Facial Recognition Using ML

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01

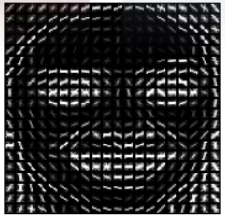
Libraries and tools used

1. Pandas
2. Numpy
3. Matplotlib
4. OpenCV
5. Skimage
6. Scikit-learn

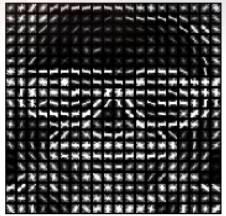
02

Data Processing

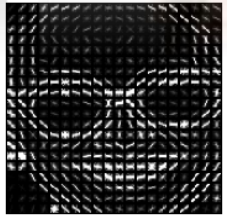
Elizabeth Olsen



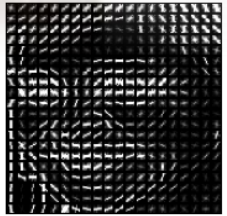
Robert Downey Jr



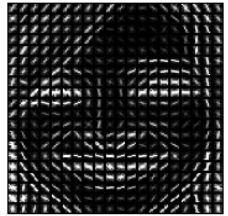
Natalie Portman



Ellen Degeneres

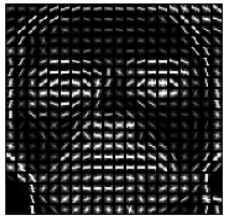


Lisa Kudrow



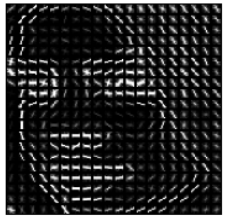
Priyanka Chopra

Robert Downey Jr



Hrithik Roshan

Priyanka Chopra



Robert Downey Jr

HOG:Finding the Shape of Things

What HOG is:

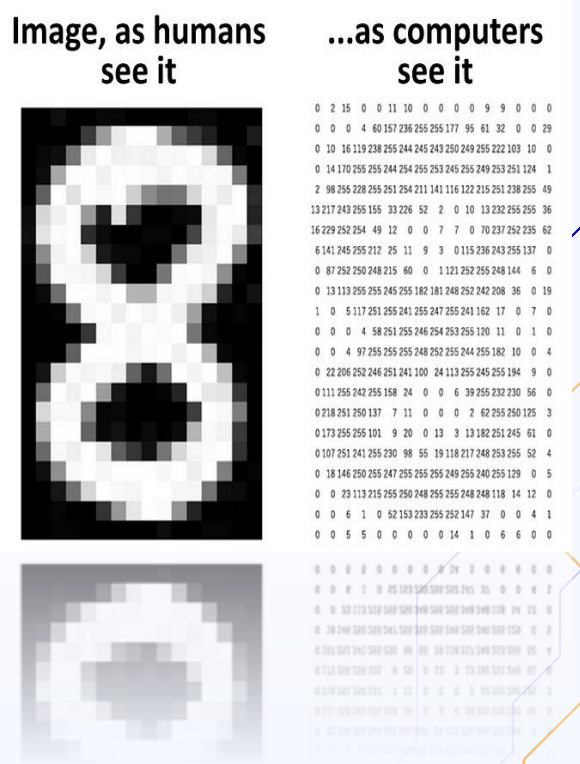
- Emphasize that HOG (Histogram of Oriented Gradients) is a feature descriptor used in computer vision.
- Explain that it captures the shape and texture of objects by analyzing gradient orientations.

Why HOG is used:

- Highlight its effectiveness in object detection, particularly for tasks like face detection.
- Mention its robustness to variations in lighting and small geometric changes.

Why This Works:

- It uses relatable concepts like "edges" and "directions."
- It focuses on the finding shape rather than the complex calculations.



