



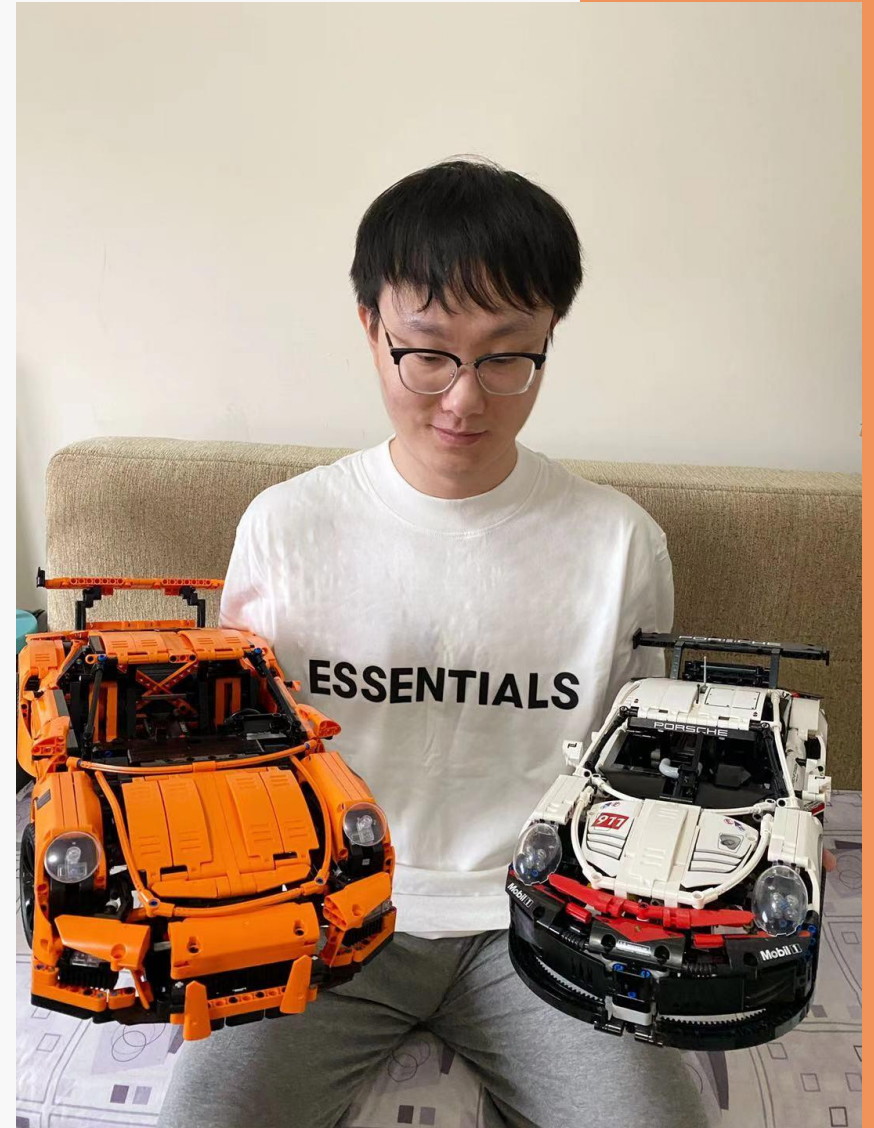
DS-NYC-13-Capstone2

COVID-19 Face Mask Detection Using Deep Learning













By: Hang Yin

Biography

- Master's in Statistics from Cornell University
- Veteran of U.S. Army
- Data Scientist since 2020
- New hobby: Building up LEGO sets.



