Free-hand Sketch Recognition

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Aim

- Recognition of hand-drawn sketches

Tech Stack

- Environment
  - Google colab
- Python libraries
  - OpenCV, Numpy, Keras, Matplotlib

Dataset Description

- Name: TU Berlin
- Source: Cybertron
- Number of samples: 20,000
- Categories: 250
- Number of images per category: 80

Challenges

- Less details
- Sketch orientation
- Sketch position

Day 1

- Image augmentation
  - Mirroring
  - Erosion
  - Rotation
  - Shifting
  - Scaling

Image augmentation

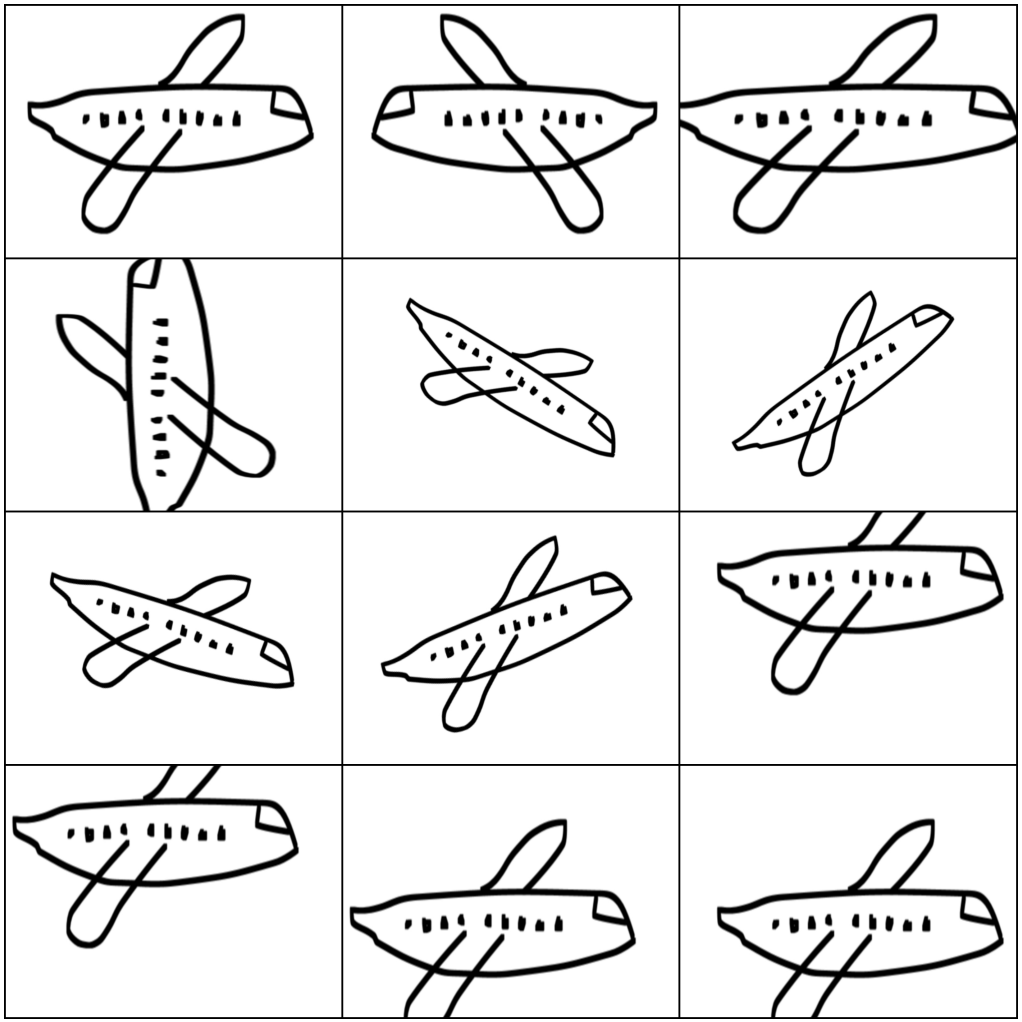
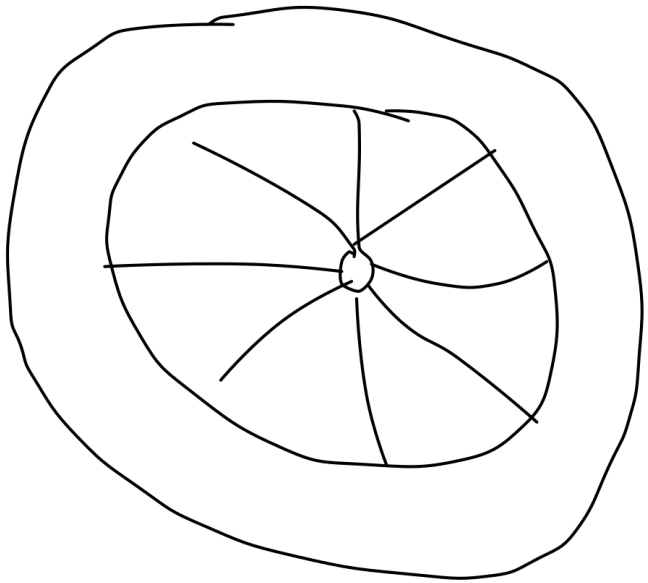
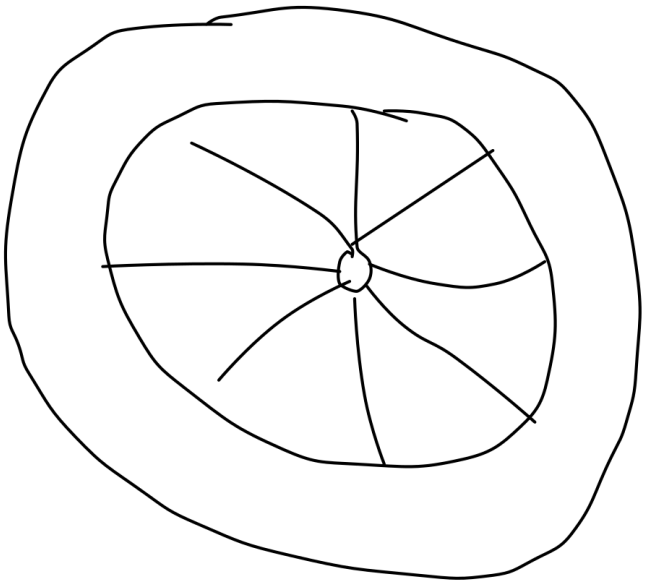


