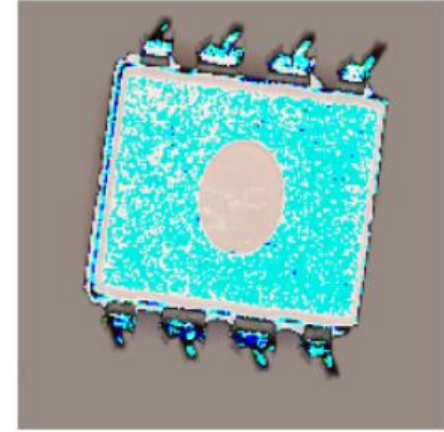# HOST 2023 SCS TRACK Submission
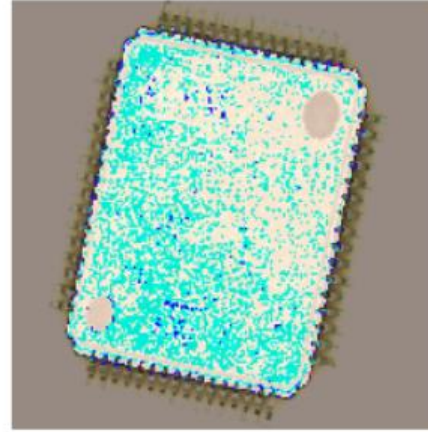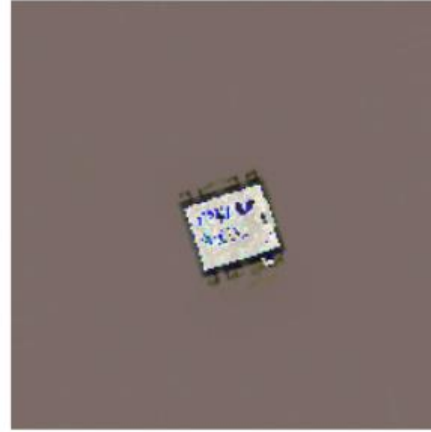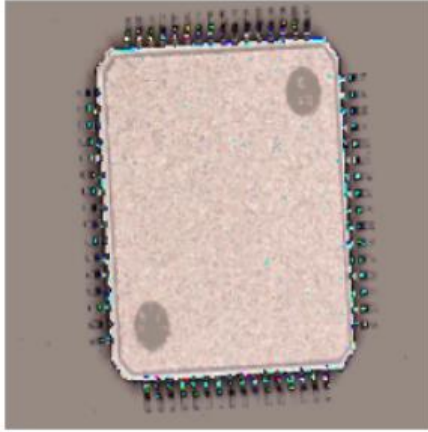
