ViShield

Protects you from unwanted images/videos

The INTERNET

IMAGES

VIDEOS

TEXT

Phobia Triggers

A phobia is an anxiety disorder defined by a persistent and excessive fear of an object or situation

Fear of amphibians

Batrachophobia

Arachnophobia

Fear of spiders

Fear of clowns

Coulrophobia

Cynophobia

Fear of dogs

Fear of insects

Entomophobia

Other Issues

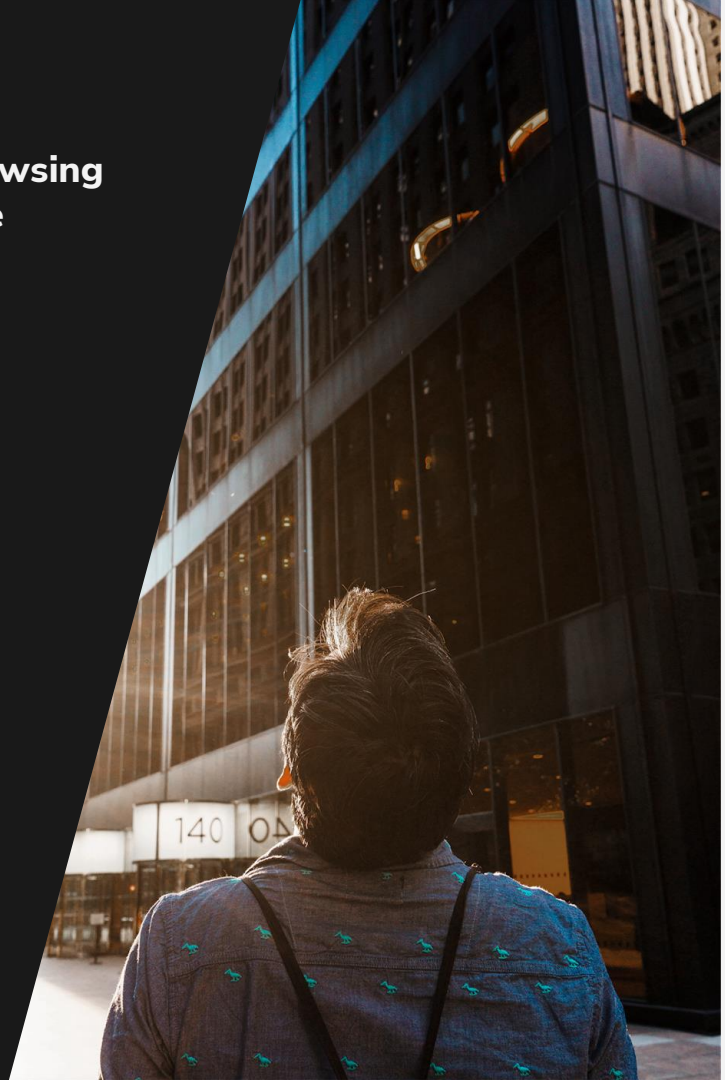
Depressions

Pornography

Violence

IMAGINE
you are browsing the website

Trigger Warning!