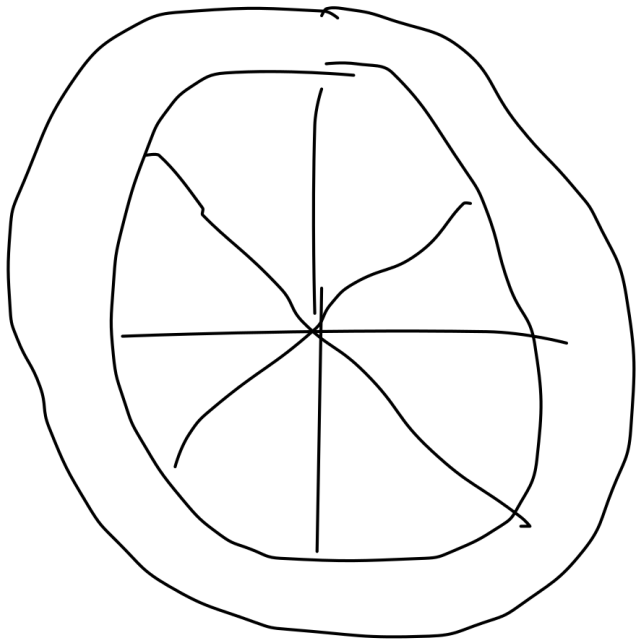
Figure: Output

Challenges



Challenges





Day 2

- New dataset
  - Number of samples: 1,53,600
  - Categories: 160
  - Number of images per category: 960
- Images size: 224 X 224