HEADS GROUP UNC Charlotte:
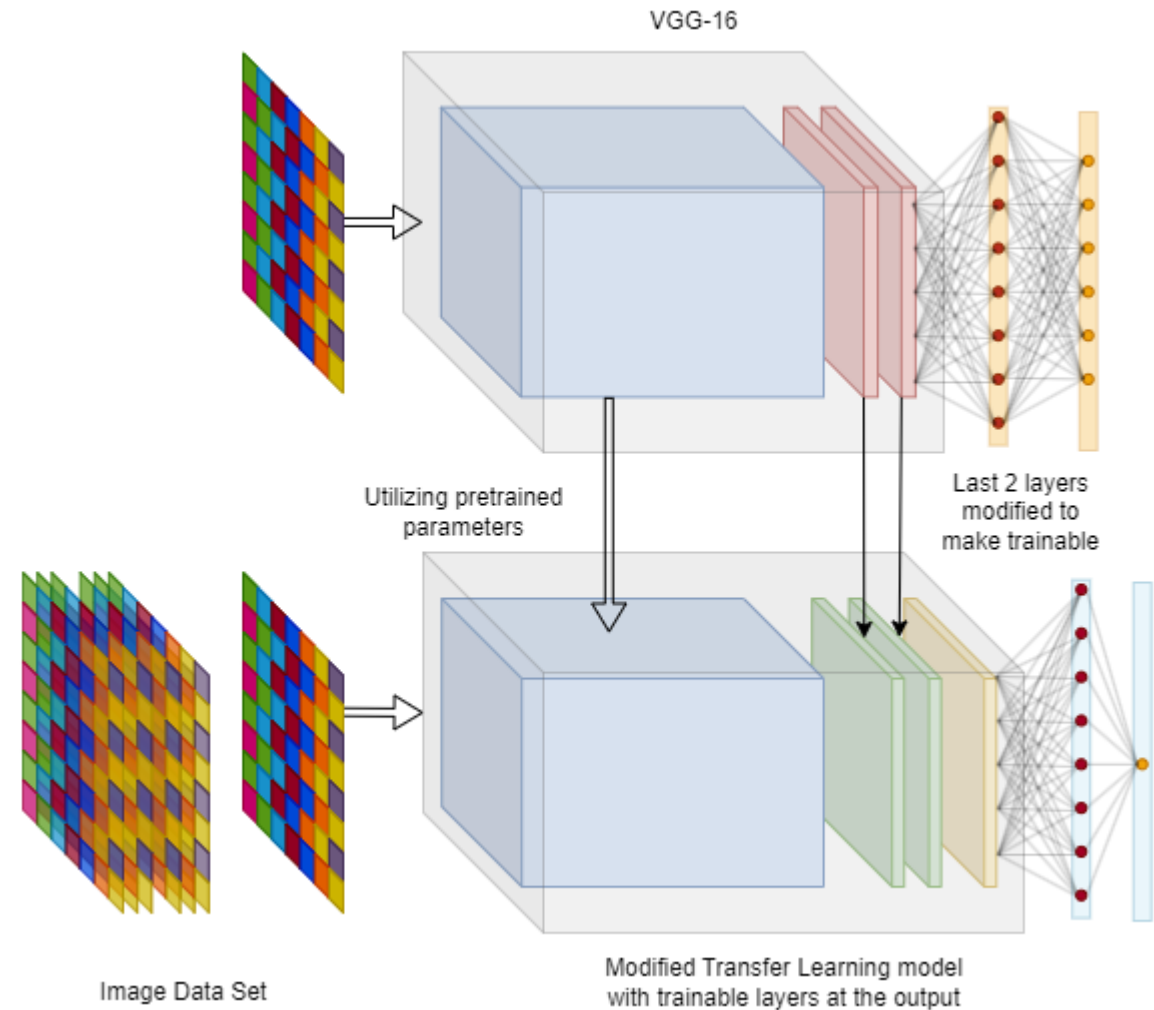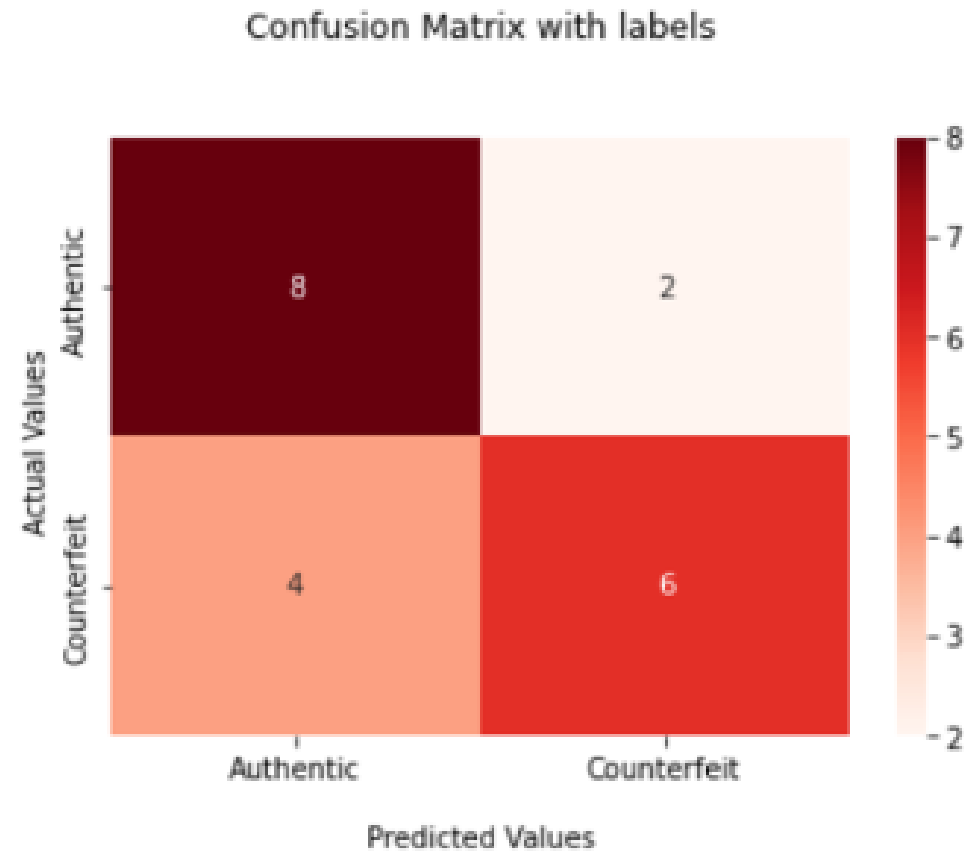Chaitanya Bhure
Dhruvakumar Aklekar
Geraldine Shirley

