**Measuring Effectiveness of Video Advertisements**

Introduction

“Advertisements are unavoidable in modern society. Times Square is notorious for its incessant display of advertisements. Its popularity is worldwide and smaller cities possess miniature versions of the display, such as Pittsburgh and its digital works in Oakland on Forbes Avenue. Tokyo’s Ginza district recently rose to popularity due to its upscale shops and constant onslaught of advertisements to pedestrians. Advertisements arise in other mediums as well. For example, they help popular streaming services, such as Spotify, Hulu, and Youtube TV gather significant streams of revenue to reduce the cost of monthly subscriptions for consumers. Ads provide an additional source of money for companies and entire industries to allocate resources toward alternative business motives or to increase profit for future competitive ventures. They are attractive to companies and nearly unavoidable for consumers. One challenge for advertisers is examining the advertisement’s effectiveness or usefulness in conveying a message to their targeted demographics. If an advertisement is constructed, but an algorithm can predict with high accuracy whether it will be effective, and how effective in particular, businesses will save time and money. For example, a company creates an ad, but the algorithm predicts it will be ineffective, the business will have to spend more money to reimagine the ad, but potential revenue will increase since more consumers will enjoy the content after its recreation. In another scenario, a business creates an advertisement and there exist quarrels among stakeholders whether a specific portion of the ad should be changed, but the algorithm says the advertisement will be highly effective. The company will save time since they know changing the ad will cost more money and time to reshape it, while either hurting or

marginally increasing effectiveness. This challenge proves more significant in video advertisements. Rather than constructing a single, static image of content, a video advertisement possesses hundreds of frames of data with varying scenes, actors, objects, and complexity. Therefore, measuring effectiveness of video advertisements is important to impacting a billion-dollar industry across nearly any sector of industry.”

Dataset

3477 samples

6 input features

38 topics

30 sentiments

Action statement

Reason statement

5 funny levels

5 exciting levels

3 language values

1 output feature

5 effective levels

High dimensional & small

Youtube videos

Annotated with Amazon Mechanical Turk

Task is difficult due to dataset size, static image dataset is 65k samples

Data Preprocessing

Unbalanced dataset

Goes down to 600 samples (~120 per class)

14 newly computed features

Optical flow = 20 bin histogram

Hue = 3D vector

Shot boundary = 15 bin histogram

One hot encoding

Aggregating annotations

Median vs. average effectiveness

124 new ‘features’

Celebrities & meta learning

Worker identity

Data Analysis

Correlations

Top 200 most effective topics

Top 200 most effective sentiments

Bottom 200 least effective topics

Bottom 200 least effective sentiments

Standard deviation of topics

Mean/median of topics

Coefficient of variance (-1 to +1)

2057 videos in threshold

Kappa statistics won’t work

Distributions of effectiveness

Across topics

Across sentiments

Learning

Individual SVMs

Decision Trees + SVMs

Why not to use NNs

That one proposed approach that was weird

Ensemble learning

Majority vote

Binarizing with effective > 2.5 and < 2.5

Binarizing with effective > 4 and < 2

‘exciting’ logistic regression results

80/20 train-test split

No validation set

Results

78% binary classification

61% 4-way classification

45% 5-way classification

Future Work

Image dataset

More features

Commercial dataset

Constructing formula for effective ad

Suggesting ways to improve the ad