Why We Wear Masks

Person with COVID-19	Person without COVID-19	Chance of spread
	Neither wears face covering + Less than 6 feet apart 	VERY HIGH
	Only healthy wears face covering + Less than 6 feet apart 	HIGH
	Only infected wears face covering + Less than 6 feet apart 	MEDIUM
	Both wearing face covering + Less than 6 feet apart 	LOW
	Both wearing face covering + Stay at least 6 feet apart 	VERY LOW
	Stay at home 	NEARLY NONE

Data Information



Contains 1006 Human Face images



Divided into Training, Validation and Testing set

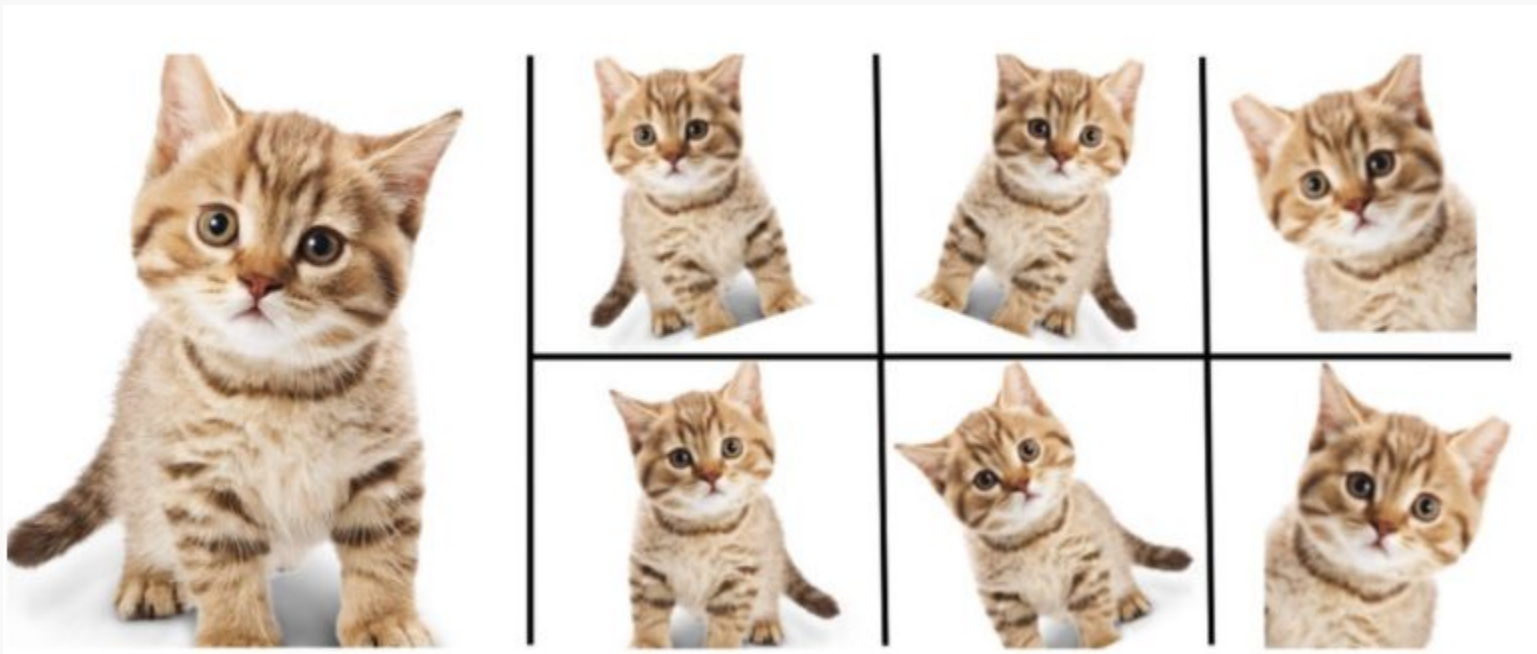


Balanced Data with two label:
Mask and No mask



Image Augmentation

- Modify existing Training Data
- Adding more images to train
- Avoid Overfitting