Data Augmentation

- Convert RGB to BGR format for input to VGG 16 model
- Augmentations including rotation, zooming and horizontal flipping
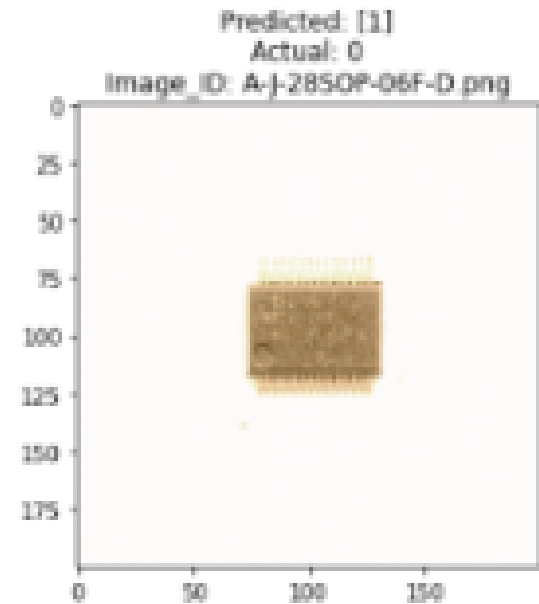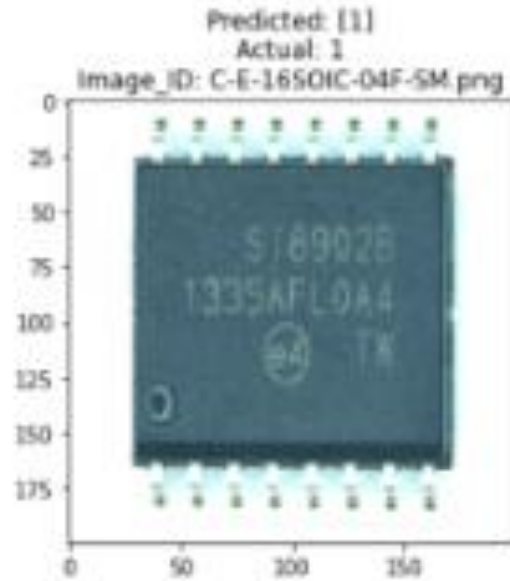
Transfer Learning