Day 3

- Transfer learning
- VGG16 as feature extractor
- Fine tuning

Transfer Learning

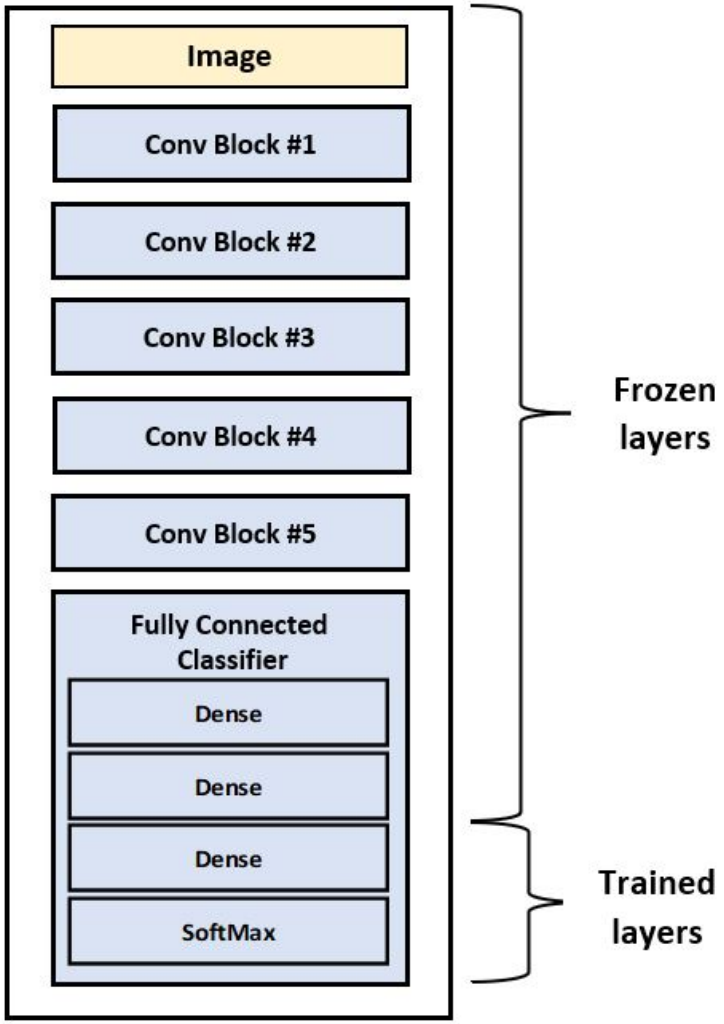


Figure: VGG16 as feature extractor

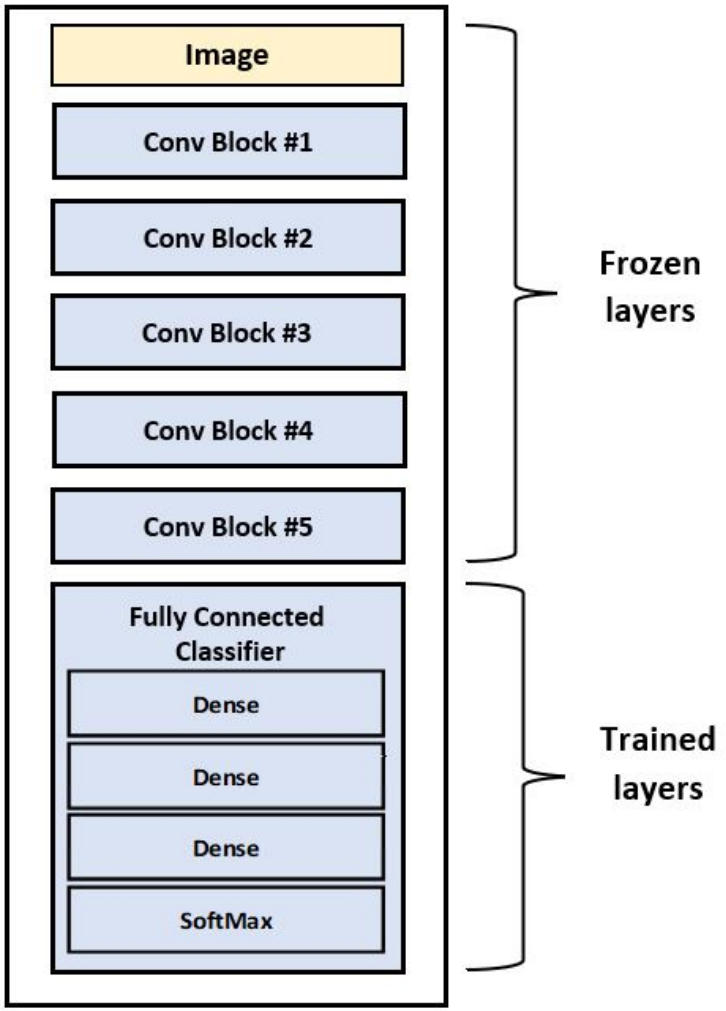


Figure: Fine tuning

Results: Dissimilar objects

