PREDICTING A POLITICIAN’S PARTY AFFILIATION FROM A PHOTO

Diego Garcia-Olano, Amin Anvari, Farzan Memarian
How good are you at judging a politician by his/her cover?
after 5000 responses, the average = 65%
Dataset: color images for **11,000 US State Level** congress people along with their name, state, and party affiliation

Models:

- VGG19, VGG16, inceptionV3, Xception, ResNet, Inception-ResNetV2 (**ImageNet**)
- VGG-Face (**Deep Face data set**) 2.6 million face images.
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<tr>
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<th>test acc</th>
<th>repub acc</th>
<th>dem acc</th>
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Final Ensemble Model 72%
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Final Ensemble Model 72%

DEMOCRATs with high probability

REPUBLICANs with high probability
INCORRECTLY PREDICTED AS DEMOCRAT

INCORRECTLY PREDICTED AS REPUBLICAN
OBJECT DETECTION with YOLOv2, YOLO9000, and ResNet
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COCO Dataset (less than 100 labels)
OBJECT DETECTION with YOLOv2, YOLO9000, and ResNet

COCO Dataset (less than 100 labels)
OBJECT DETECTION with **YOLOv2**, **YOLO9000**, and **ResNet**

**COCO Dataset (less than 100 labels)**

<table>
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<th>label</th>
<th>all</th>
<th>republican</th>
<th>democrat</th>
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<tr>
<td>tie</td>
<td>7646 (71.6%)</td>
<td>4618 (78.3%)</td>
<td>3028 (63.4%)</td>
</tr>
<tr>
<td>person</td>
<td>10641 (99.7%)</td>
<td>5884 (99.7%)</td>
<td>4757 (99.6%)</td>
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OBJECT DETECTION with YOLOv2, YOLO9000, and ResNet

9000 labels in dataset

YOLO9000 - mostly noisy (i.e., low probability) labels and high probability labels were of little interest "whole", "neckwear" followed by "object", "instrument", "worker", and "commodity"
OBJECT DETECTION with YOLOv2, YOLO9000, and ResNet

1000 labels in ImageNet

ResNet - requires very low probability cut off to get varied results

some labels are always wrong no matter their probability, "bulletproof vest", "military uniform", "oboe", "wig", "bassoon" always in top 15 detected objects

98% bulletproof

96% military unif
OBJECT DETECTION with YOLOv2, YOLO9000, and ResNet

ResNet - requires very low to prob cut off to get varied results

almost always correct even if their probability is very low, "cowboy hat", "flagpole", "bolo-tie", "bow tie", and "windsor tie", (cowboy hat / flag pole very rare)

5% cowboy hat 7% flagpole
OBJECT DETECTION with YOLOv2, YOLO9000, and **ResNet**

**ResNet** - why manual verification is needed

1000 labels in ImageNet
OBJECT DETECTION with YOLOv2, YOLO9000, and ResNet

ResNet - why manual verification is needed

Neck Brace (96%)

Chainmail (99%)

Boa Constrictor (30%)
Boundary Equilibrium Generative Adversarial Networks (beGAN)

Fake “new” politicians
Boundary Equilibrium Generative Adversarial Networks (beGAN)

All Politicians (64 x 64)
Boundary Equilibrium Generative Adversarial Networks (beGAN)

All Politicians (64 x 64)

“male whitening”
Boundary Equilibrium Generative Adversarial Networks (beGAN)

All Politicians verification (via Nearest Neighbors)
Boundary Equilibrium Generative Adversarial Networks (beGAN)

All Politicians (64 x 64)

http://diegoolano.com/demorepu/generated/images_by_epoch_all_politicians.html
All politicians (128 x 128) = 4 days training vs 1 day for prior GANs
Conclusions:

1) Constructed 11 thousand color images data set of politicians with meta data
2) Gathered 5000 human responses to establish baseline of 65%
3) Final model with 72% accuracy for predicting party affiliation from image alone
4) Use of object detection systems to better understand test results
5) Use of GANs to generate new politicians

THANKS!