Phase 1 Confusion Matrix

Confusion Matrix with labels

	Precision	Recall	F1-Score	Support
Authentic	0.65	0.80	0.73	10
Counterfeit	0.75	0.60	0.67	10
Accuracy			0.70	20
Macro avg	0.71	0.70	0.70	20
Weighted avg	0.71	0.70	0.70	20

Classification Report Phase 1

Qualitative Results

Phase 2 Confusion Matrix

Confusion Matrix with labels
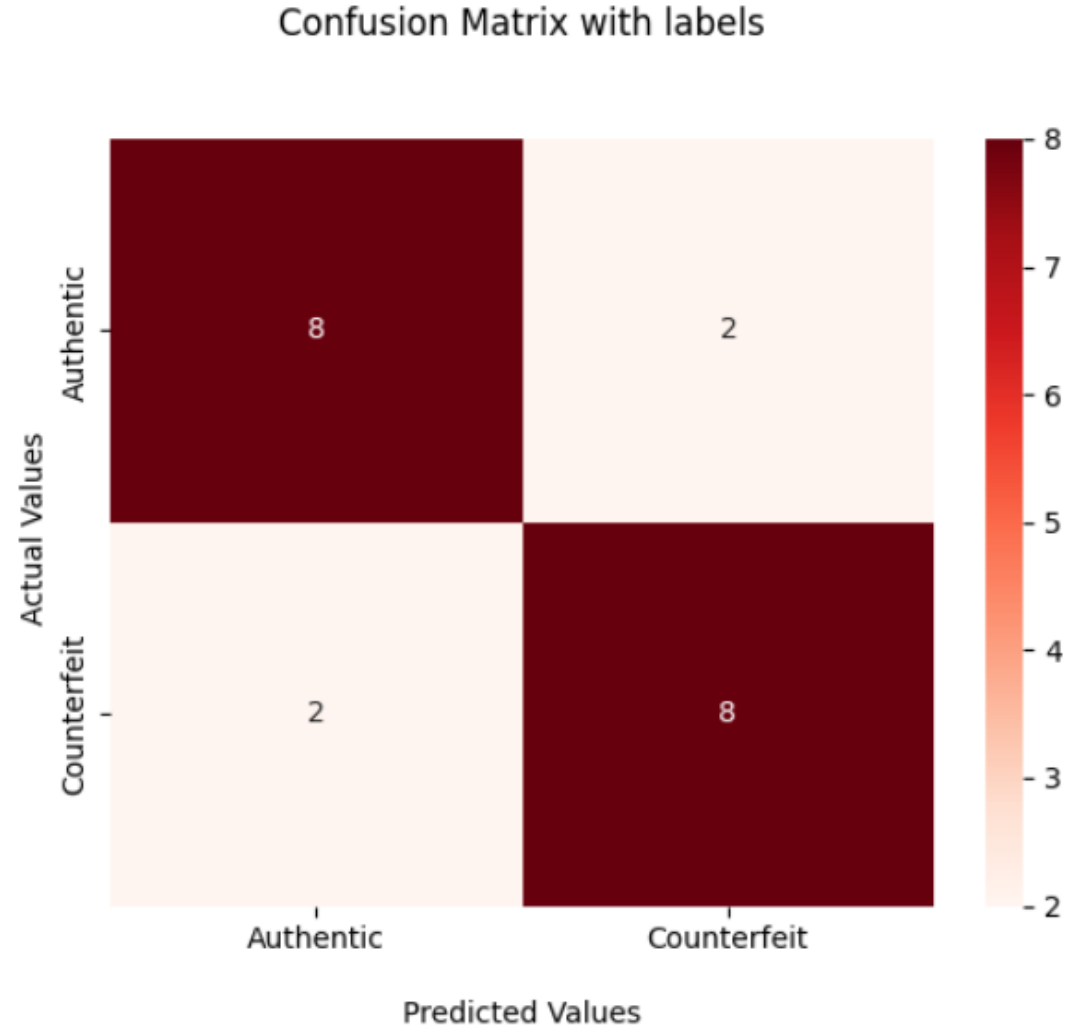
	Precision	**Recall**	**F1-Score**	**Support**
Authentic	0.80	0.80	0.80	10
Counterfeit	0.80	0.80	0.80	10
Accuracy			0.80	20
Macro avg	0.80	0.80	0.80	20
Weighted avg	0.80	0.80	0.80	20