Model Framework



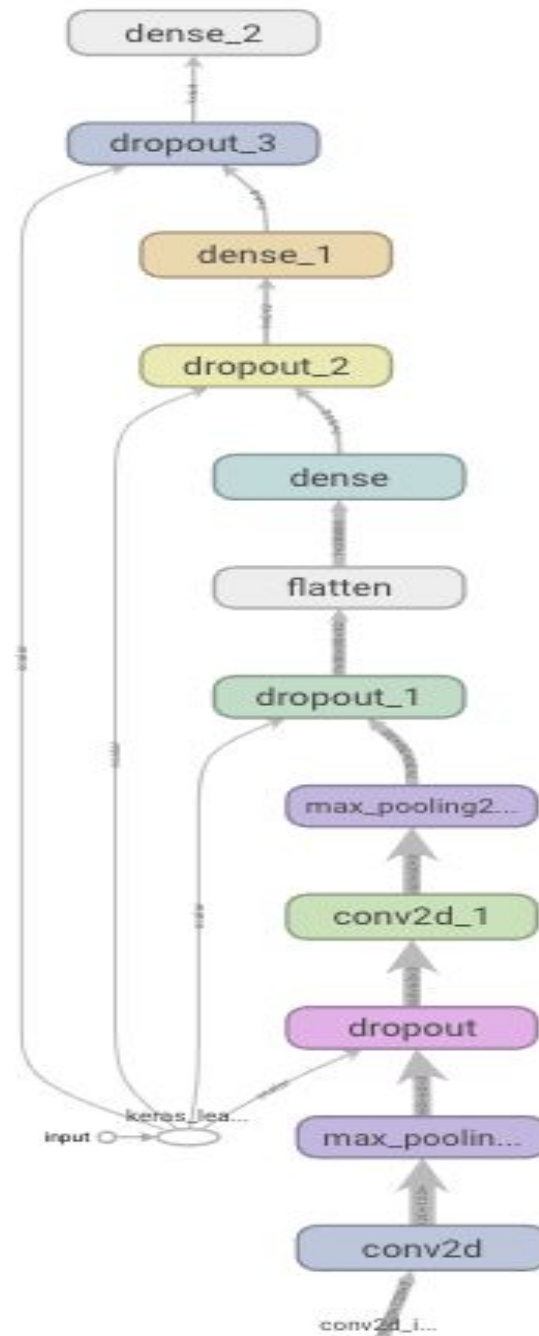
Keras Sequential() model



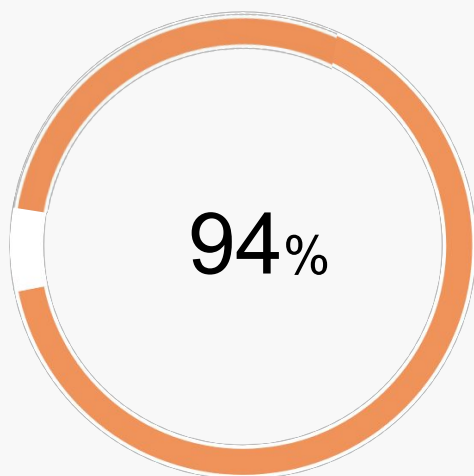
Dropouts to prevent overtraining



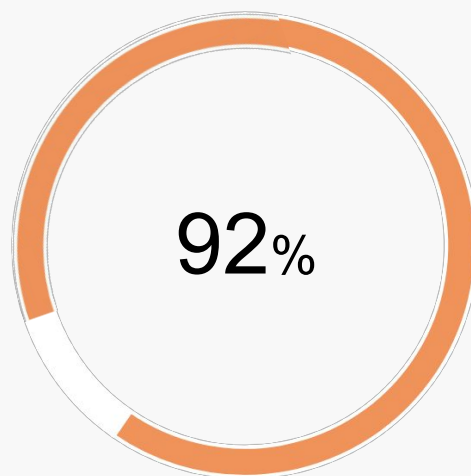
