Implementing Online Protective Measures For Children Using Deep Learning

Dream Team LLC,
Ani Zotti, Ashanti Jabri, Brian Cho

Agenda

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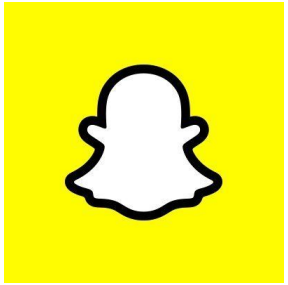
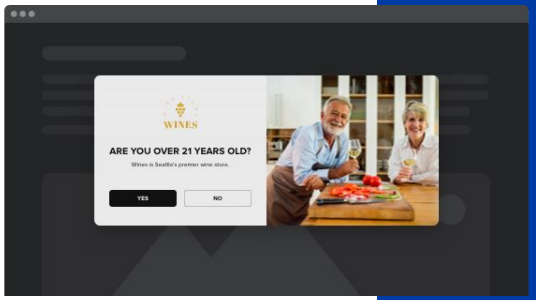
2. Project Roadmap
3. EDA and Pre-processing
4. Modeling
5. Results
6. Deployment
7. Conclusions/Recommendations

Project Overview

How can we develop a binary age classification model in order to add an extra layer of security for minors on the internet?

- **Age verification**
- **Online enticement of children**





Project Roadmap

EDA and Pre-Processing

- Dataset Used: UTKFace Dataset
- Addressing Imbalanced Classes
- Image Augmentation

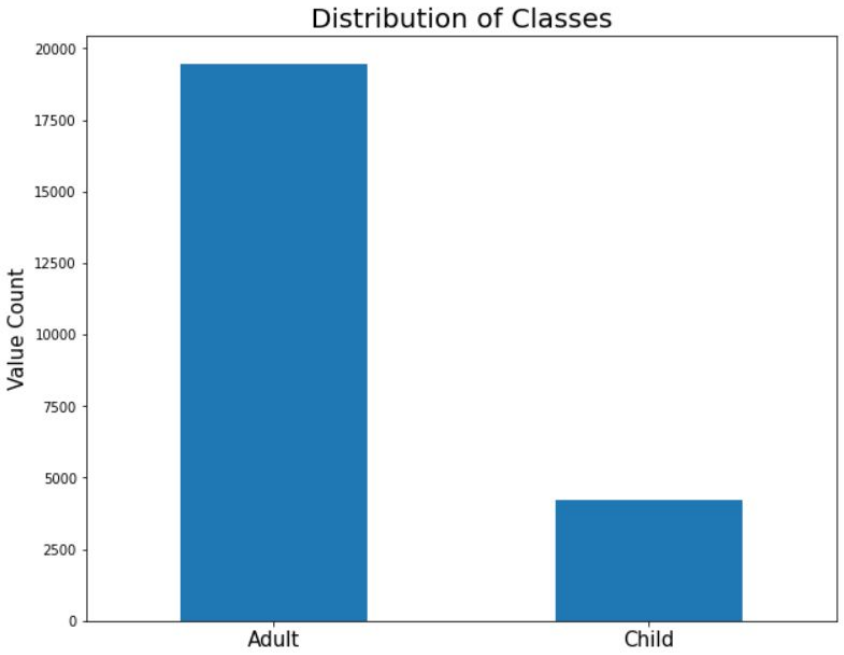
Modeling

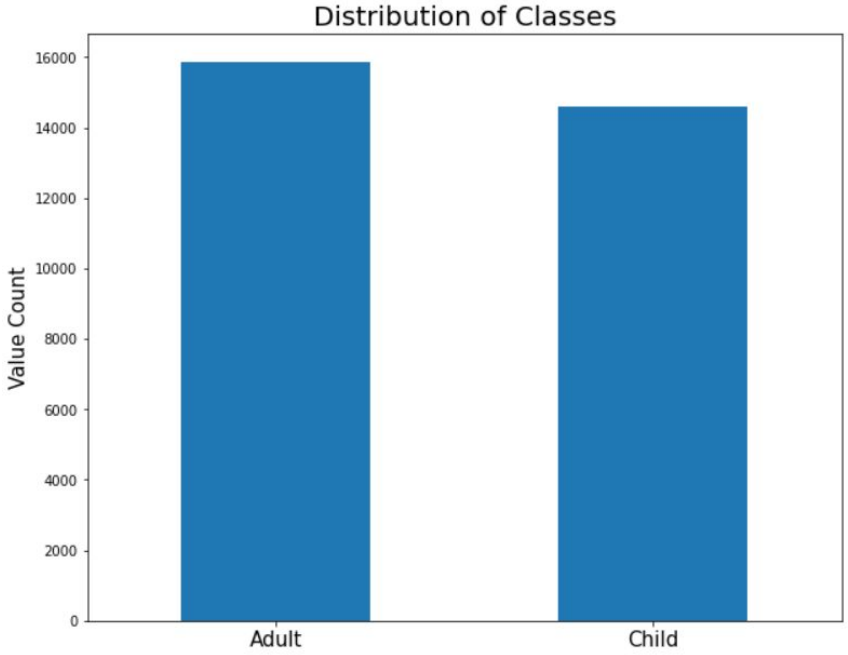
- Dream Team Model
- ResNet50
- VGG-16
- Evaluations