Classification Report Phase 2

Qualitative Results

Predicted: [1]
Actual: 1
Image_ID: C-E-16SOIC-10F-D.png

Predicted: [0]
Actual: 1
Image_ID: C-T-28SOP-05B-SM.png
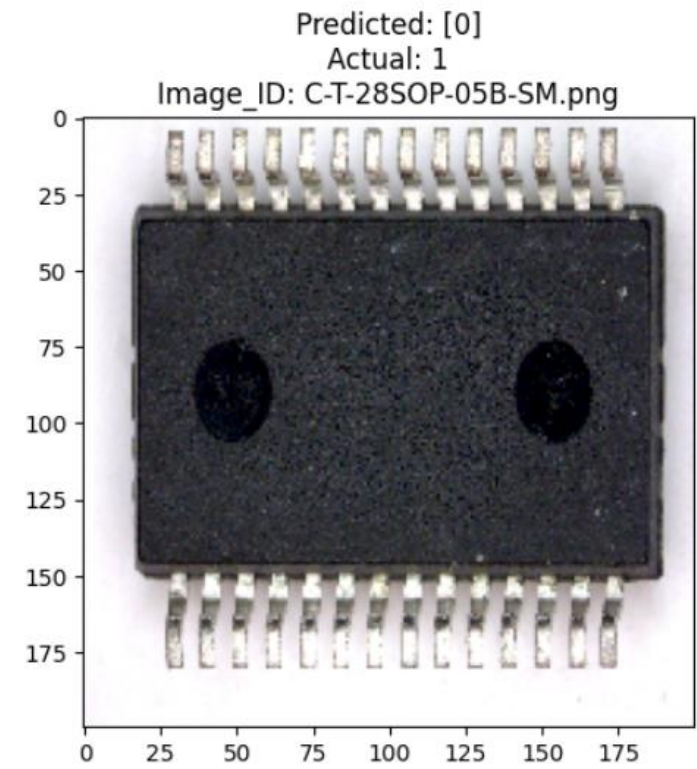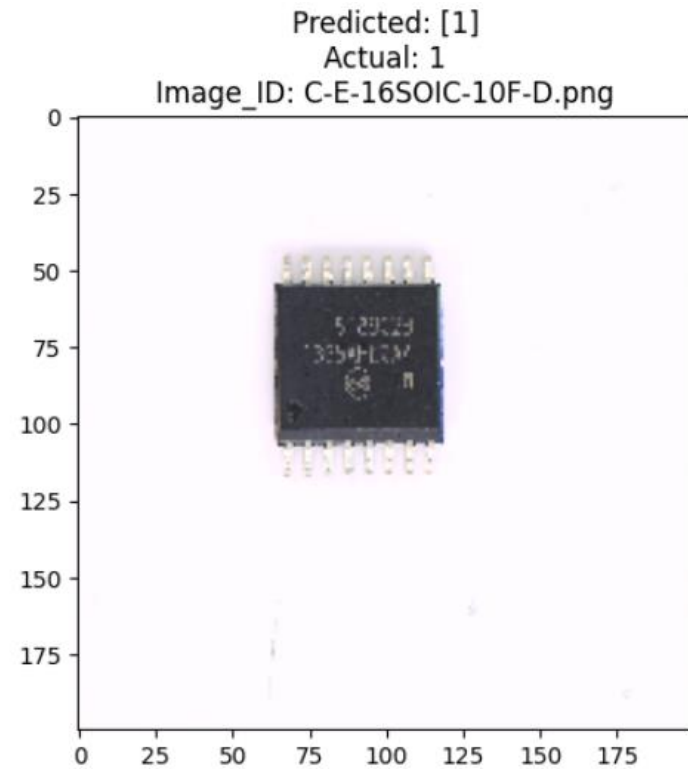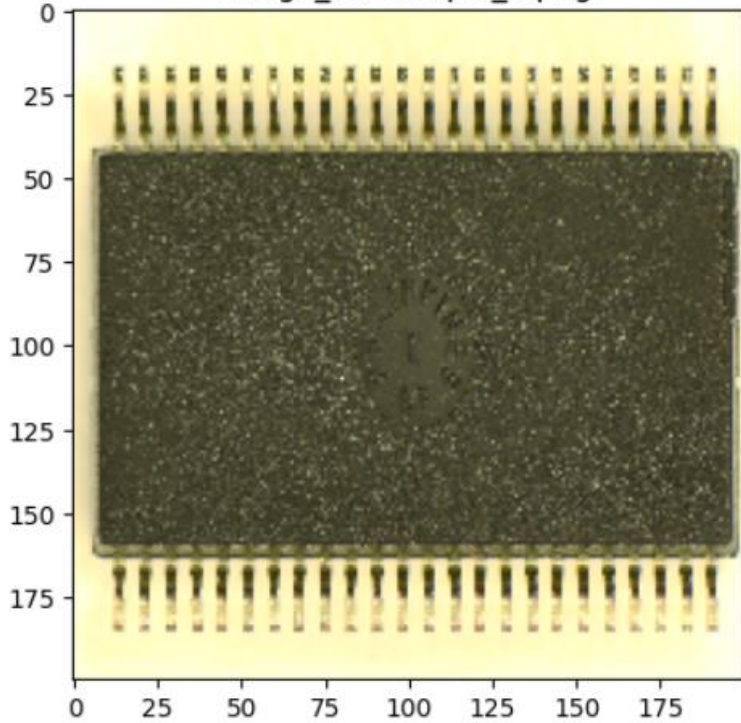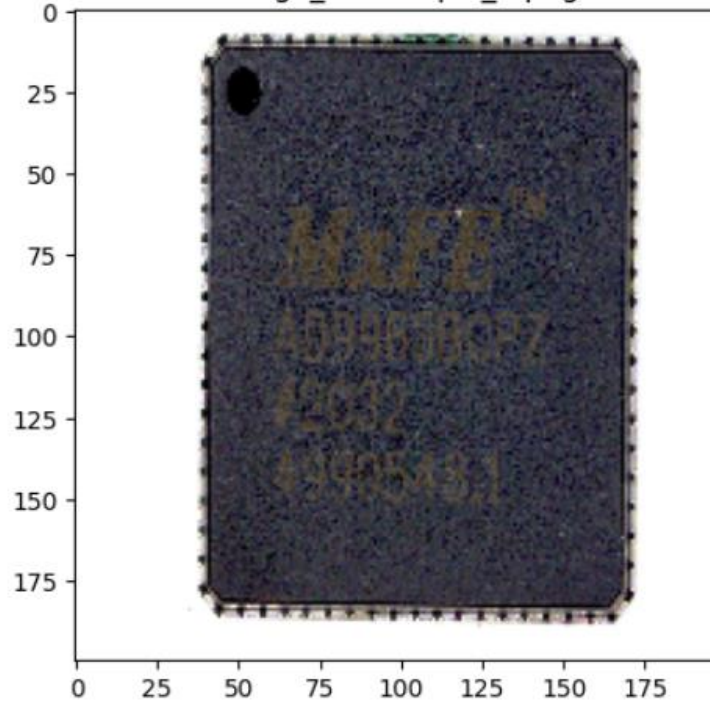
Overfitting