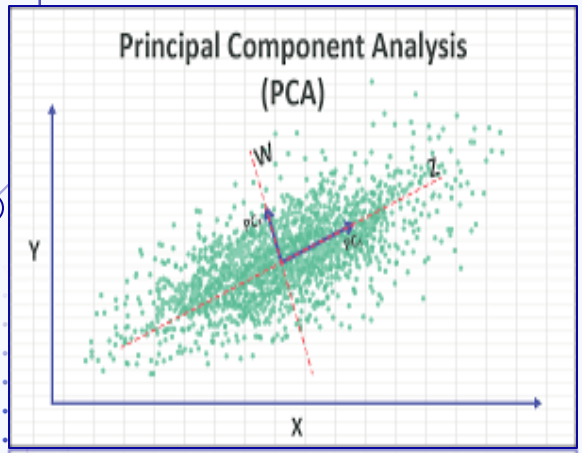
03

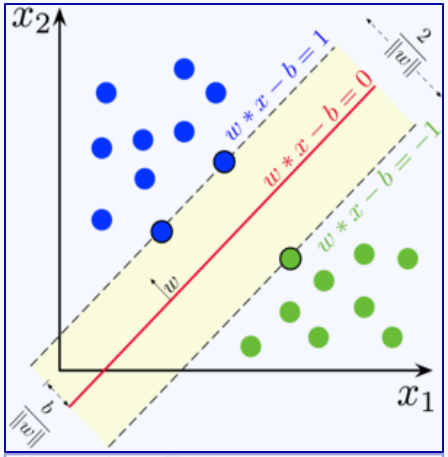
Machine Learning Models

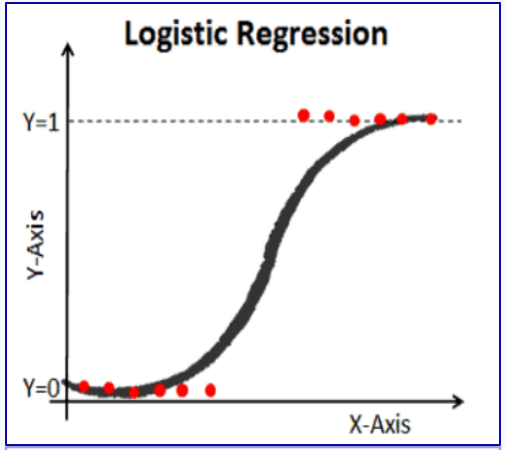
Machine Learning Models Used

- **Principal Component Analysis (PCA)**
- **Support Vector Machine (SVM)**
- **Logistic Regression**

Compare the models based on accuracy and performance



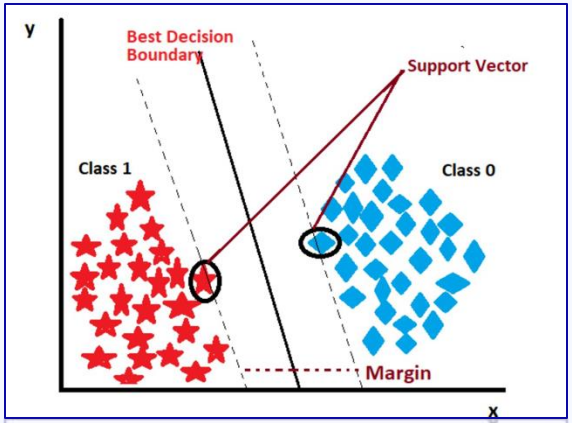


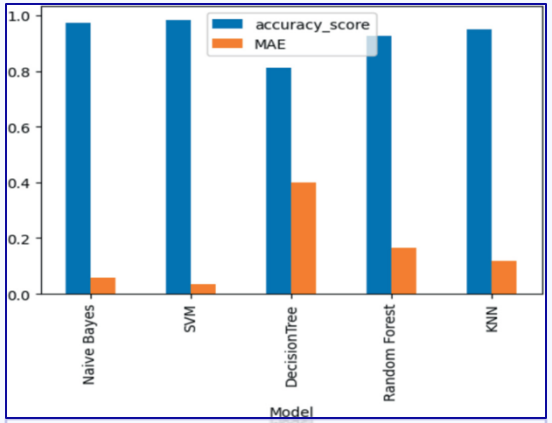


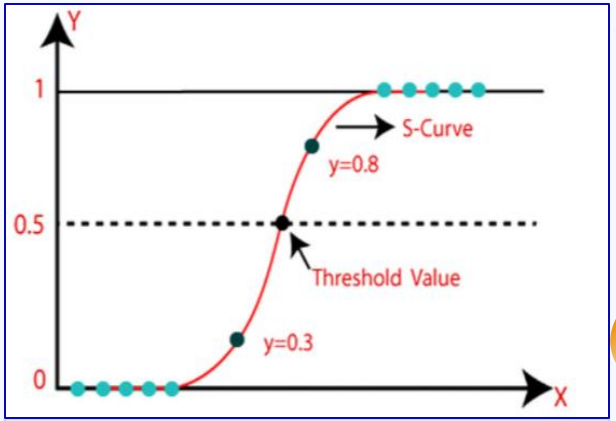
04

Choosing the Best Model

Which Model Should I Use?







Evaluate Performance

Evaluate using performance metrics

Compare Accuracy

A bar chart showing the accuracy of each model

Choose Best Model

Choose the best in terms of accuracy and classification results

05

Model Training & Evaluation

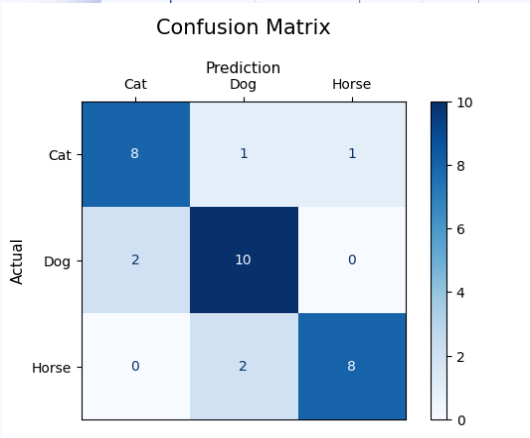
Model Training & Evaluation

Splitting data into training and test sets:

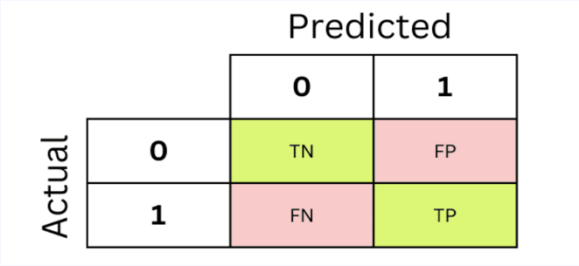
- Use an 80/20 split, allocating 80% of the data for training and 20% for testing.