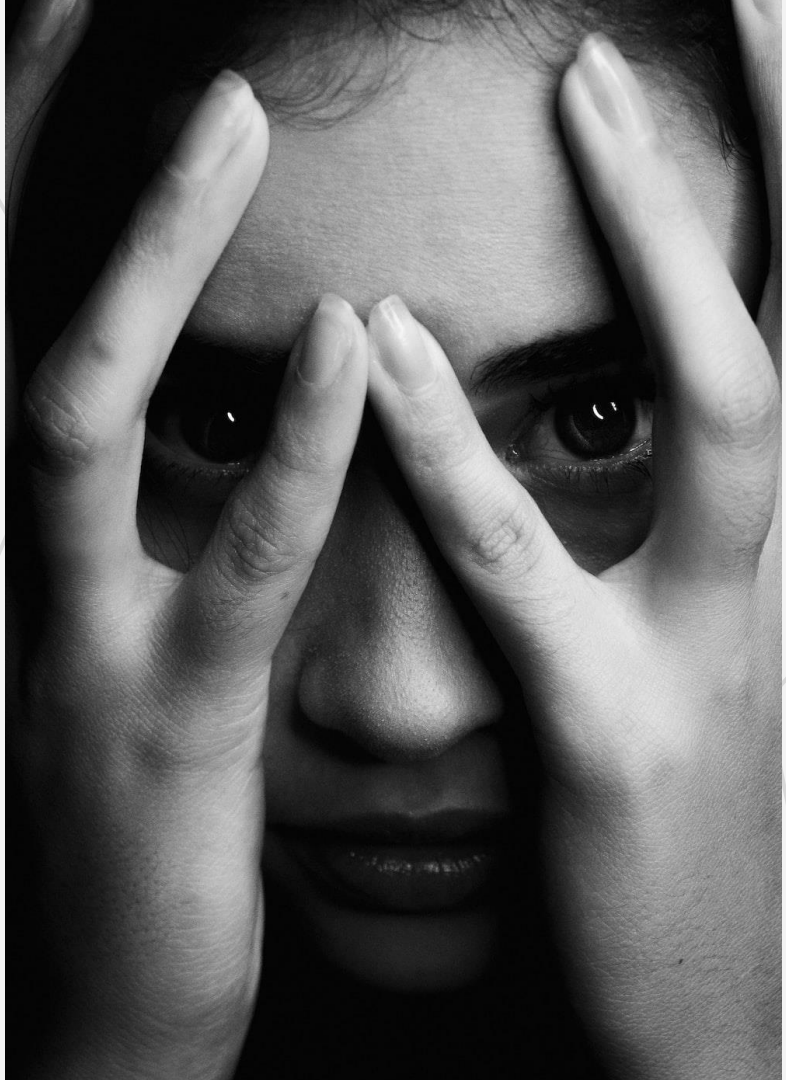
Snakes

Trypophobia

Symptoms / Effects

Short term

Sweating
Chills
Shortness of breath
Nausea
Headaches
Numbness
Confusion or disorientation
Loss of appetite