Max_pooling and flatten to



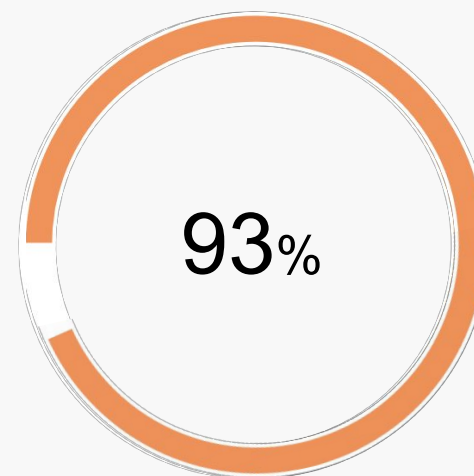
Model Performance



Training Set Accuracy
Average Loss: 0.25



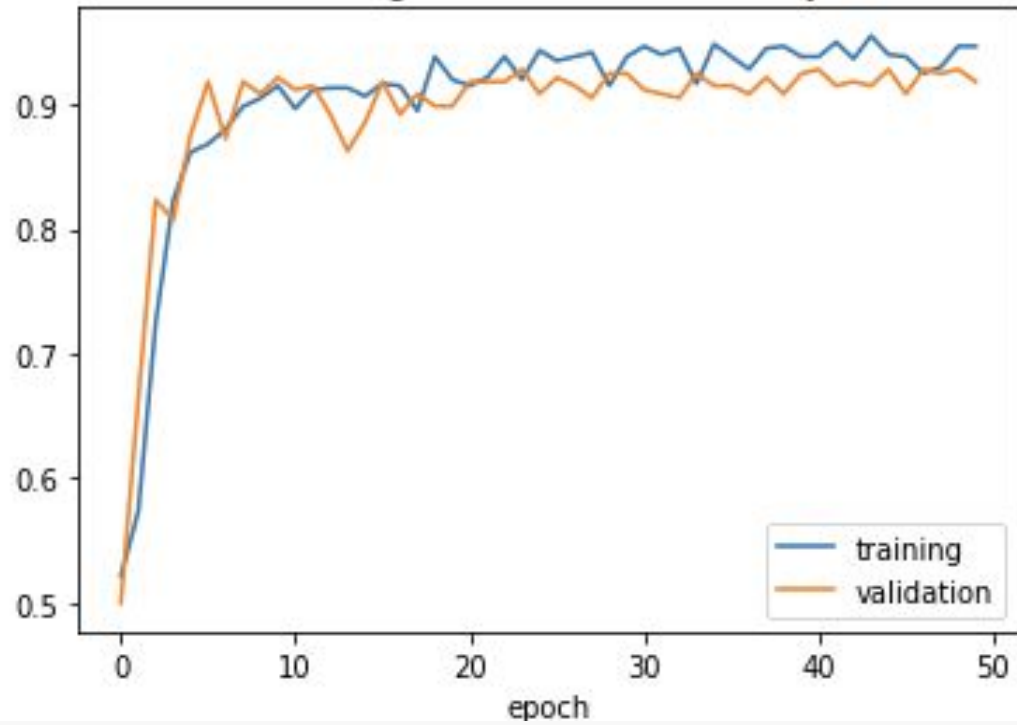
Validation Set Accuracy
Average Loss: 0.27



