PREDICTING A POLITICIAN'S PARTY AFFILIATION FROM A PHOTO

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How good are you at judging a politician by his/her cover?


DEMOCRAT REPUBLICAN


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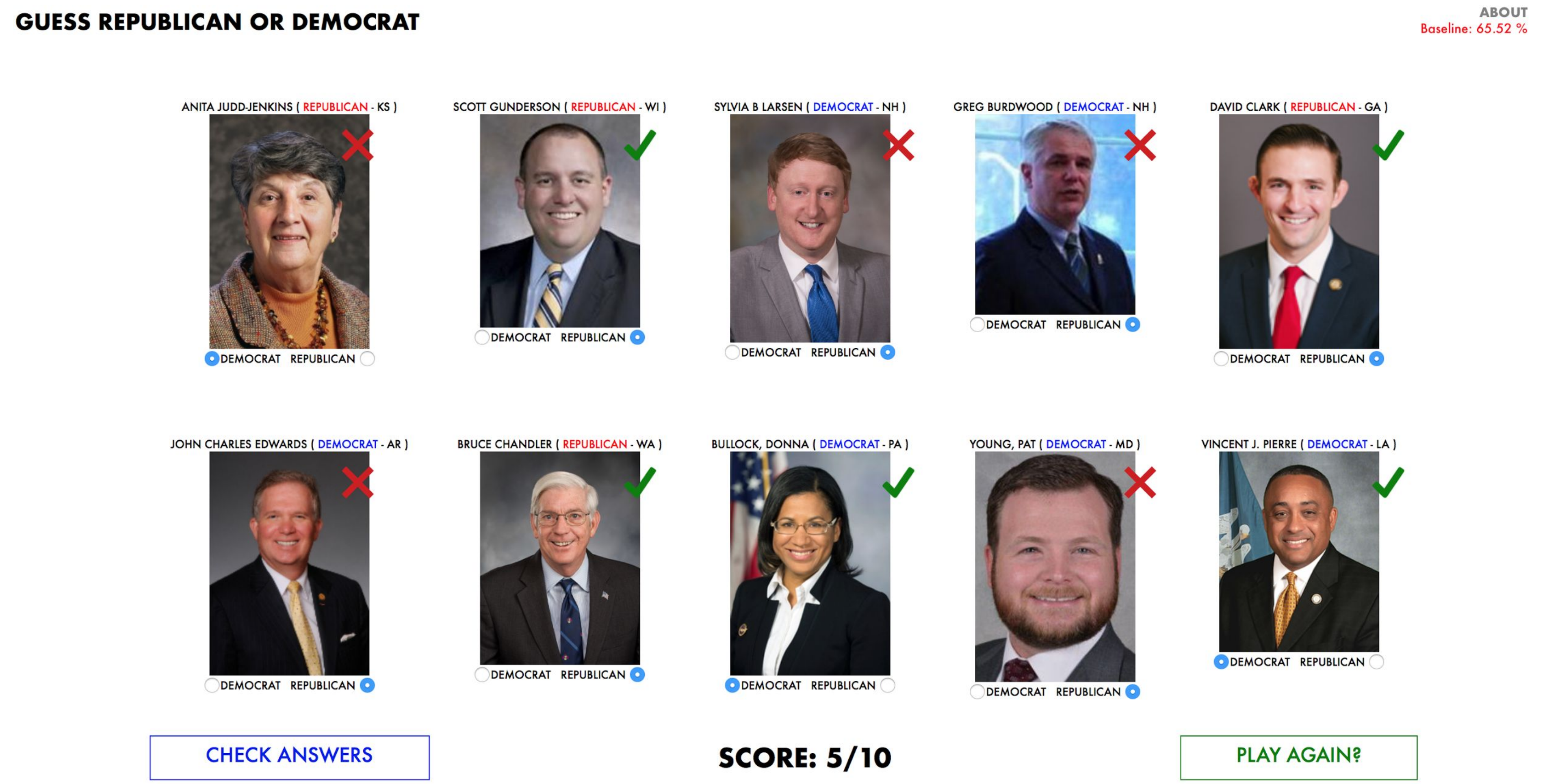
CHECK ANSWERS