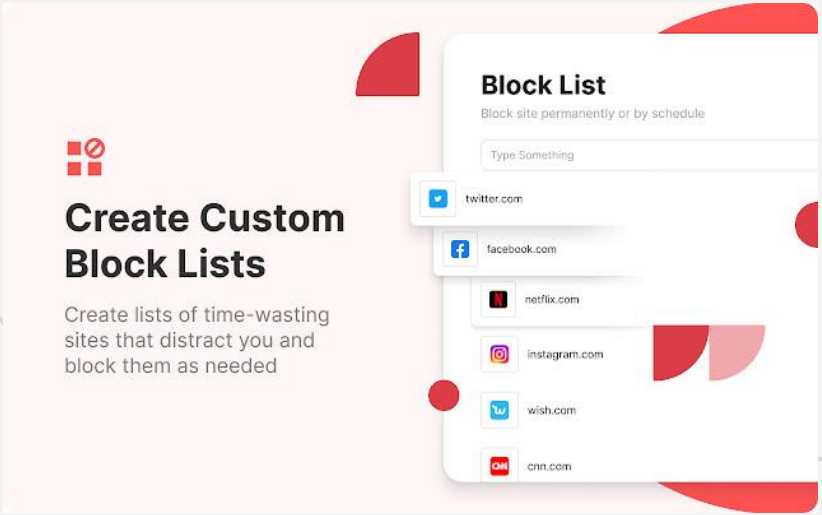
Long Term

Constant Anxiety
Panic Attack
Suicidal (depression)
Character & Values change

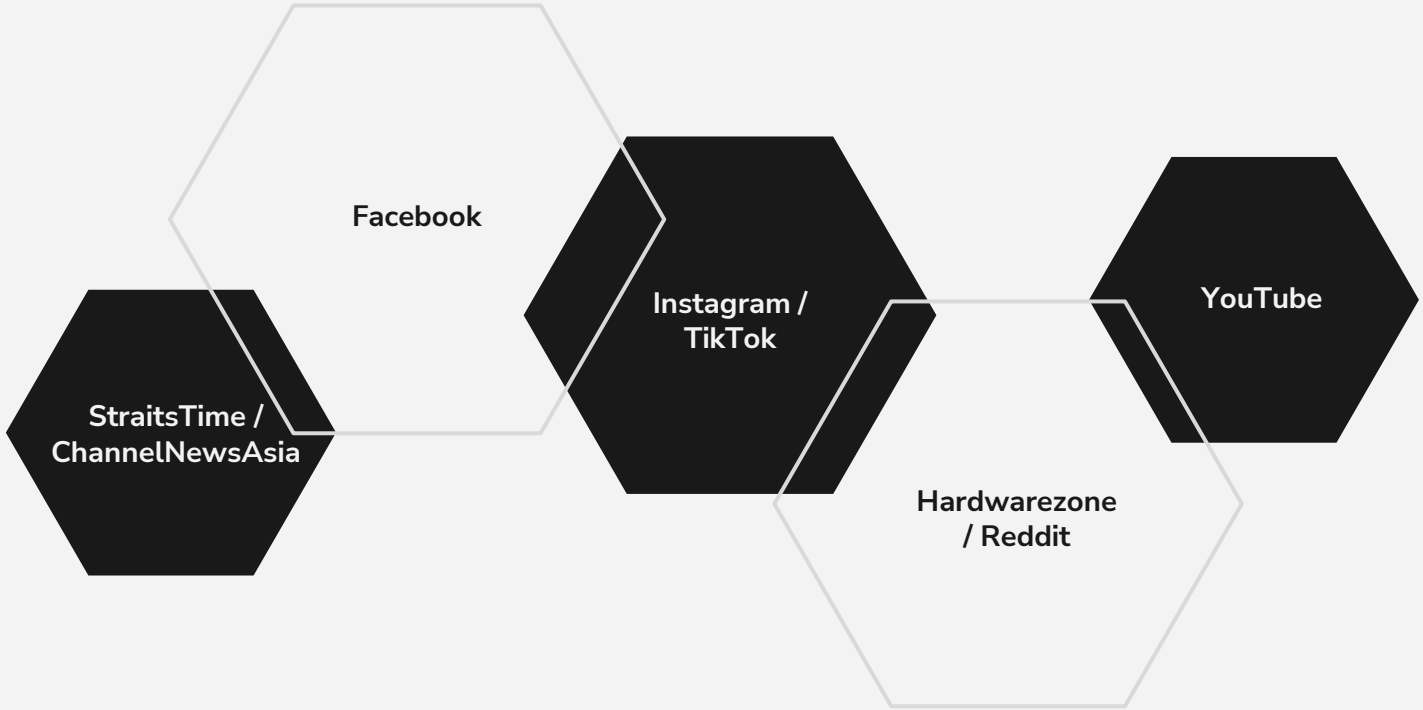
Current Solutions: URL Blacklist

Government Blacklist

Open Sourced / Custom Url Blocklist



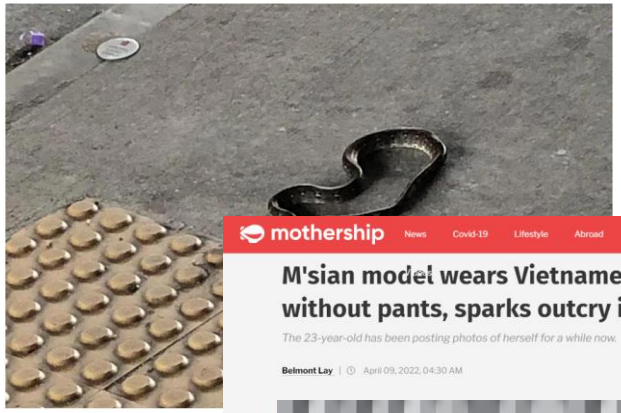
What about everyday sites?



Everyday Sites

THE STRAITS TIMES SINGAPORE LOG IN SUBSCRIBE

Python removed from traffic junction near Waterway Point in Punggol



A python was spotted at a traffic junction near W

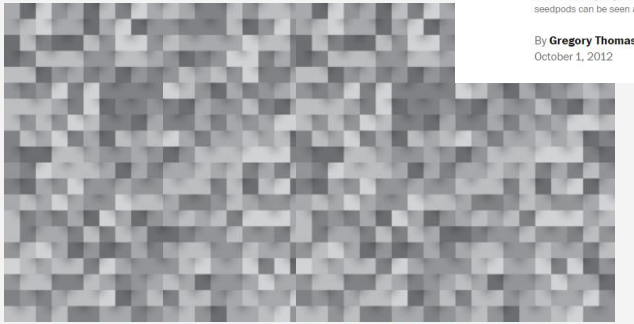
STOMP

mothership News Covid-19 Lifestyle Abroad Weekend Environ

M'sian model wears Vietnamese nation without pants, sparks outcry in Vietnar

The 23-year-old has been posting photos of herself for a while now.

