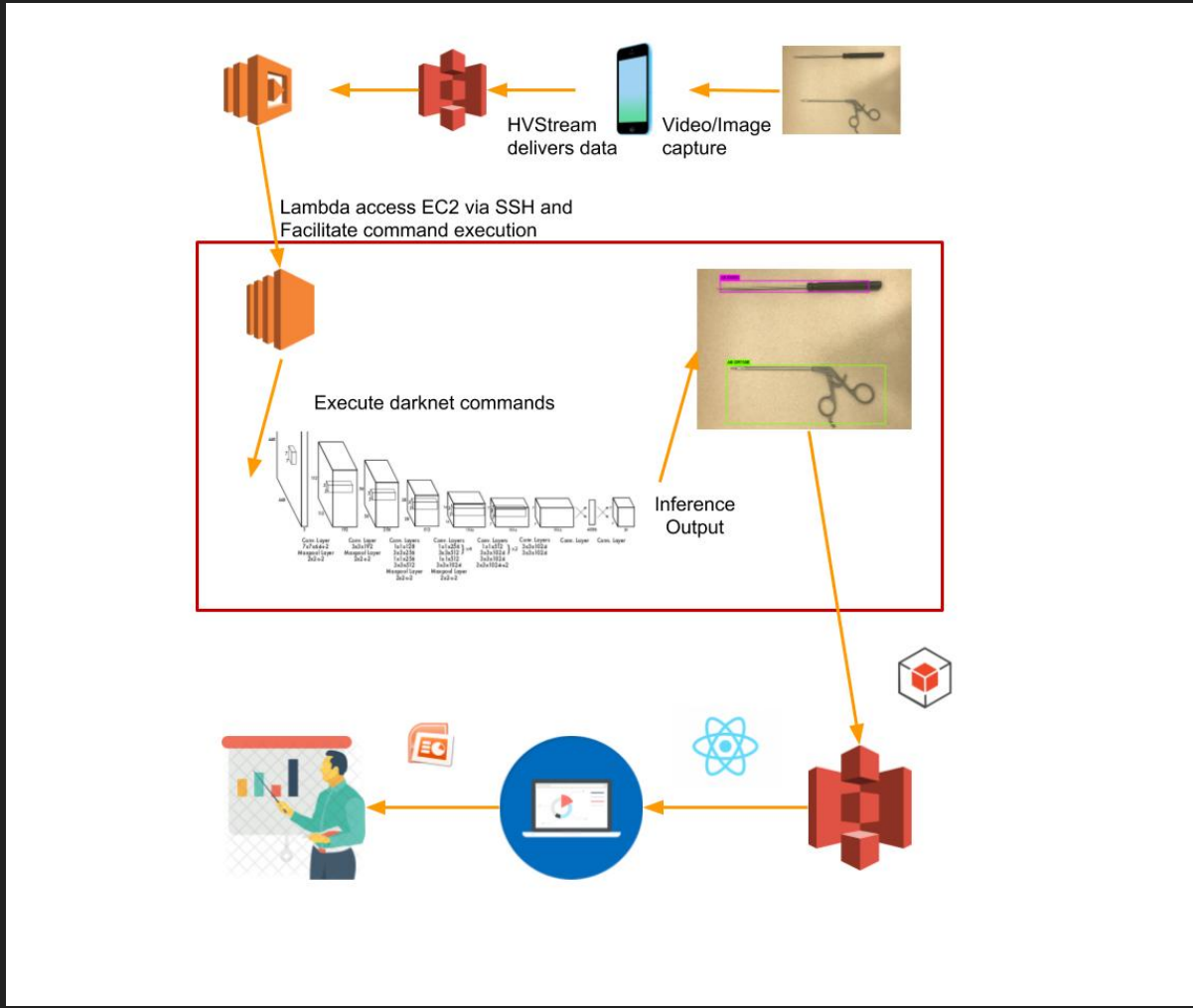
Doctors have more time for patient care - time to improve cafeteria food (;