Deployment

- Streamlit to Heroku

EDA and Pre-Processing





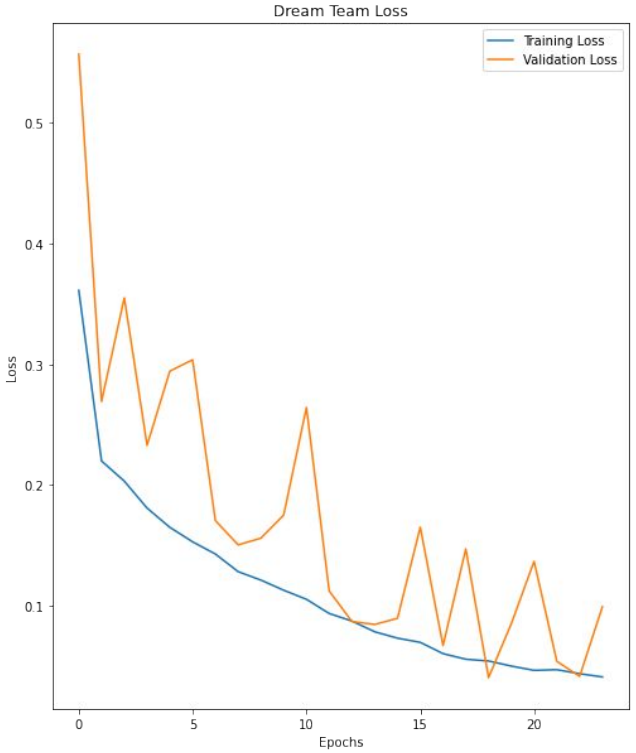
EDA and Pre-Processing

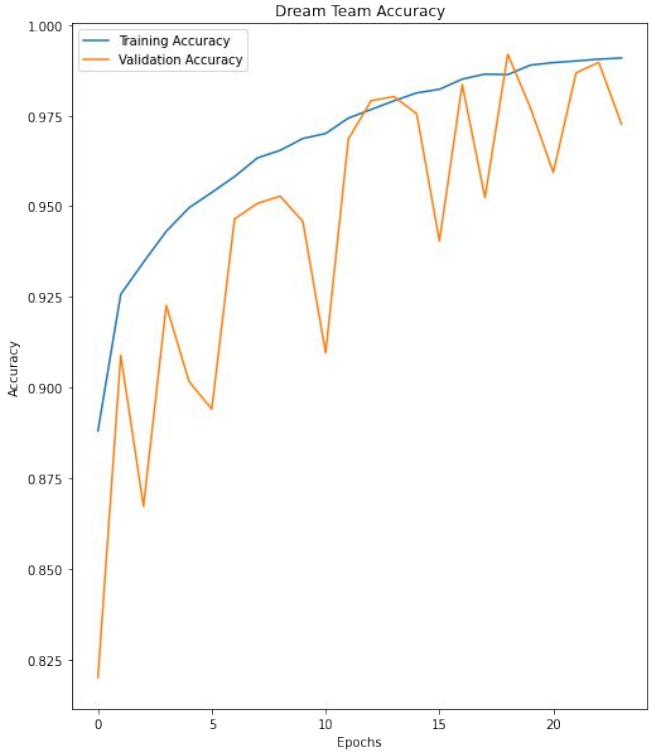
Original

Unsharp Mask

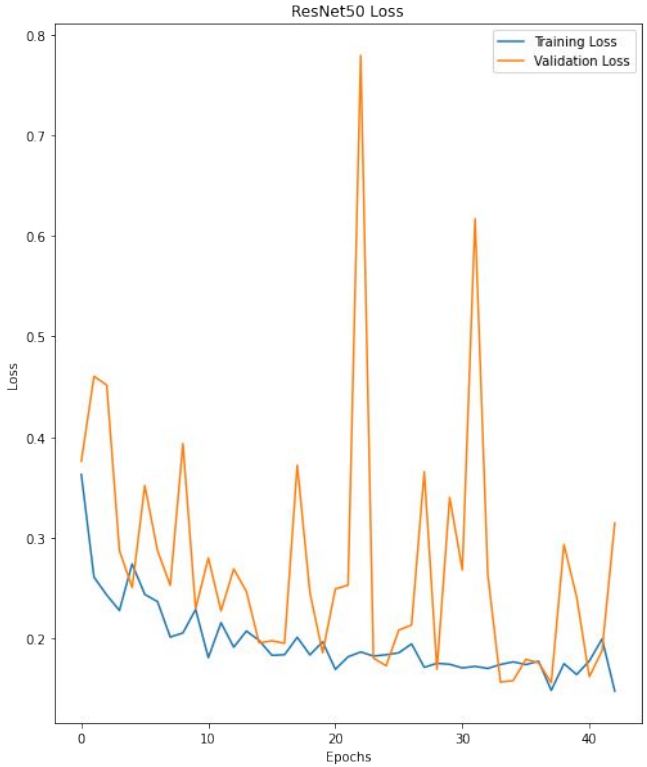
Flipped & Rotated

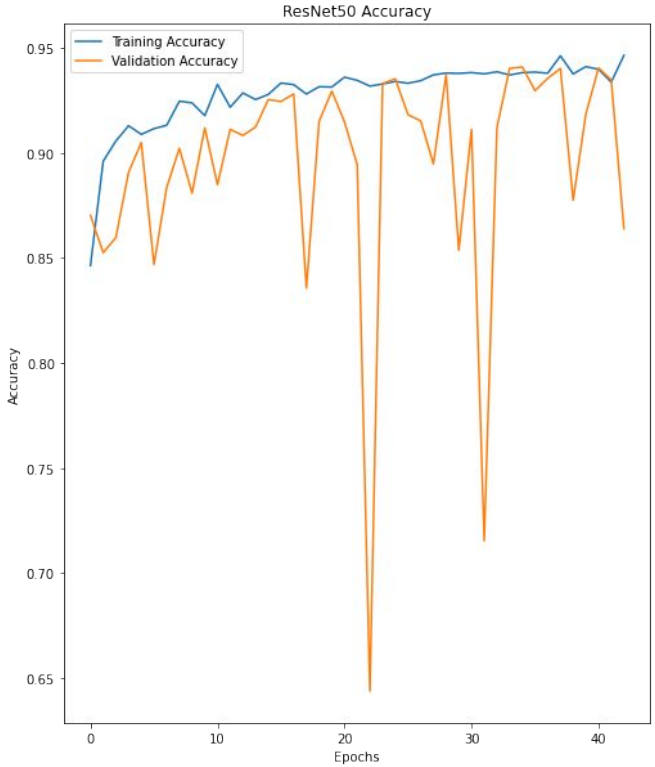
Dream Team Model



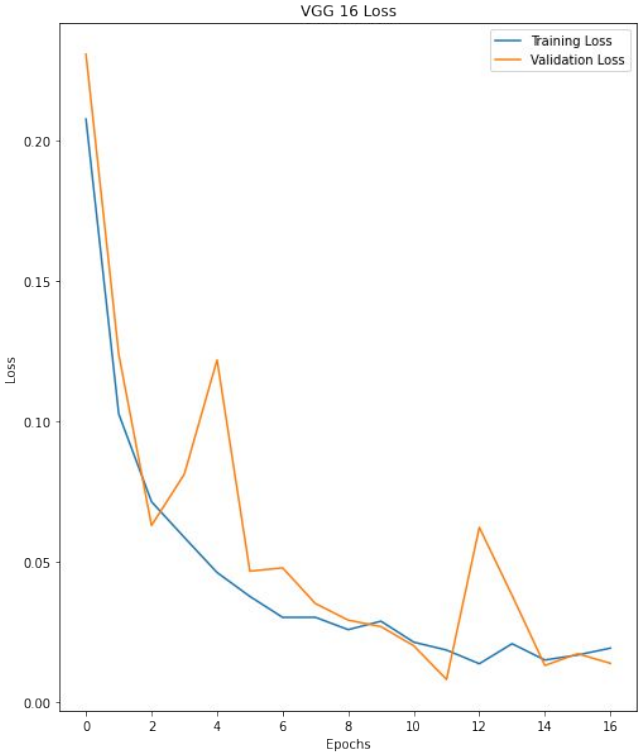


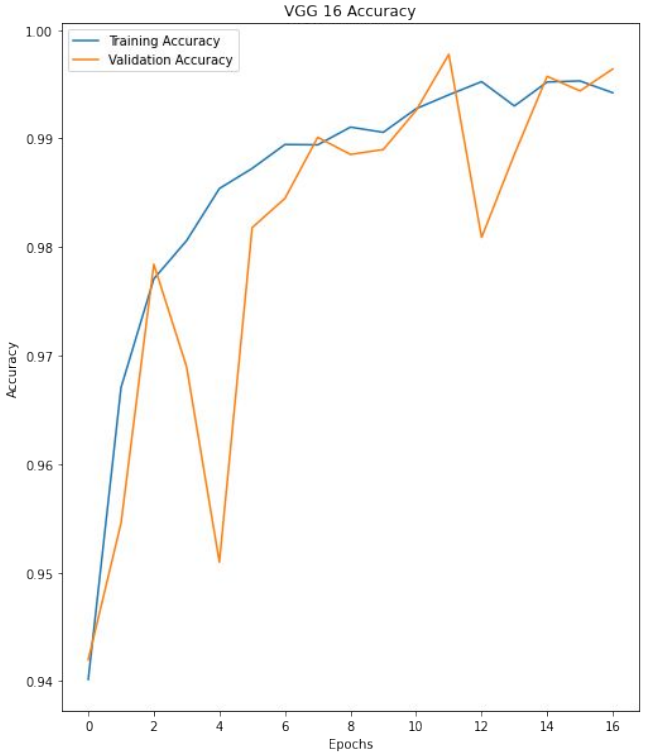
ResNet50 Model





VGG-16 Model

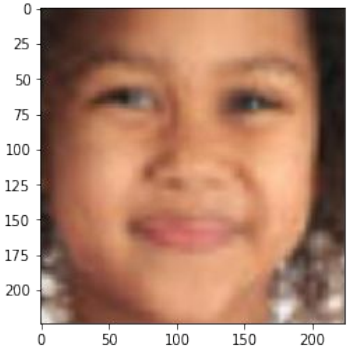

VGG 16 Loss
Training Loss
Validation Loss
Loss
Epochs
0.00
0.05
0.10
0.15
0.20
0