Belmont Lay | April 09, 2022, 04:30 AM



Sections The Washington Post Democracy Dies in Darkness Sign In

Health Health Care Medical Mysteries Science Well+Being

Health & Science

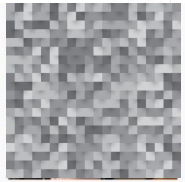
Phobia about holes is not officially recognized, but U.K. scientists look into it

Arnold Wilkins, left, and Geoff Cole, right, hope to show that an aversion to objec seedpods can be seen as a phobia with an evolutionary basis. (Roger Deeble)

By **Gregory Thomas**
October 1, 2012

Most Read National

1 Cows fed hemp produced milk with THC, researchers say



What can we do?

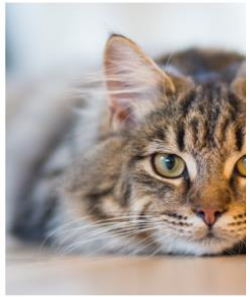
How can we prevent users from getting bothered by undesired Images and Videos?

ViShield

Machine Learning
Incorporated

Computer Vision

Classificati



CAT

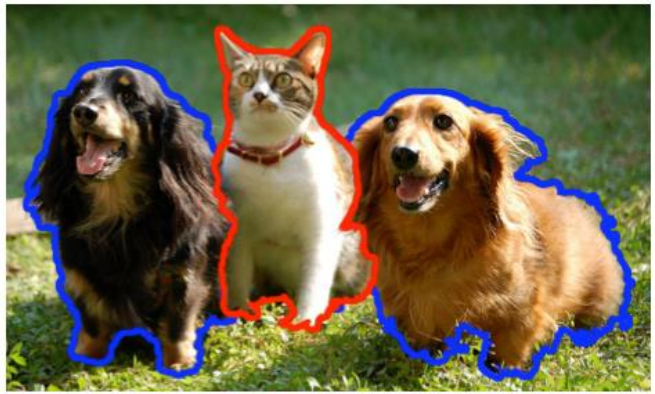
Classification

CAT

Objec

CAT

Instance Segmentation



CAT, DOG

Our Capabilities

Chrome Extension

(Image Classification)

Hide images and gif that you choose not to see.

- Dogs
- Cats
- Snakes
- Trypophobia

Streamlit Post-Processing Image Filter

(Instance Segmentation)

Identify images of snakes by pixel and filter them out

Streamlit Post-Processing Video Filter

(Instance Segmentation)

Identify images of snakes in a video by pixel and filter them out

Chrome Extension

Business Requirements & Success Factors

Business Requirements

- Javascript compatible model (serverless)
- Speed
- Model pretrained with relevant dataset