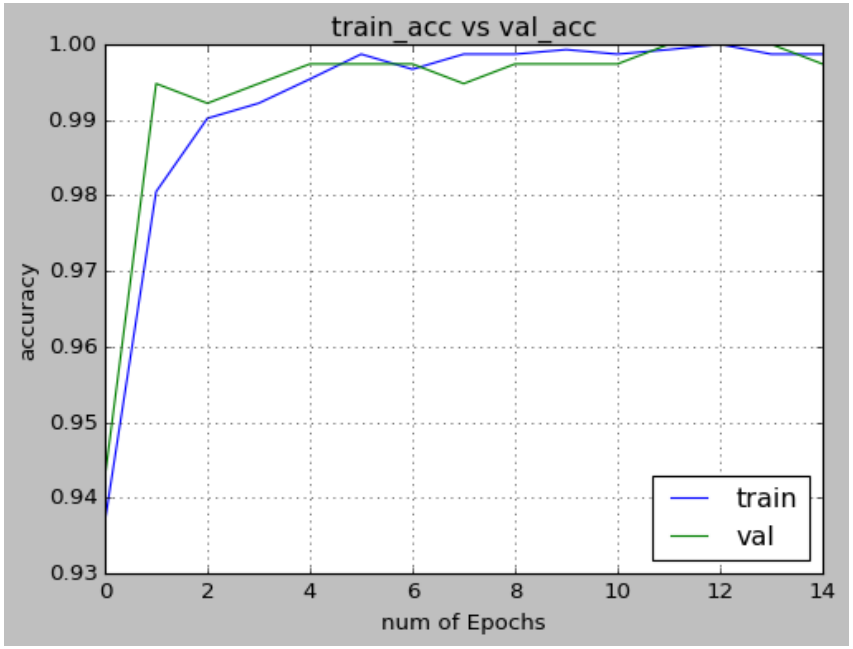


Figure: VGG16 as feature extractor

Results: Dissimilar objects

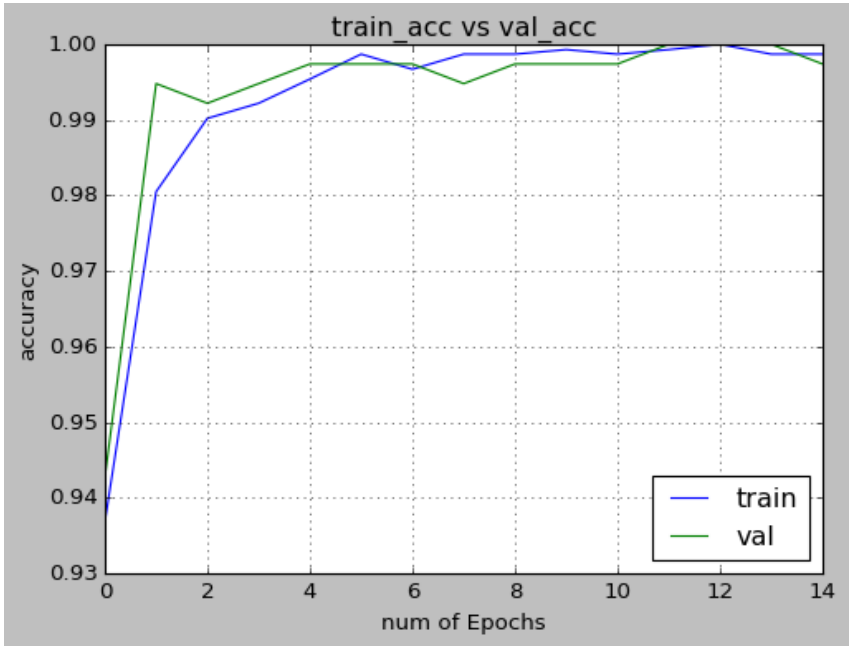


Figure: VGG16 as feature extractor

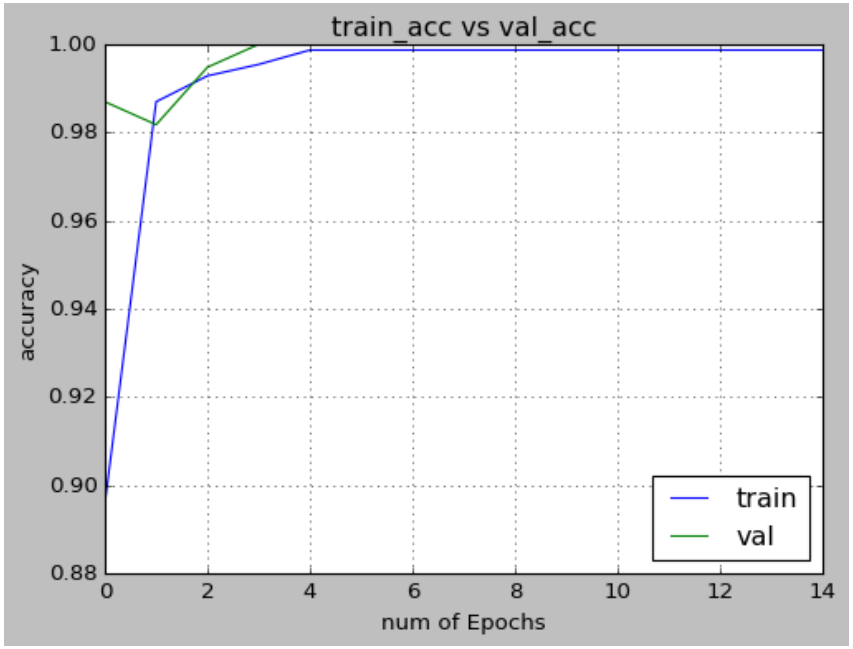