diegoolano.com/demorepu/

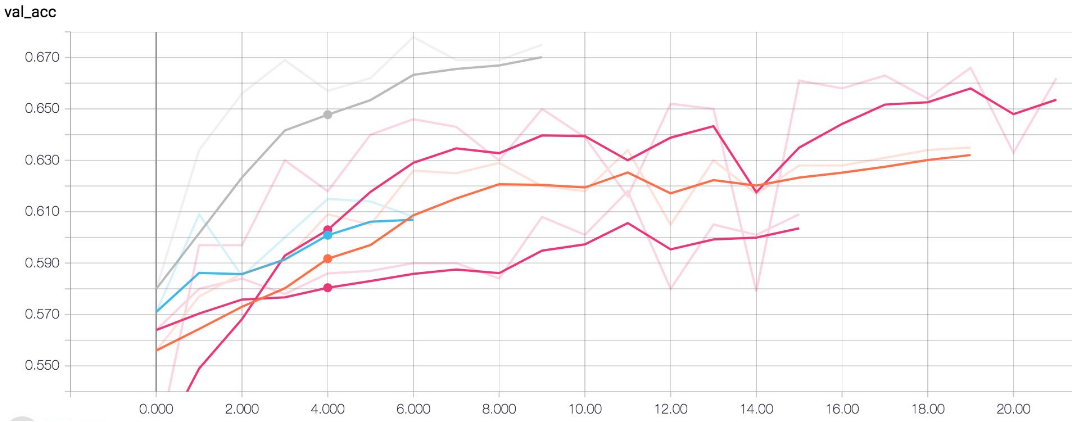


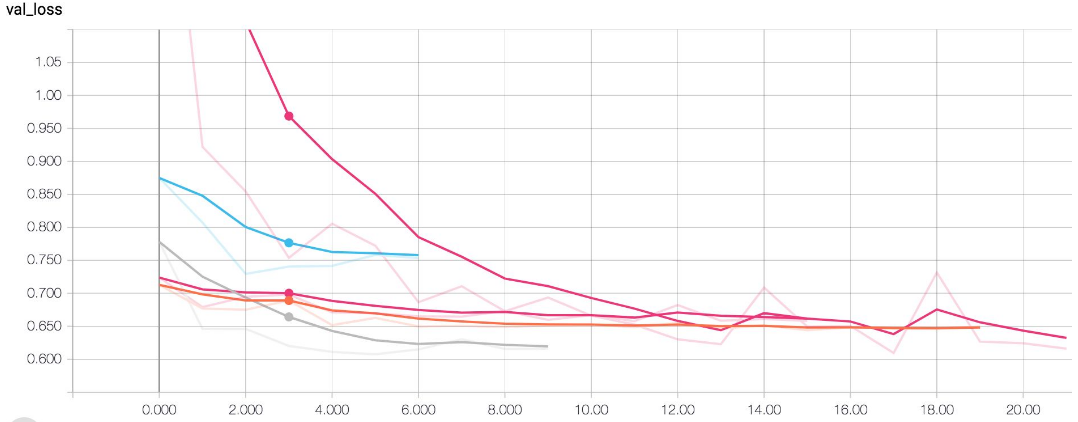
after 5000 responses, the average = **65%**

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.





model	learning rate	test accuracy
inceptionv3	0.0009	0.692
resnet	0.0001	0.691
vgg19	0.001	0.670
vggFace	0.00009	0.677
xception	0.0009	0.657

models	test acc	repub acc	dem acc
inv3,res	0.697	0.791	0.582
inv3,res,v19	0.707	0.791	0.605
inv3,res,v19,xcpt	0.721	0.784	0.641
inv3,res,v19,xcpt,vface	0.722	0.798	0.629

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)

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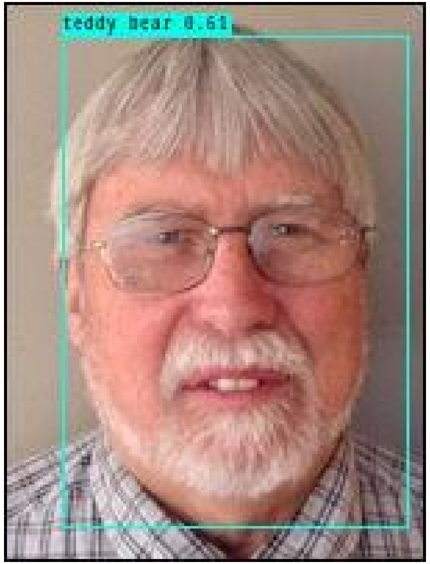

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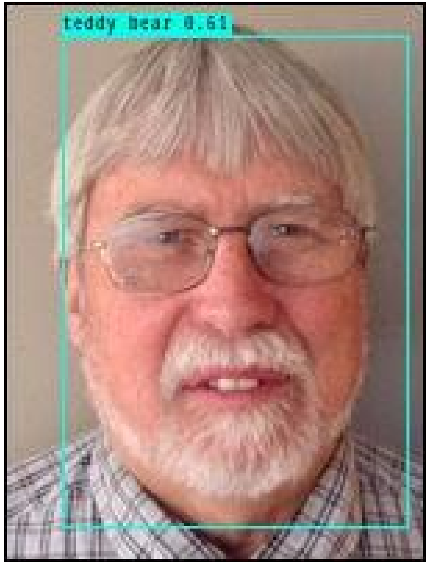


label	all	republican	democrat
tie	7646 (71.6%)	4618 (78.3%)	3028 (63.4%)
person	10641 (99.7%)	5884 (99.7%)	4757(99.6%)

OBJECT DETECTION with YOLOv2, **YOLO9000**, and ResNet

9000 labels in dataset

YOLO9000 - mostly noisy (ie 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**

1000 labels in ImageNet

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)
21 / 61 out of 32,000

5% cowboy hat

7% flagpole

OBJECT DETECTION with YOLOv2, YOLO9000 , and **ResNet**

1000 labels in ImageNet

ResNet - why manual verification is needed

OBJECT DETECTION with YOLOv2, YOLO9000 , and **ResNet**

1000 labels in ImageNet

ResNet - why manual verification is needed

Neck Brace (96%)

