

*Photo by Patrick Rex*

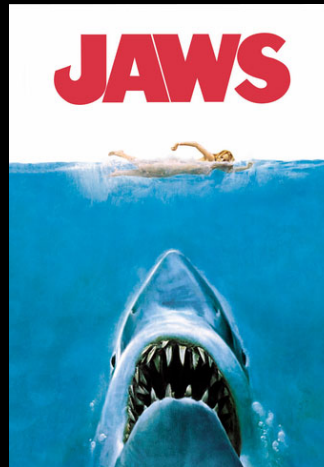
# Identifying Humans in Drone Footage from Local Beaches

*Echelle Burns – Feb 2020*

# Introduction: The Problem

Shark Attacks are glorified in the media

- Shark attacks do not occur as frequently as portrayed by pop culture



- No current research on the spatio-temporal overlap between White Sharks (*Carcharodon carcharias*) and beach recreationalists

## *Introduction: The Solution*



### Drone Technology in Marine Biology:

- Increasingly popular
- Allows observation of animals without influencing their behavior

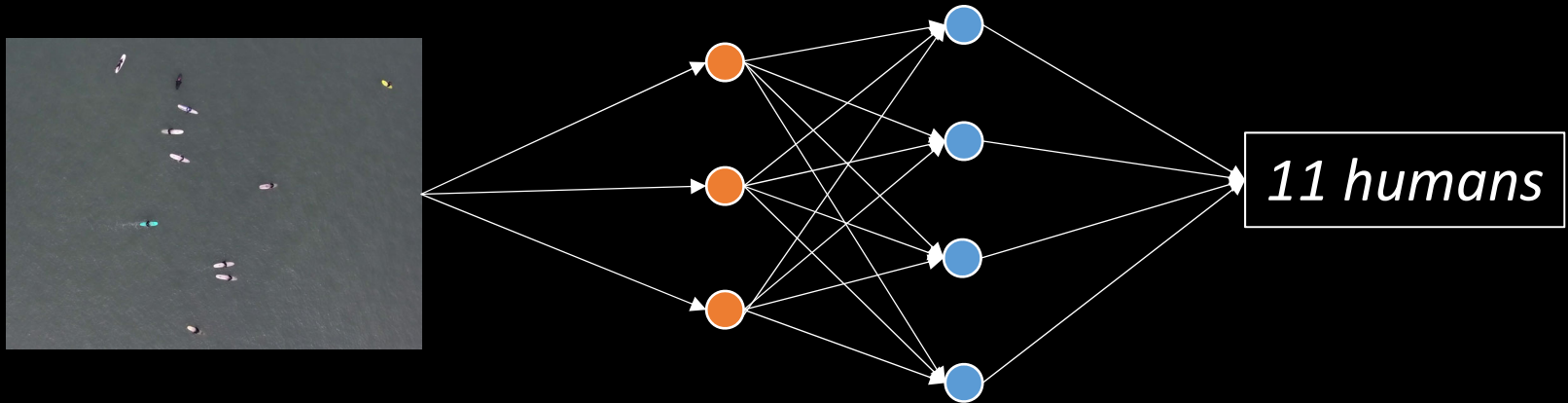
### Caveats:

- Amount of footage increases substantially with each drone flight
- Need a fast way to identify whether humans are present in a image

# Introduction: Project Objectives

## Objectives:

- Use a Deep Neural Network to identify how many people are present in each drone still image



## Audience:

- Researchers with similar problems or who are trying to answer similar research questions



# Data Sources

- 2,465 drone images (3840 x 2160 px) from CSU Long Beach Shark Lab
- Surveys along beaches in Southern California
- Include footage of:
  - Beach Recreationalists:
    - Walking
    - Wading
    - Swimming
    - Paddle boarding
    - Surfing
    - Kayaking
  - White Sharks
  - Other marine animals



## *Methods: Image Labeling*

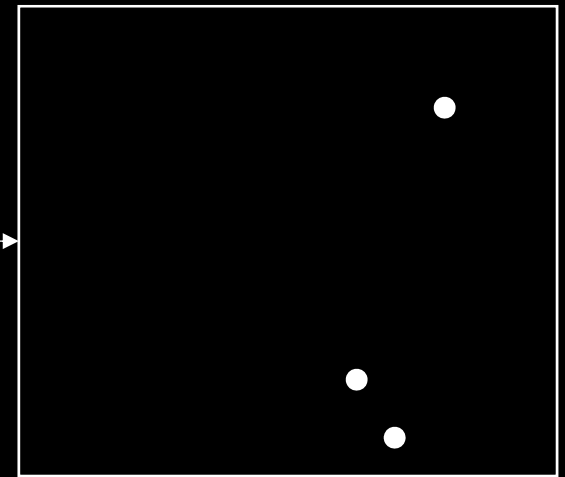
- Images resized (960 x 540 px) to make labeling easier
- Manual labeling by placing dots on locations of humans



Original



Manual Labeling



Labeled Image

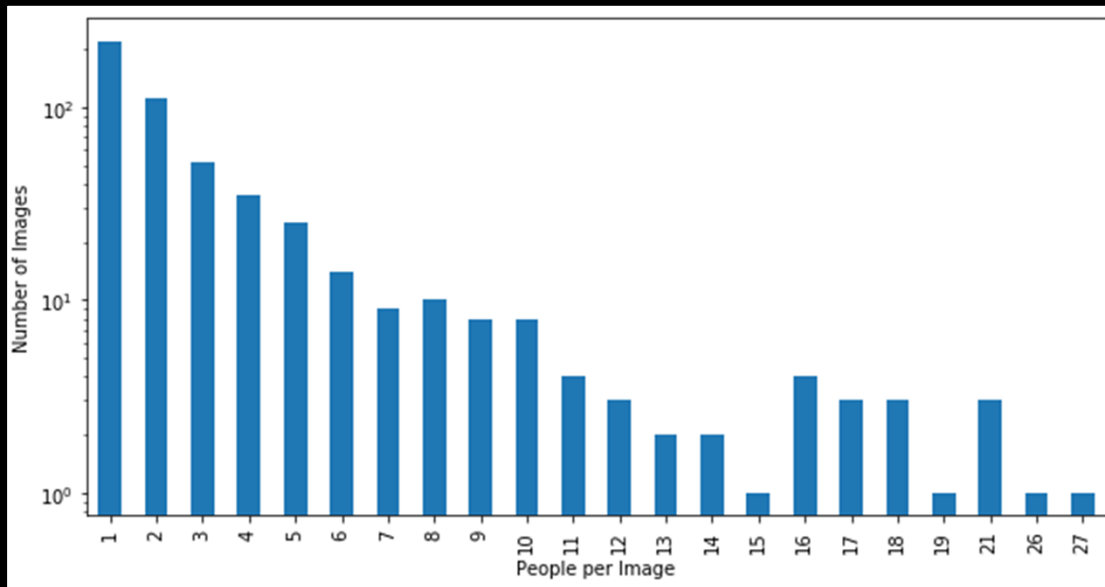
- Labeled images saved in black and white

## Methods: Image Slicing and Contrast Editing

- Resized Images cut into 25 smaller images (192 x 108 px)
  - Increase model efficiency
- Smaller images changed to grayscale/HSV to increase color contrast



# Methods/Results: Exploratory Data Analysis



- 521 images with humans present
  - Most with  $\leq 7$  humans

- 521 large images yielded 13,025 smaller images
  - ~90% had 0 people
  - ~7% had one person