2
4
6
8
10
12
14
16

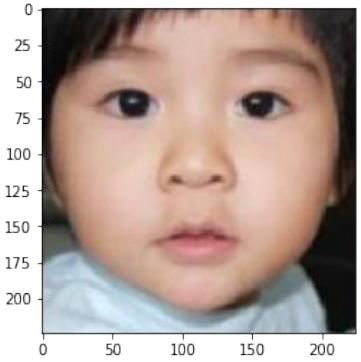

VGG 16 Accuracy
Training Accuracy
Validation Accuracy
Accuracy
Epochs
0.94
0.95
0.96
0.97
0.98
0.99
1.00
0
2
4
6
8
10
12
14
16

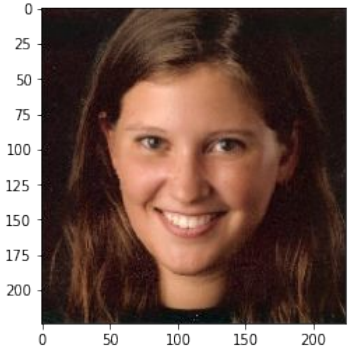
Score Comparisons

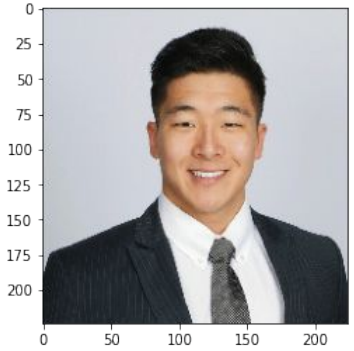
	Accuracy	Loss	Precision	Recall
DT Model	99.45%	0.31%	99.14%	99.67%
VGG 16	99.78%	0.08%	99.83%	99.89%
ResNet50	94.02%	1.5%	94.36%	98.50%

Predictions









Room for Improvement

Uploaded Image

Classifying...

ADULT

Classification Complete!

Conclusions and Recommendations

Added benefit for incorporating an additional layer of security for age verification for parents and organizations alike

- **99.78% accuracy**
- **Facial recognition features on applications**
- **Prevent possible litigation**
- **Identifying online enticement of children**

Recommendations:
This model serves as the basis for classifying children and adults

- **Utilize the OpenCV library**
- **Incorporate a facial-recognition system that can identify children/adults in real time.**
- **Further train the model to verify human faces**