Success Factors

- Model accuracy above 70%
- Functioning chrome extension

Fulfilling Business Requirements

MobileNet V2

JavaScript Requirement

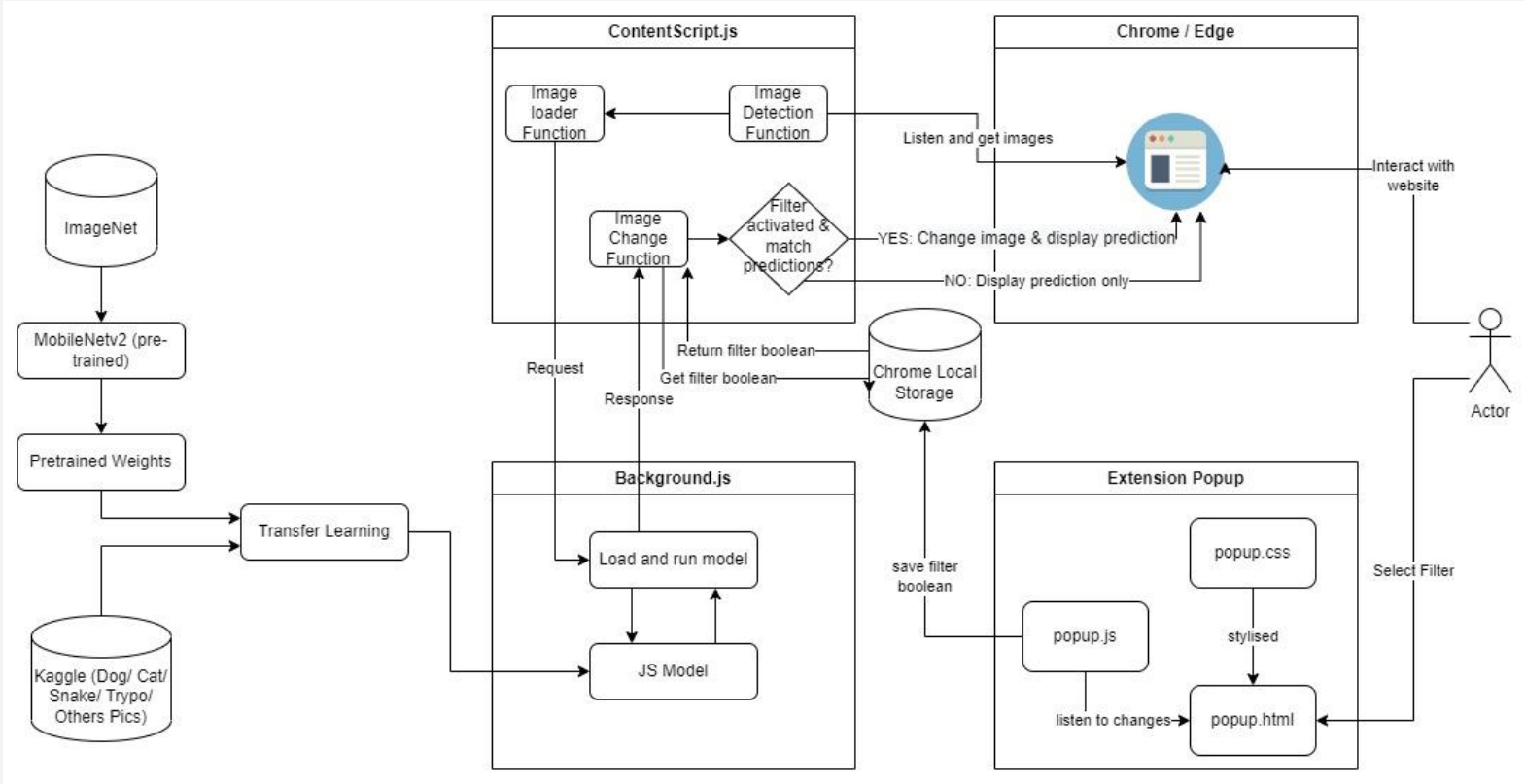
TensorFlow.js

Relevant Pretrained Dataset

Speed

Model	Model Size (MB)	Inference time (sec)	Testing Accuracy
MobileNetV2	8.54	0.035	0.888
EfficientNet Lite-0	12.58	0.042	0.924
EfficientNet Lite-1	15.8	0.064	0.913
EfficientNet Lite-2	18.37	0.085	0.907
EfficientNet Lite-3	26.38	0.128	0.907
EfficientNet Lite-4	44.69	0.221	0.891

Model Architecture



Metrics

Hidden Layers	Regularisation	Validation Loss*	Validation Accuracy
1	None	0.1402	0.9586
1	EarlyStopping	0.1570	0.9603
2	EarlyStopping, Dropout	0.1533	0.9522