- Data Augmentations
  - Rotation Range = 20
  - Zoom range = 0.02
  - Horizontal Flipping
  - Convert RGB images to BGR as part of input preprocessing for VGG 16 model
  - Implemented F1 score metrics along with Precision and Recall to overcome imbalanced class problem

Holdout Data Sample Predictions

Holdout Data Quantitative Results

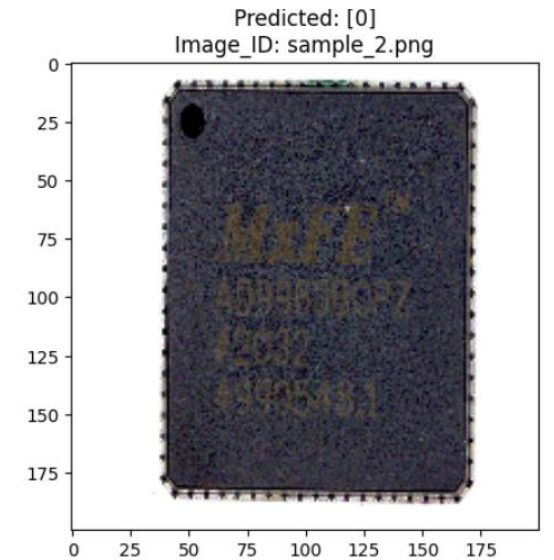| Image Id	Predictions
Sample 1	1
Sample 2	0
Sample 3	0
Sample 4	1
Sample 5	1
Sample 6	1
Sample 7	1
Sample 8	1
Sample 9	0
Sample 10	0

Model Explainability using activation map
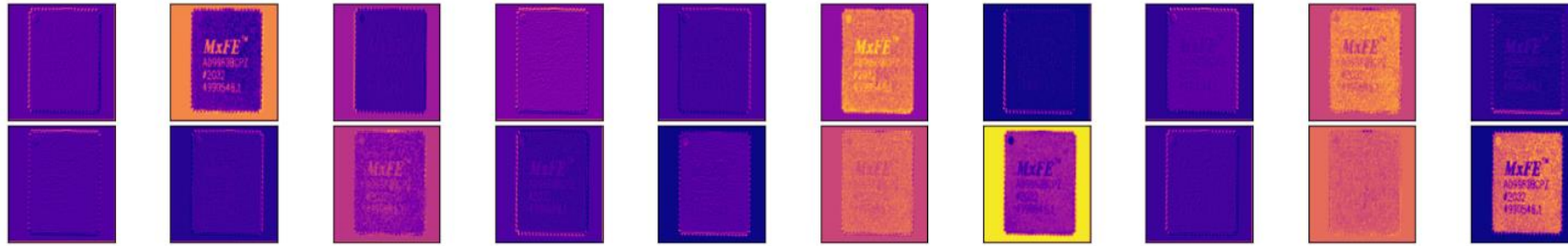
Layer 1 Activation Map