Chainmail (99%)

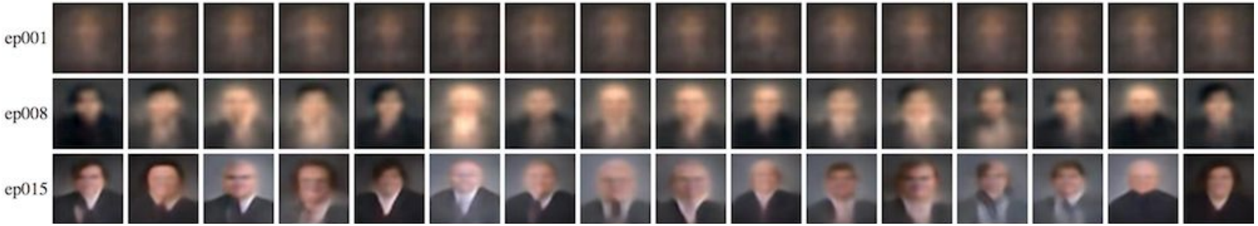
Boa Constrictor (30 %)

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)

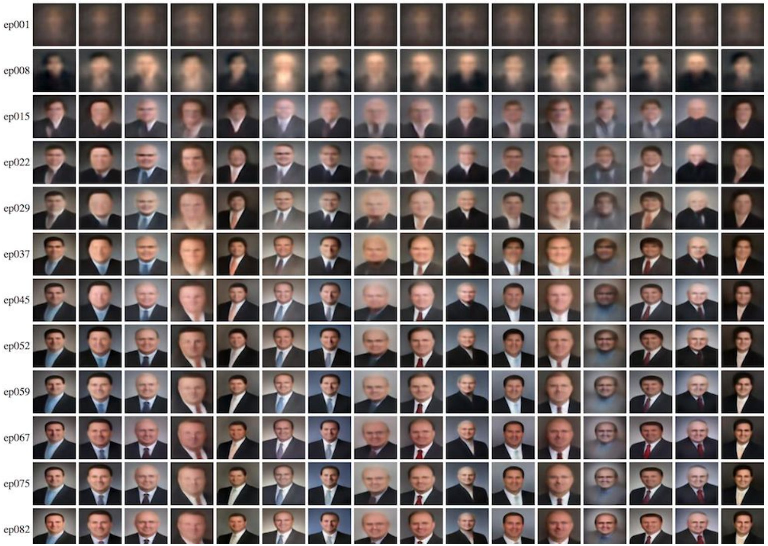
“male whitening”

Boundary Equilibrium Generative Adversarial Networks (beGAN)

All Politicians verification
(via Nearest Neighbors)

Boundary Equilibrium Generative Adversarial Networks (beGAN)

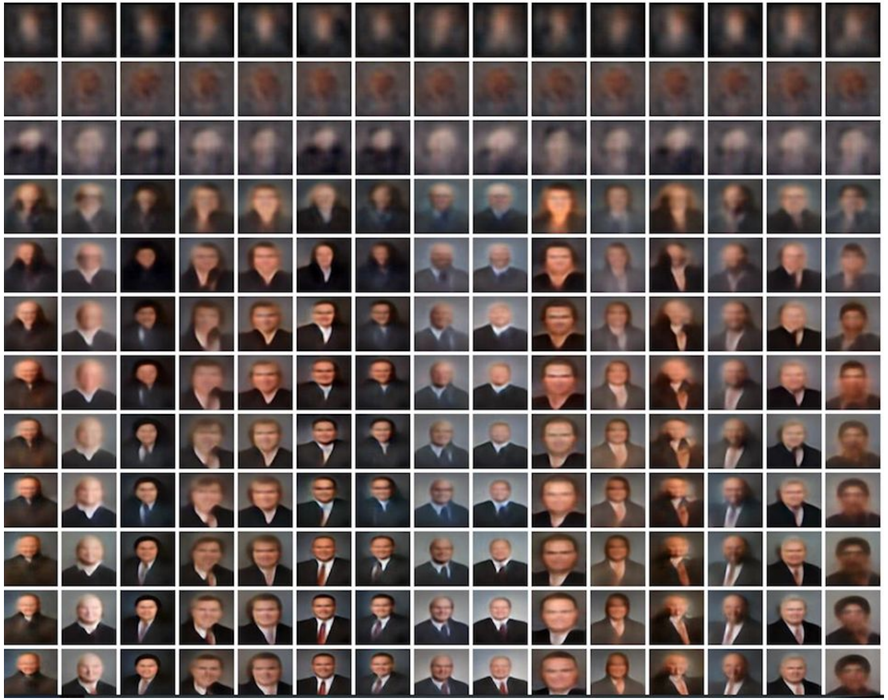
All Politicians (64 x 64)



http://diegoolano.com/demorepu/generated/images_by_epoch_all_politicians.html

Republicans (64 x 64)

Democrats (64 x 64)



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

party?

state?

?

party?

state?

4) Use of object detection systems to better understand test results
5) Use of GANs to generate new politicians



THANKS !