* Loss Function: categorical_crossentropy

Chrome Extension

Showcase

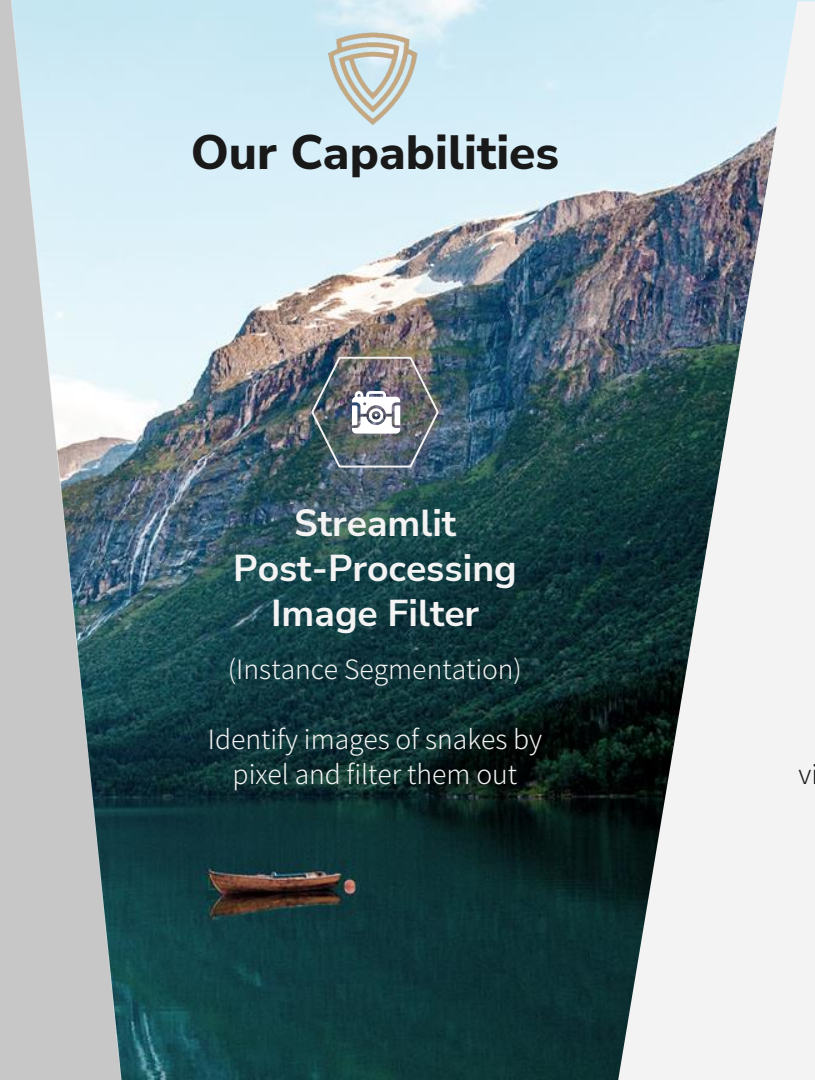
Our Capabilities

Chrome Extension

(Image Classification)

Hide images and gif that you choose not to see.

- Dogs
- Cats
- Snakes
- Trypophobia



Streamlit Post-Processing Image Filter

(Instance Segmentation)

Identify images of snakes by pixel and filter them out

Streamlit Post-Processing Video Filter

(Instance Segmentation)

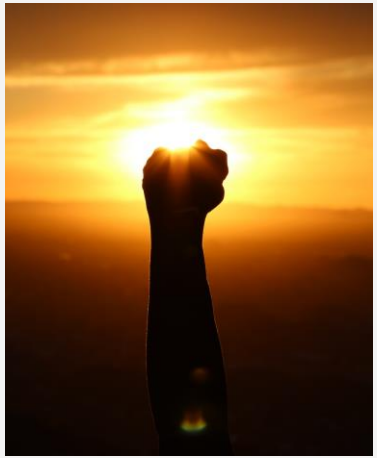
Identify images of snakes in a video by pixel and filter them out

Streamlit

Business Requirements & Success Factors

Business Requirements

- Balance between Speed and Accuracy
- Model should work on both images and videos
- Constant Learning MLOps



Success Factors

- Bounding mAP_0.5 > 0.5
- Mask mAP_0.5 > 0.5
- Functioning Streamlit

Fulfilling Business Requirements

YOLOv7

Works on Images & Videos

Constant Learning

roboflow

Speed & Accuracy

PWC Categories	Model	FPS	Mask AP
Real-time Instance Segmentation	SparseInst-608	40	37.9
Video Instance Segmentation	IDOL	17.6	64.3
Real-Time Object Detection	YOLOv7-E6E	36	64.0

roboflow

Example of mask segmentation annotation.
Green border denotes polygon coordinates