Overview

iOS

AWS

Web

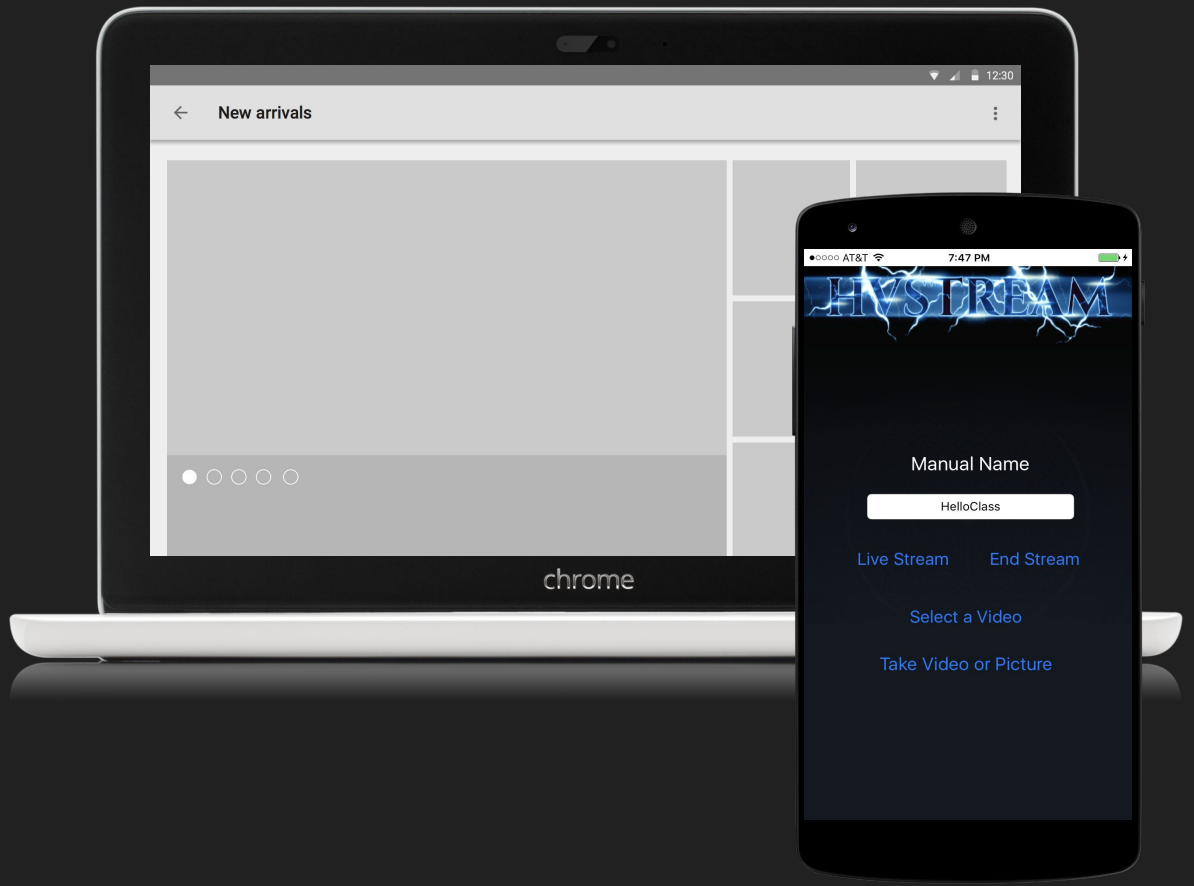


The Frontend

Overview: React and AWS SDK

Key Points: Navigation bar and Search bar

Challenges: Making website seamlessly transition from different devices as well as handling different bugs the user might cause

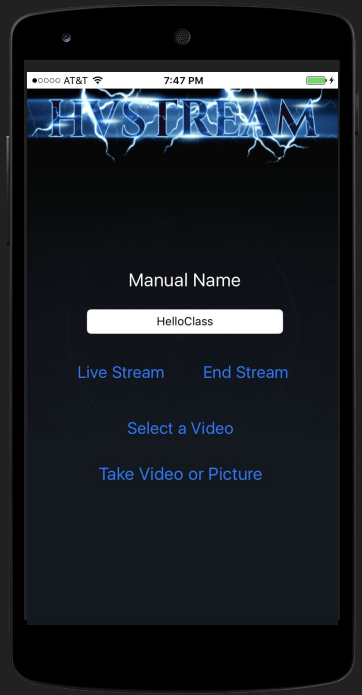


Data Upload Solution : HVSTREAM

HVStream allows data to be uploaded to our AWS resources.

