

Rock-Paper-Scissors

ML 2023/2024

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Main Goal

- We decided to focus on the classification of images.
- Our main goal is to classify the gesture in the photo as one of the three movements from the "Rock-Paper-Scissors" game with best possible accuracy.
- We want to see how far we can go with the tools learned in the lecture and compare the results obtained.

Data

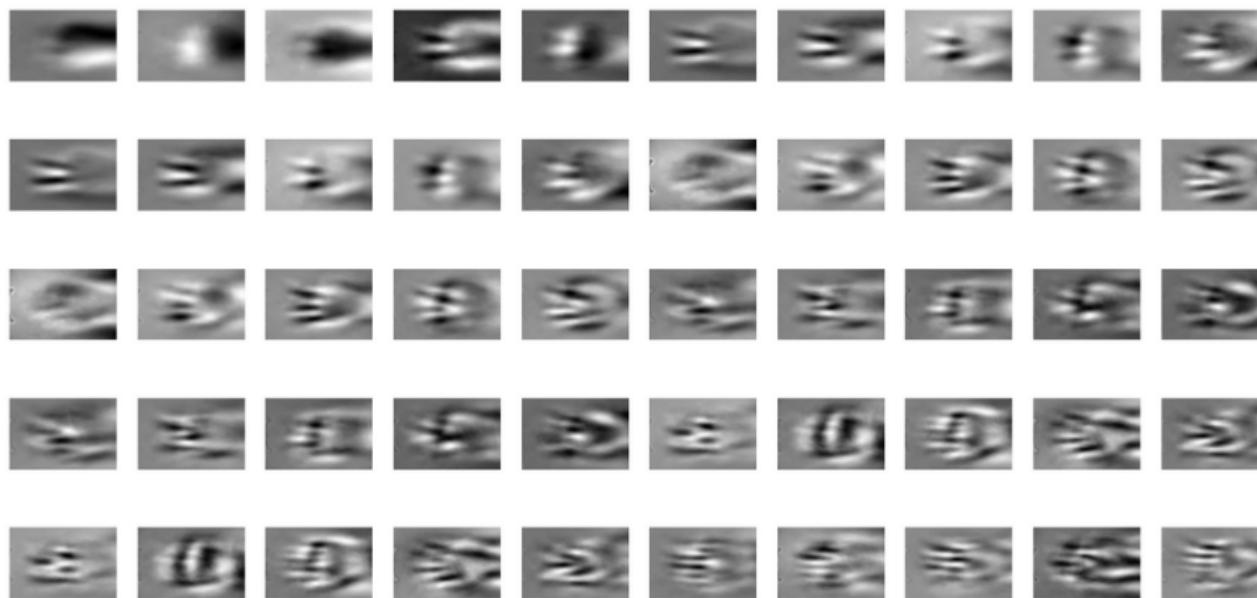
Our dataset on Kaggle: Rock-Paper-Scissors Images



Preprocessing

- Grayscale
 - Normalization
 - Pca

PCA features



No augmentation

KNN

	Mean	Std	Test
Full imgs	91.14%	1.7%	92.24%
Scaled imgs	91.48%	1.85%	92.46%
PCA	91.65%	2.26%	93.15%