Figure: Fine tuning

Results: Similar objects

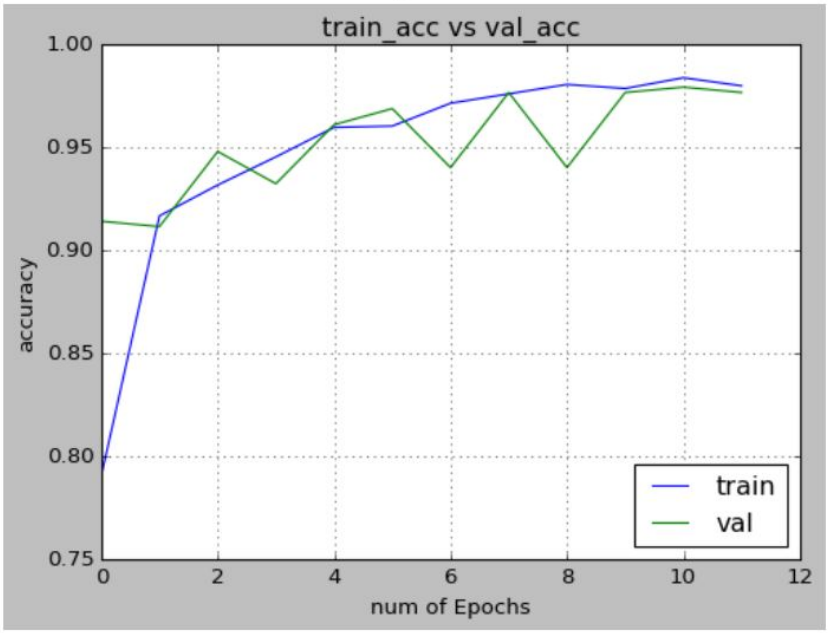


Figure: VGG16 as feature extractor

Results: Similar objects

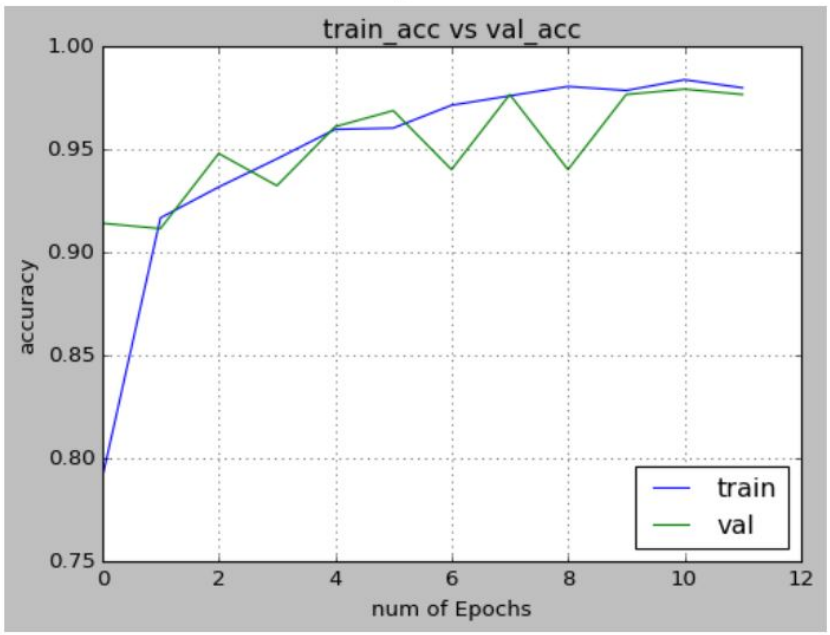


Figure: VGG16 as feature extractor

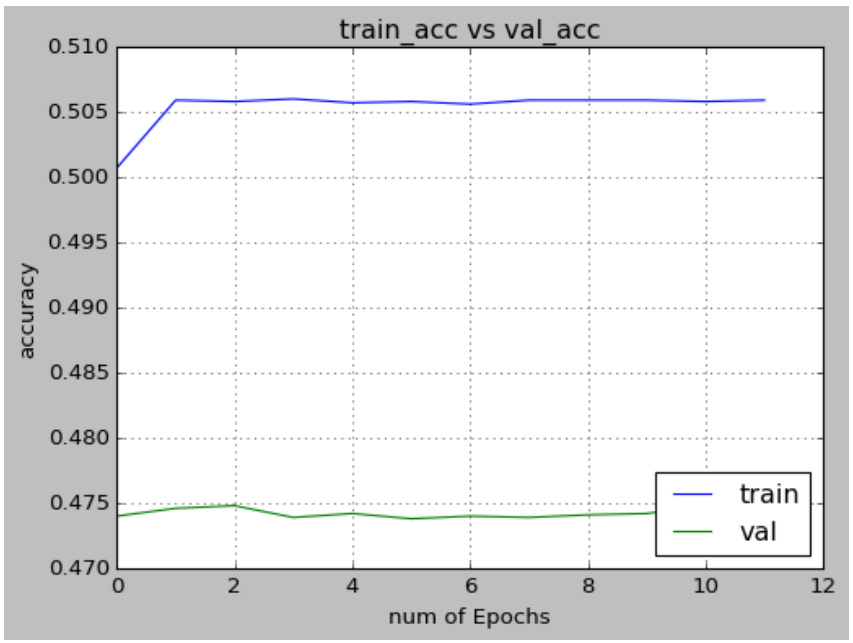


Figure: Fine tuning

Challenges

- Large dataset
- GPU restriction

Demo

Learnings

- Image pre-processing
- Transfer learning
- Version control system

Future Scope

- Develop an application
- Recognize all objects

Discussions