We Are Humor Beings: Understanding and Predicting Visual Humor

Shuai Wang

University of Toronto

March 29, 2016

Intro

- An integral part but not understood in detail

Intro

- An integral part but not understood in detail
- An adult laughs 18 times a day

Intro

- An integral part but not understood in detail
- An adult laughs 18 times a day
- A good sense humor
  - is related to communication competence
  - helps raise an individual's social status & popularity
  - even helps attract compatible mates
  - makes yourself happier :)

What makes an image funny?

Humor Techniques

- Animal doing something unusual
- Person doing something unusual
- Somebody getting hurt
- Somebody getting scared

Animal doing something unusual

Person doing something unusual

Somebody getting hurt

Somebody getting scared

Changing objects can alter the funniness of a scene

Removing Incongruities

An elderly person kicking a football while skateboarding is incongruous, but a young girl doing so is not

Adding Incongruities

Add incongruities (and humor) by replacing the expected with the unexpected

Two Tasks to Understand Visual Humor

- Predicting how funny a given scene is (scene-level)
- Changing the funniness of a scene (object-level)

Object-level Features

- **Object embedding** (150-d): captures the context in which an object usually occurs
- **Local embedding** (150-d): weighted sum of object embeddings of all other instances

Scene-level Features

- **Cardinality** (150-d): bag-of-words representation of how many instances of each object are in the scene
- **Location** (300-d): horizontal and vertical coordinates of every object (closest to the center if multiple instance)
- **Scene embedding** (150-d): sum of object embeddings of all objects in the scene

Predicting Funniness Score

- Dataset: 6,400 scenes, with funny score from 1-5 labelled by workers from Amazon Mechanical Turk

Predicting Funniness Score

- Dataset: 6,400 scenes, with funny score from 1-5 labelled by workers from Amazon Mechanical Turk
- Support Vector Regressor (SVR) on scene-level features

Predicting Funniness Score

- Dataset: 6,400 scenes, with funny score from 1-5 labelled by workers from Amazon Mechanical Turk
- Support Vector Regressor (SVR) on scene-level features
- Metric: average relative error

$$\frac{1}{N}\sum_{i=1}^{N}\frac{|Predicted\,F_i - Ground\,Truth\,F_i|}{Ground\,Truth\,F_i}$$

Predicting Funniness Score: Ablation Analysis

Different feature subsets perform about the same: slightly better than baseline (average score of the training scenes)

Feautres	Avg. Rel. Err.
Avg. Prediction Baseline	0.3151
Embedding	0.2516
Cardinality	0.2450
Location	$\boxed{0.2400}$
Cardinality + Location	0.2435
Embedding + Location	0.2435
Cardinality + Embedding	0.2435
Embedding + Cardinality + Location	$\boxed{0.2400}$

Alter Funniness of a Scene

- Detect the objects that do (or do not) contribute to humor
- Identify which objects should replace the objects from step 1

Predicting Objects to be Replaced

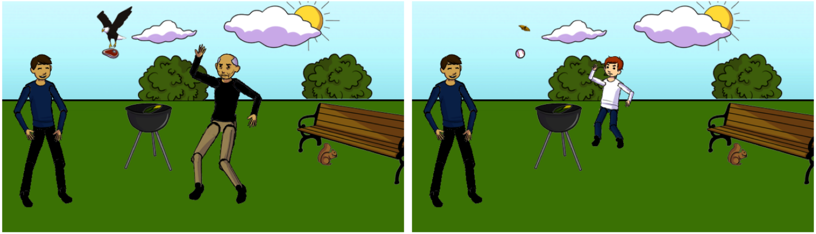
- On average, the model replaces 3.67 objects (2.54 ground truth) $\rightarrow$ this bias towards replace ensures a large ‘margin’

Predicting Objects to be Replaced

- On average, the model replaces 3.67 objects (2.54 ground truth) $\rightarrow$ this bias towards replace ensures a large ‘margin’
- Animate objects like humans and animals are more likely sources of humor $\rightarrow$ tends to replace these objects

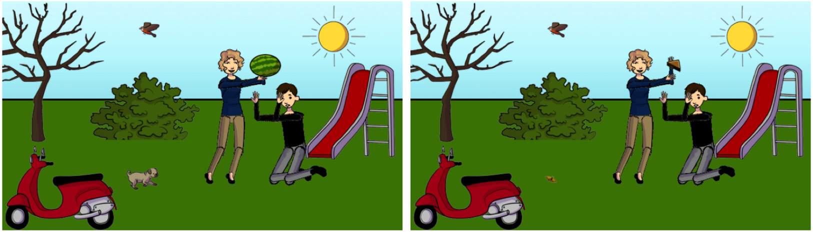
Funny → Unfunny

Old man dancing → young boy dancing
Hawk stealing meat → baseball



Funny → Unfunny

Cute puppy → Insect
Watermelon → Ax



Unfunny → Funny

Couple having dinner at the table → Puppies having dinner at the table

Unfunny → Funny

Cating playing around → Racoon driving motorcycle


Discussion

- Style/genre of an image or painting can make a difference

Discussion

- Style/genre of an image or painting can make a difference
- Dataset is small: 6,400 images

Discussion

- Style/genre of an image or painting can make a difference
- Dataset is small: 6,400 images
- Feature representation can be improved


THE END!