

MobileNet v2 Collab

Group 1: Rohan Sanjay, Carolina Souza, Kartik Balodi, Kelly Huang, Derek Lim

Group 3: Anna Gard, Wendy Qi, Mei Zhang, Chris Lange, Kenneth Su

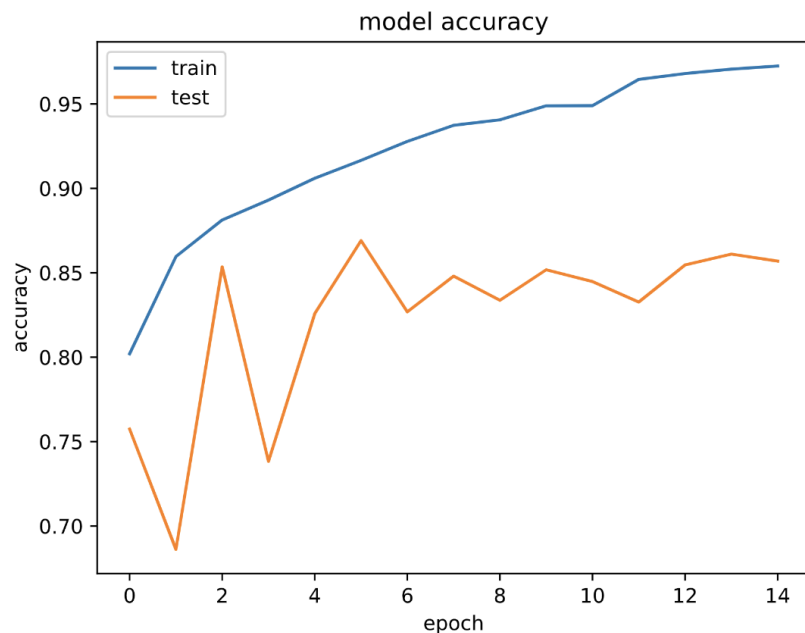
The Problem :(

- **Inaccuracy** in classifying lying images
- **Sitting and standing** classification confusion
- Image loading not optimized (30-45 min)

The Solution :)

- **Pre-processing:** Data set input images balancing
- **Data augmentation**
- **Border replication** with ratio exclusion
- **Alternative image loading process**
 - `tf.data.Dataset` object

Model – Full Dataset



Posture	Correct	Total	Accuracy
Sitting	1679	1906	88.1%
Standing	3895	4392	88.7%
Lying	670	988	72%

```
[[1679 168 59]
 [ 487 3895 10]
 [ 262 56 670]]
```

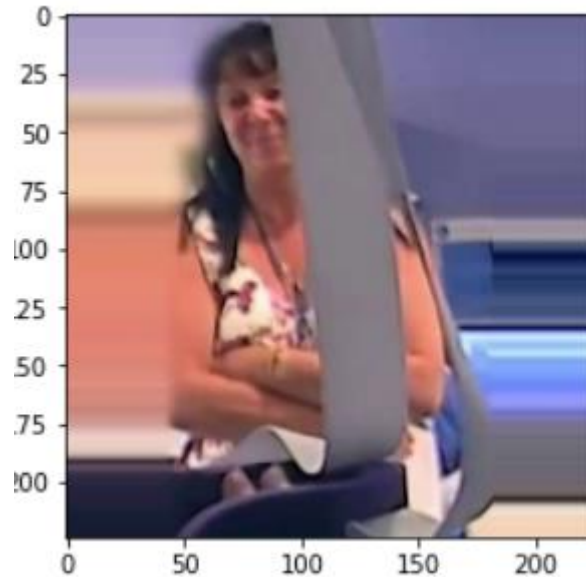
Test Accuracy:
87.2%

Split: 50, 30, 20

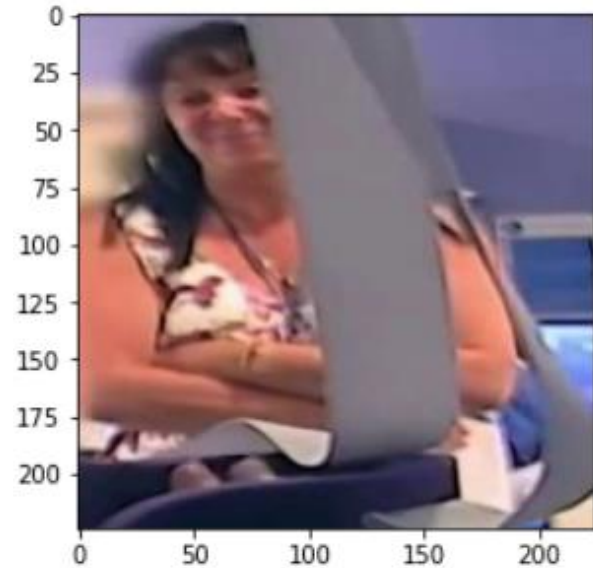
Border replication – Ratio



With Border Replication



Without Border Replication



Border replication – Ratio

Test Accuracy: 86.12%

	Correct	Incorrect Classification - Sitting	Incorrect Classification - Standing	Incorrect Classification - Lying	Total Observations in Class	Categorical Classification Accuracy
Sitting	1316	--	120	229	1665	79.03%
Standing	4335	477	--	87	4899	88.5%
Lying	624	91	7	--	722	86.4%

Data Augmentation – Class Specific

Sitting Augmentation

- Sitting confusion generally
 - Worse confusion with lying
 - sitting/standing confusion better but still not great
- 84.4% Sitting correctly categorized:
decrease 3.7%
- 93.3% Standing correctly categorized:
increase 4.6%
- 84.4% Lying correctly categorized:
increase 12.4%