Evaluating performance:

- Use accuracy score, confusion matrix, and classification report to evaluate the performance of the model.



	precision	recall	f1-score	support
Elizabeth Olsen	0.80	0.86	0.83	14
Ellen Degeneres	0.88	1.00	0.93	14
Henry Cavill	0.90	0.64	0.75	14
Hrithik Roshan	0.73	0.57	0.64	14
Hugh Jackman	0.62	0.57	0.59	14
Jessica Alba	0.79	0.79	0.79	14
Lisa Kudrow	0.88	1.00	0.93	14
Margot Robbie	0.80	0.86	0.83	14
Natalie Portman	0.68	0.93	0.79	14
Priyanka Chopra	0.92	0.86	0.89	14
Robert Downey Jr	0.92	0.79	0.85	14
accuracy			0.81	154
macro avg	0.81	0.81	0.80	154
weighted avg	0.81	0.81	0.80	154

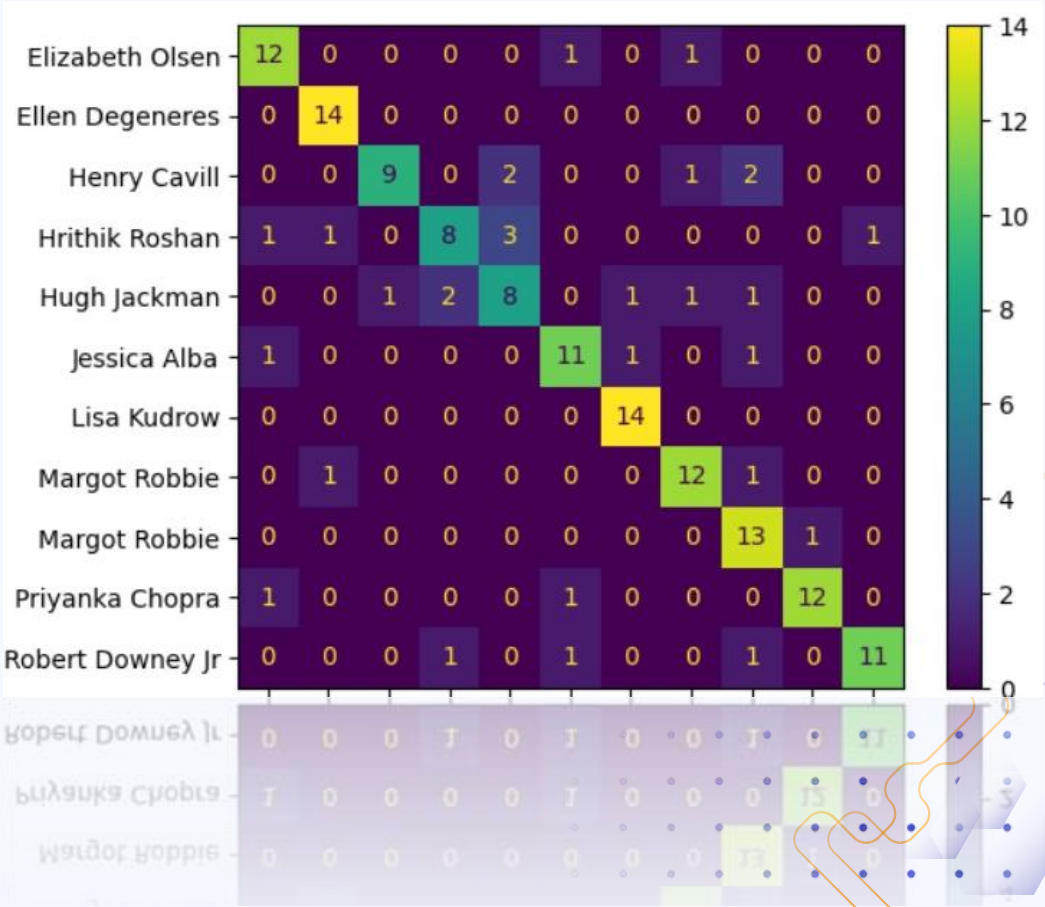


06

Results and Visualizations

Our Confusion Matrix:

Feature importance and model performance metrics:
SVM showed the highest accuracy compared to other models



Conclusion

Model Training & Evaluation

This project focused on developing an AI-based face classification system using machine learning. We utilized Python libraries like OpenCV and scikit-learn for image processing and model training. The SVM's superior performance was confirmed through rigorous evaluation using metrics like accuracy, confusion matrix, and classification report.

Thanks!

Do you have any questions?