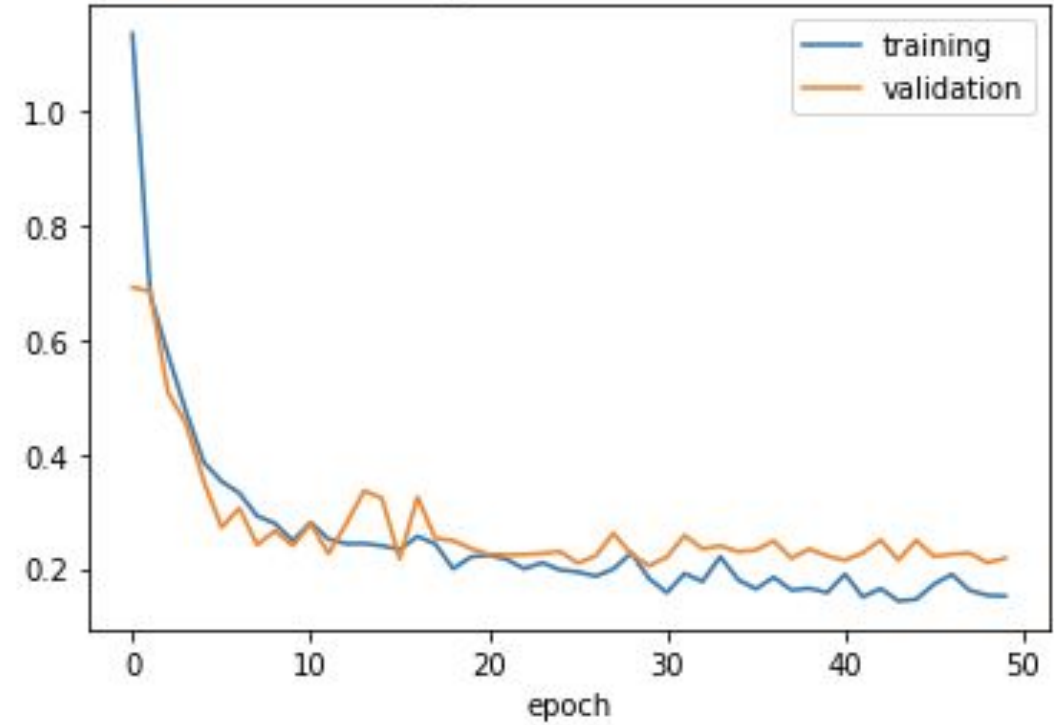
Testing Set Accuracy
Average Loss: 0.15

Model Performance

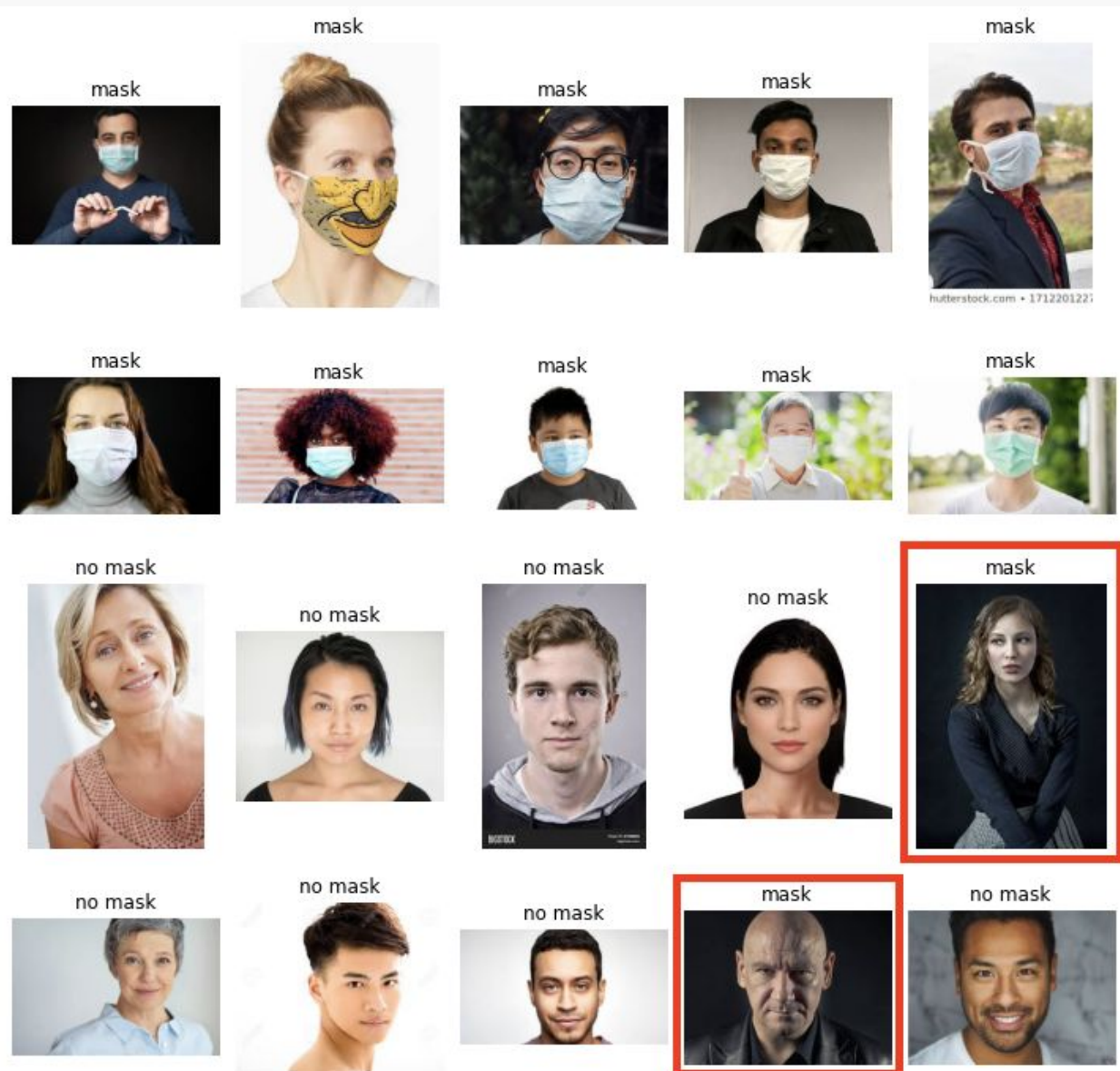
Training and validation accuracy



Training and validation loss



Model Testing



Mask prediction Accuracy : 10 / 10



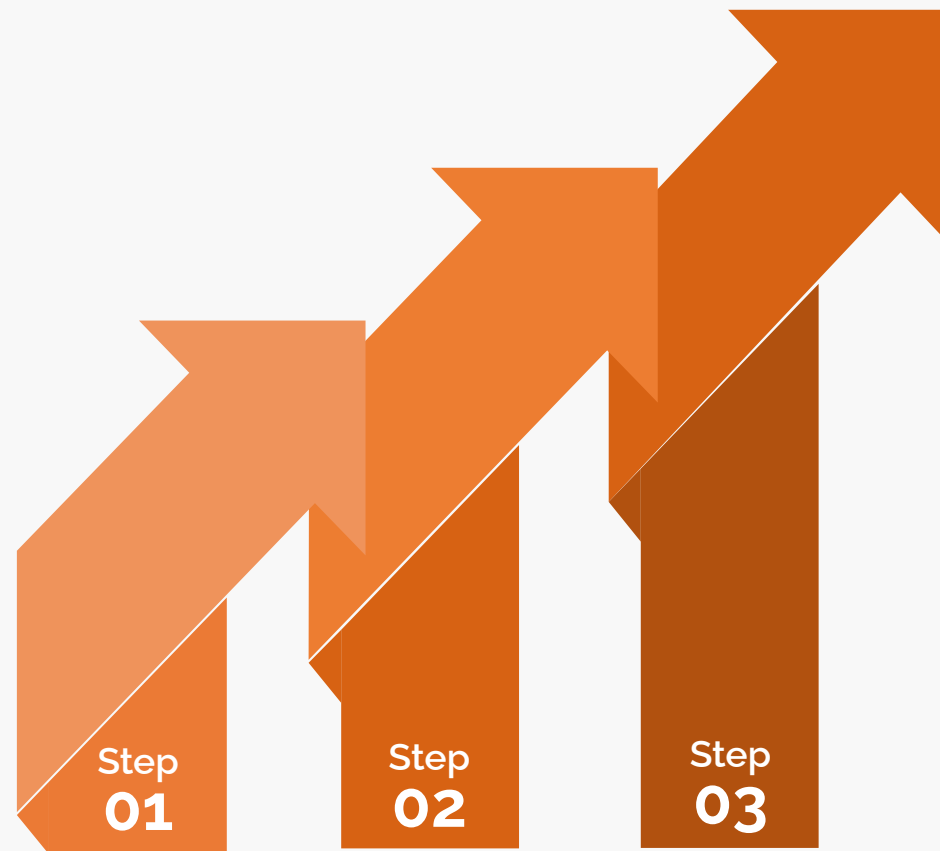
No Mask prediction Accuracy : 8 / 10



Having issues detecting no mask with dark background?

Further Research

- ☐ Transfer Learning
- ☐ Multiple Person Images
- ☐ Video Detection



The background features several decorative elements: orange circles of varying sizes and gray parallelograms. One large orange circle is at the top center, with a gray parallelogram extending from its bottom right. Another orange circle is on the right side, with a gray parallelogram extending from its bottom left. A third orange circle is at the bottom center, with a gray parallelogram extending from its bottom right. A fourth orange circle is at the bottom right, with a gray parallelogram extending from its bottom right. A fifth orange circle is on the left side, with a gray parallelogram extending from its bottom left.

Questions?

Thank you.