Implements:

- Swift upload due to ease of access using phone cameras
- Quick changes can be made to upload variables
- Future implementations: live streaming using frame capture
- Connects to AWS S3 and AWS Lambda



AWS Backend

Lego-like service architecture

Takes care of Web Hosting

Creates event triggers

Runnable instances of code

EC2 instance to run Darknet

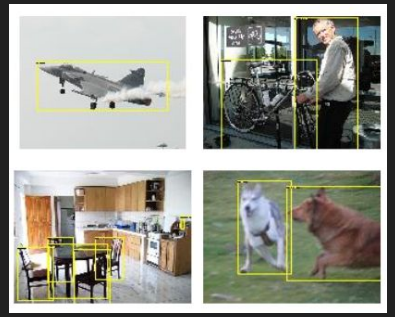
Image Recognition

Problem: We need our system to be able to recognize surgical tools.

e.g. AR-10000 & AR-13975SR

Solution: Machine Learning with YOLO.v2

-You Only Look Once
-runs on CNN Darknet
-open source
-by Joseph Redmon
-optimized for speed



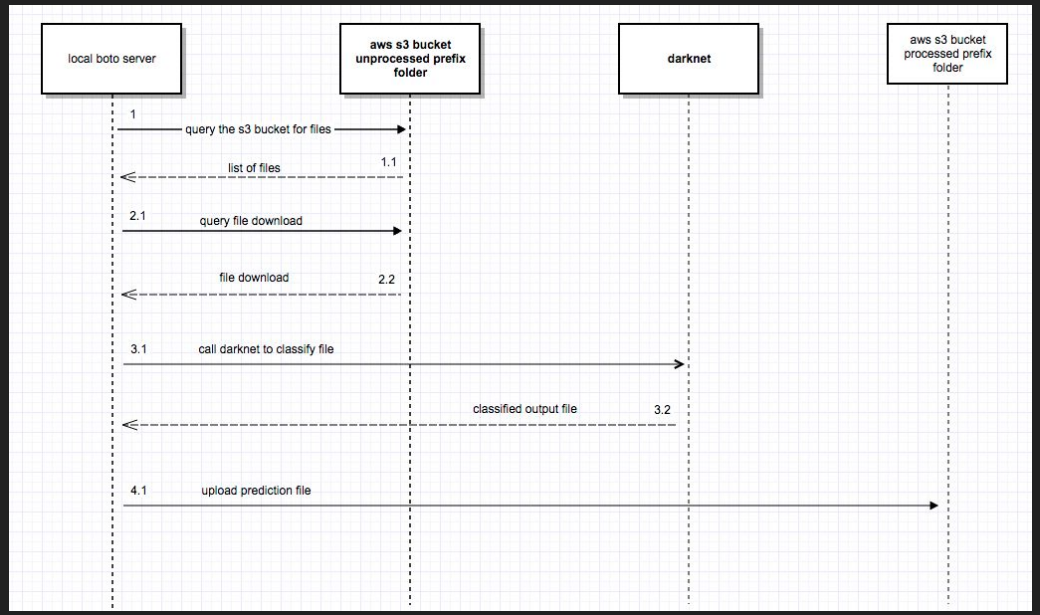
	Pascal 2007 mAP	Speed	
DPM v5	33.7	.07 FPS	14 s/img
R-CNN	66.0	.05 FPS	20 s/img
Fast R-CNN	70.0	.5 FPS	2 s/img
Faster R-CNN	73.2	7 FPS	140 ms/img
YOLO	63.4	45 FPS	22 ms/img

Custom ML Model in Action

Stand-in Server

In case ec2 instance fails:

- Use local machine as server, Cover our bases
- Download files, run darknet, upload prediction to aws S3
- Challenges: handle various edge cases, testing