Decision tree

	Mean	Std	Test
Scaled imgs	82.28%	3.91%	84.93%
PCA	76.00%	2.58%	78.99%

No augmentation

Random forest

	Mean	Std	Test
Scaled imgs	94.28%	1.81%	95.43%
PCA	88.23%	2.15%	92.01%

XGBoost

	Mean	Std	Test
PCA	91.37%	1.29%	94.06%

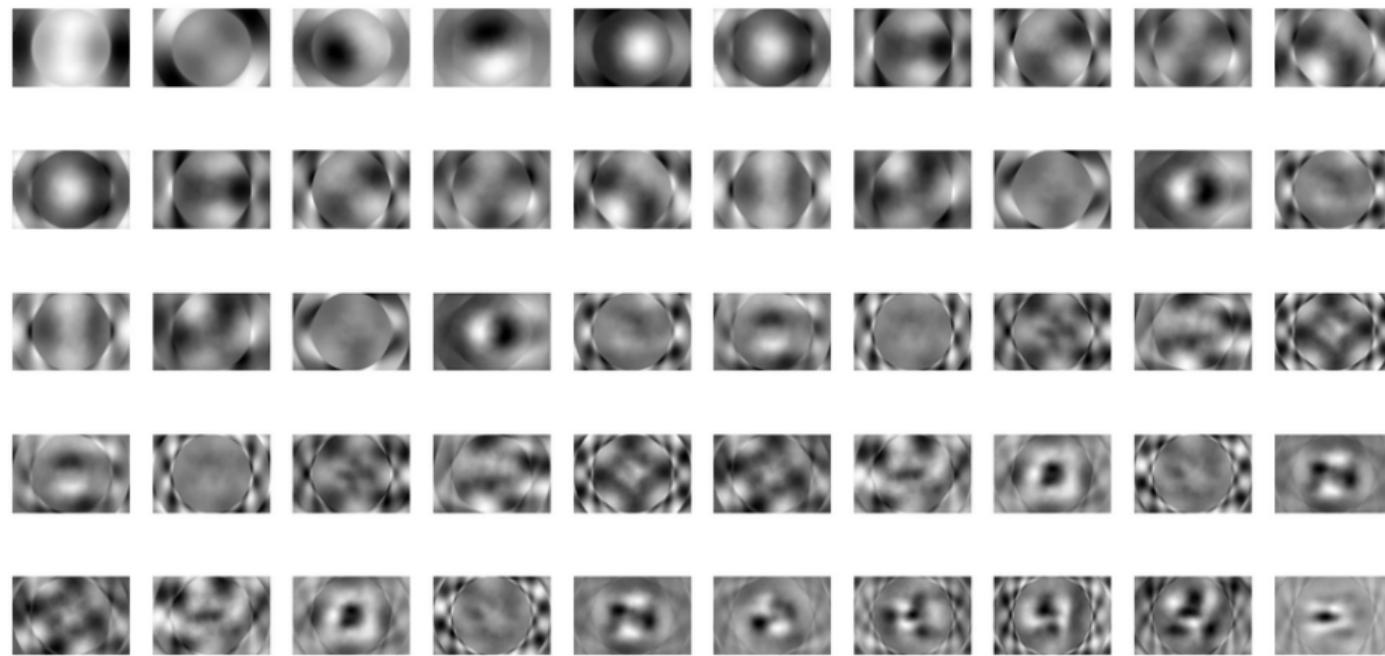
Support Vector Machine

	Mean	Std	Test
PCA	93.88%	0.92%	94.75%

Augmented dataset



PCA features of augmented dataset



Feature extraction

- We've used technique called transfer learning.
- In which we deleted the *softmax* layer (i.e last layer) of pretrained neural network **VGG16**, for some further future extraction.

Augmented dataset

KNN

	Mean	Std	Test
Scaled imgs	69.13%	1.54%	71.67%
PCA	69.97%	1.25%	72.53%
VGG16	93.57%	0.91%	94.11%

Decision tree

	Mean	Std	Test
PCA	56.99%	2.39%	59.68%
VGG16	79.00%	1.40%	79.61%

Augmented dataset

Random forest

	Mean	Std	Test
PCA	75.64%	1.62%	76.35%
VGG16	93.21%	1.00%	93.83%

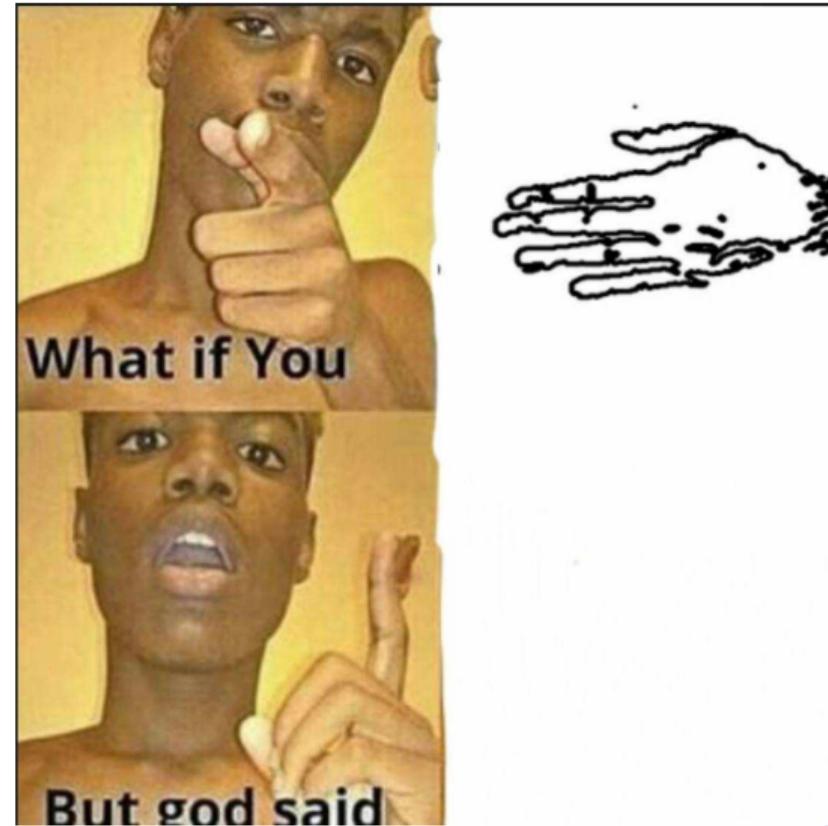
XGBoost

	Mean	Std	Test
PCA	86.57%	1.09%	86.52%
VGG16	96.82%	0.92%	96.80%

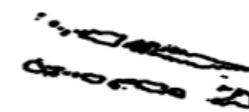
Support Vector Machine

	Mean	Std	Test
PCA	77.37%	1.12%	79.38%
VGG16	98.42%	0.40%	98.11%

Contours-only dataset (using OpenCV, FAIL)



Contours-only dataset (using OpenCV, FAIL)



Self-made photos of hands



Self-made photos of hands

Model	Score
KNN	48.33%
Decision tree	45.00%
Random forest	46.66%
XGBoost	52.50%
Support Vector Machine	57.50%



Mękarski przed
pracą nad projektem
z ml

(praca nad projektem)



Mękarski podczas
finalnej prezentacji