Layer 6 Activation Map

Predicted: [0]
Image_ID: sample_2.png
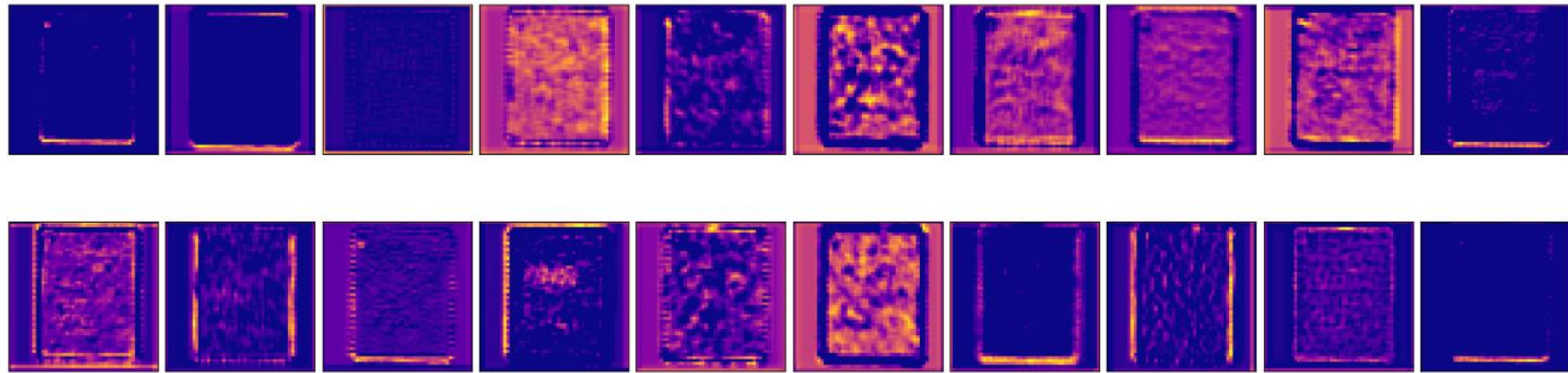
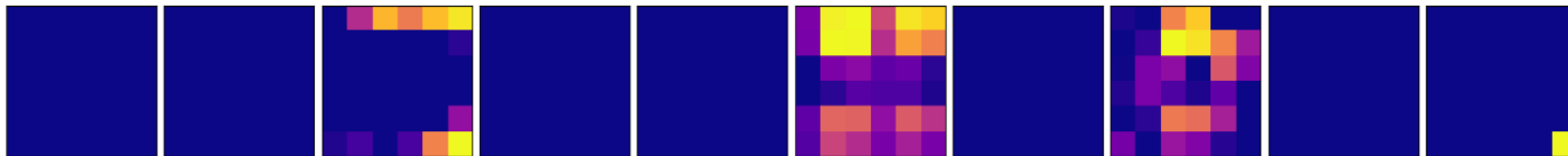# Model Explainability using activation map

Layer 10 Activation Map

Predicted: [0]
Image_ID: sample_2.png
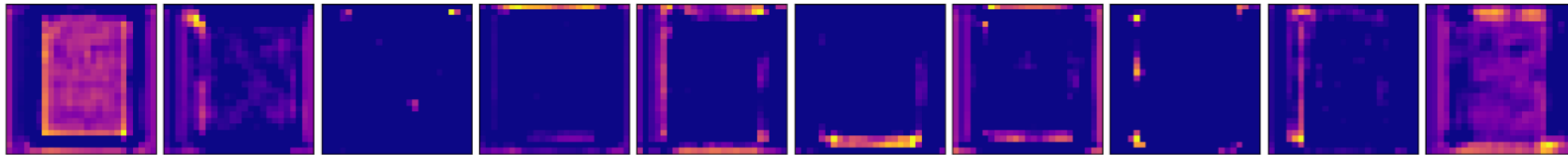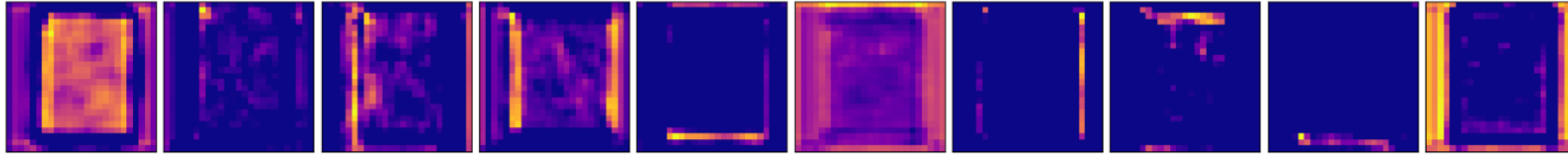
Layer 17 (Final Convolution Layer) Activation Map