Next Steps Moving Forward into CS 189B

Frontend
More analytics

Backend
Live streaming

Machine Learning
Personnel tracking

Other Areas
Increasing accuracy

DEMO

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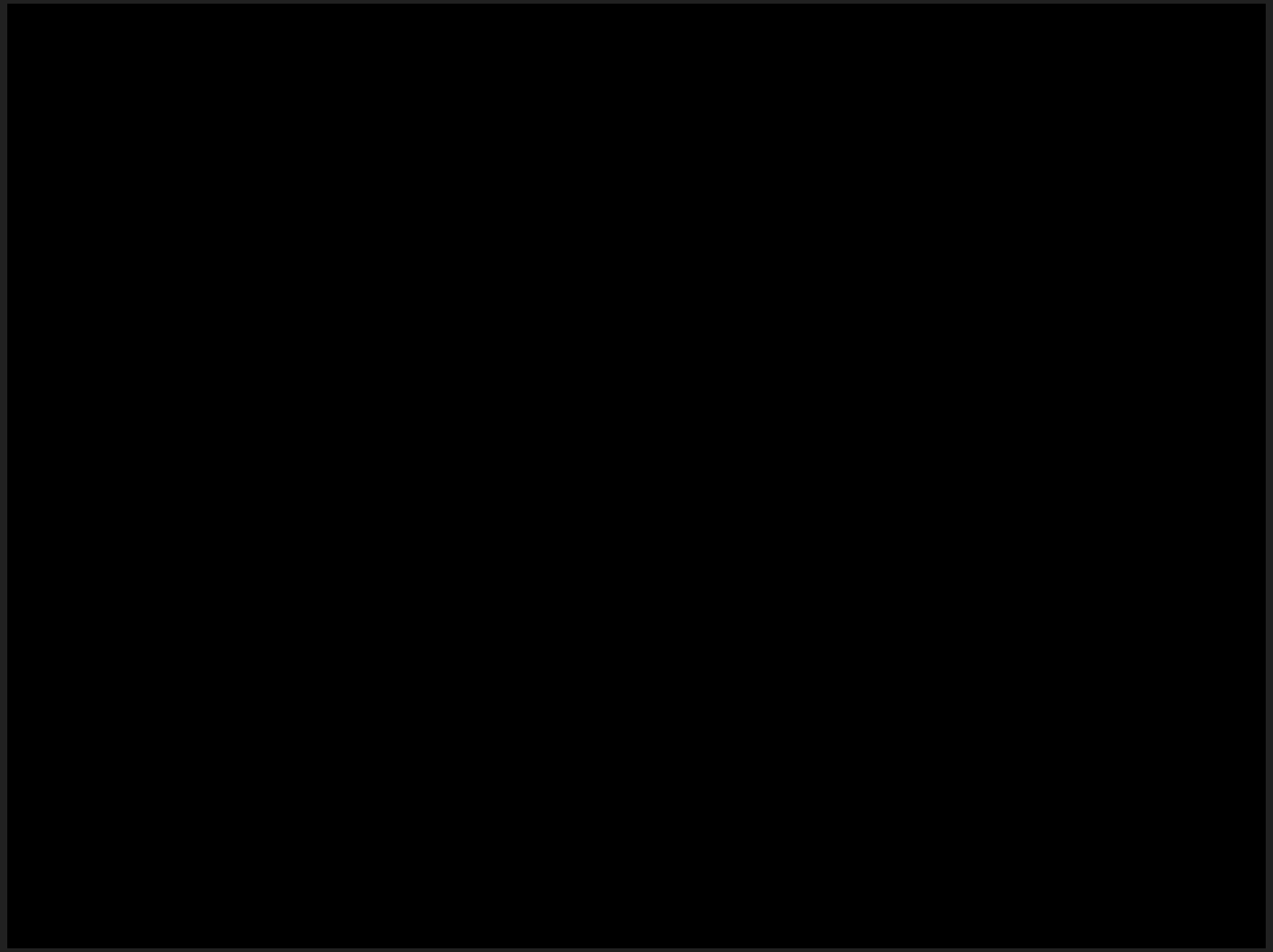

Thank you for listening and have a good rest of your day!

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