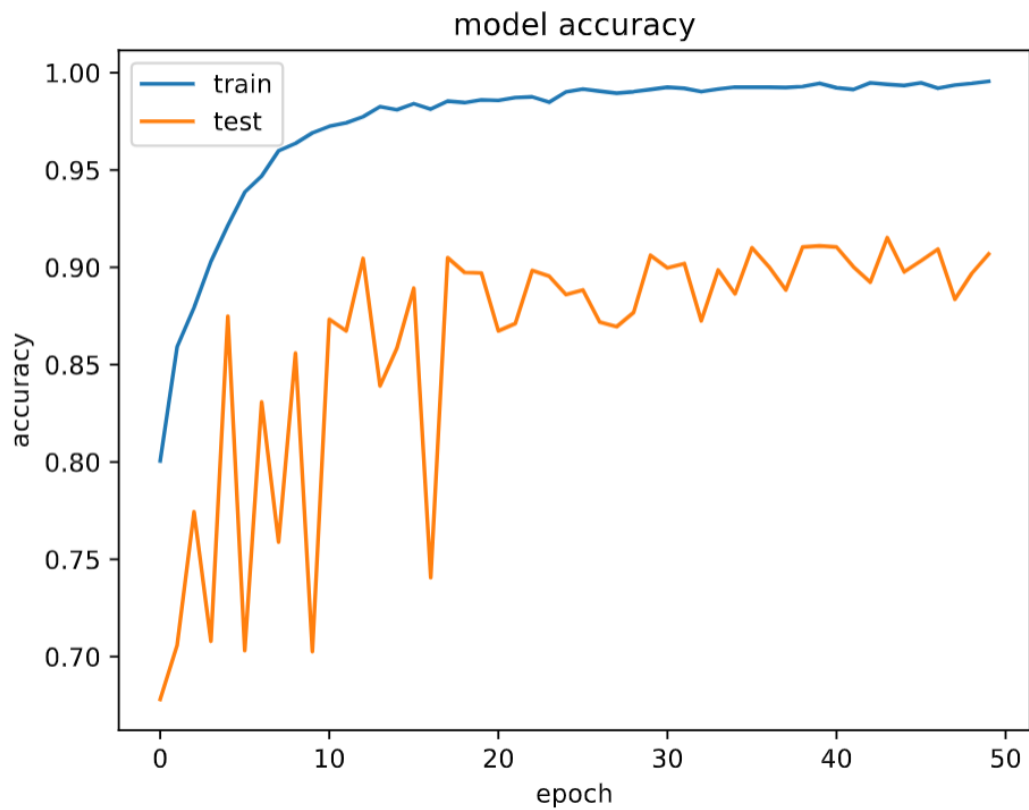
Lying Augmentation

- Sitting/standing confusion
 - $\frac{3}{4}$ of the error in these classes comes from this confusion
- 78.6% Sitting correctly categorized:
- decrease 9.5%
- 94.4% Standing correctly categorized:
increase 5.7%
- 87.5% Lying correctly categorized:
- increase 15.5%

Data Augmentation

Test Accuracy: 90.69%

	Correct	Incorrect Classification - Sitting	Incorrect Classification - Standing	Incorrect Classification - Lying	Total Observations in Class	Categorical Classification Accuracy
Sitting	2357	--	134	104	2595	90.83%
Standing	3811	351	--	59	4221	90.29%
Lying	1392	116	24	--	1532	90.86%



Best Replication Strategy - Model Accuracy

Optimizing Image Loading


- Load images to directory with subfolder structure
- Use tf.data.Dataset object
- Prefetch to load and train in parallel
- Drastically lowers runtime
- Output doesn't function with MobileNet V2 but compatible with other models

```
# ds means dataset
train_ds = tf.keras.preprocessing.image_dataset_from_directory(config.PROCESSED, image_size=(224, 224),
    seed=100, labels='inferred', subset='training', color_mode='rgb', validation_split=0.8)

test_ds = tf.keras.preprocessing.image_dataset_from_directory(config.PROCESSED, image_size=(224, 224),
    seed=100, labels='inferred', subset='validation', color_mode='rgb', validation_split=0.2)

# Enables parallel loading of images and model training
AUTOTUNE = tf.data.experimental.AUTOTUNE
train_ds = train_ds.shuffle(700).cache().prefetch(buffer_size=AUTOTUNE)
test_ds = test_ds.cache().prefetch(buffer_size=AUTOTUNE)
```

Our Deliverable

 [rohansanjay / LookDeep](#) Private

👁 Watch 3

☆ Star 0

🍴 Fork 1


<> Code ⓘ Issues 🔗 Pull requests ▶ Actions 📁 Projects 📖 Wiki 🛡 Security ↗ Insights

🔗 master 1 branch 0 tags

Go to file

Add file

📄 Code

 **rohansanjay** Update README.md 56d7040 21 hours ago 🕒 108 commits

📁 datasets	cleanup	21 hours ago
📁 notebooks	cleanup folders	14 days ago
📁 presentations	cleanup	21 hours ago
📁 visualizations	cleanup	21 hours ago
📄 .gitignore	cleanup	21 hours ago
📄 README.md	Update README.md	21 hours ago
📄 download_data.py	fixed only tranch3	29 days ago
📄 model-with-od.py	changed for test run	28 days ago
📄 model.py	Update model.py	2 days ago
📄 object_detection.py	ob working	28 days ago
📄 preprocess.py	cleanup	21 hours ago

About

Image Classification model to predict patient posture in hospital rooms.

📖 [Readme](#)

Releases







No releases published
[Create a new release](#)

Packages

No packages published
[Publish your first package](#)

Contributors

 6



Questions?