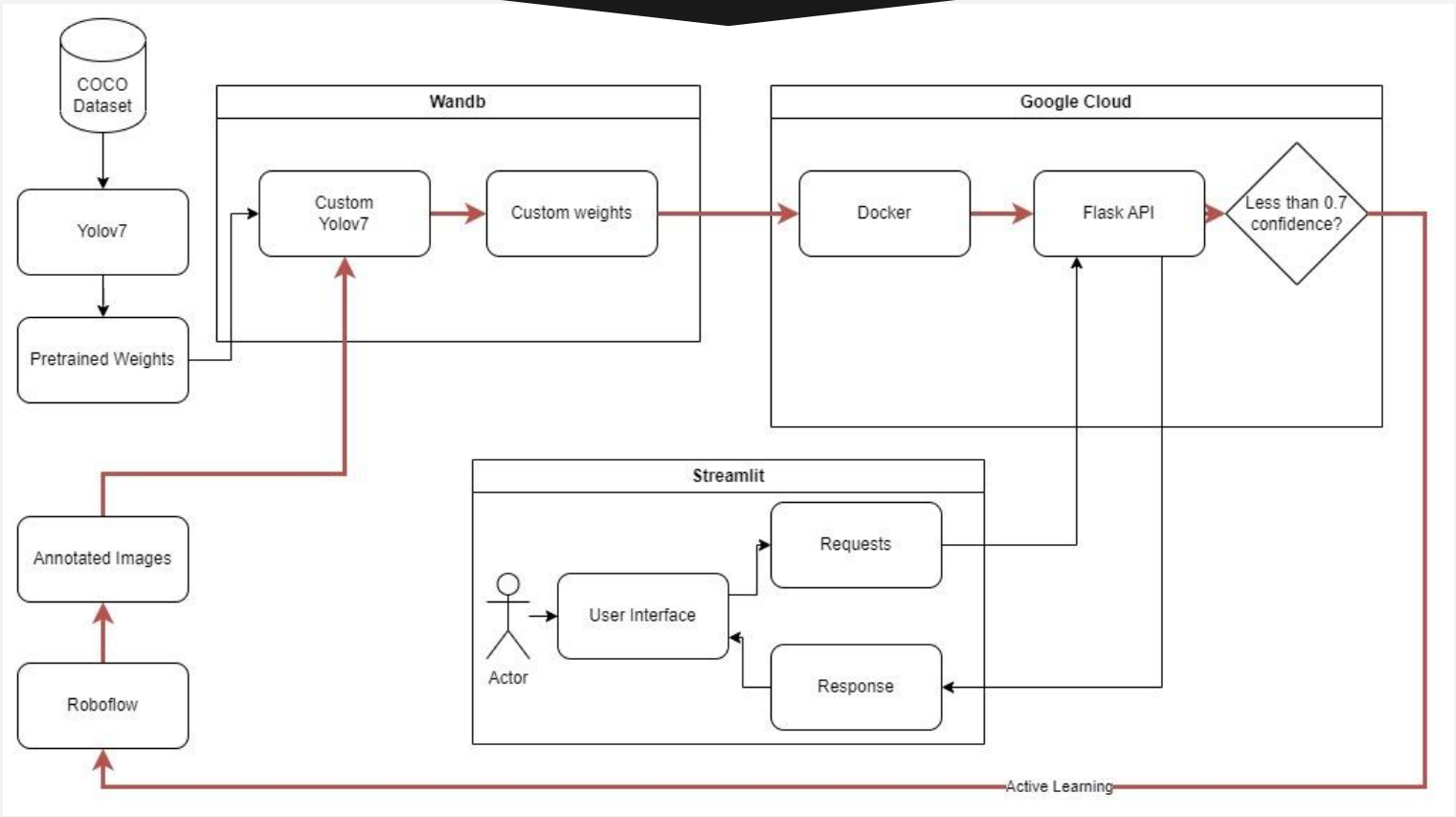
Output Label (YOLOv7 format)

```
0 0.459375 0.577777778125 0.44375 0.5611111109375 0.44
0 0.3453125 0.3333333328125 0.3515625 0.3166666671875
0 0.48887583125 0.601851853125 0.493214325 0.611111110
0 0.425 0.46944444374999994 0.42206302500000004 0.4907
```

Class

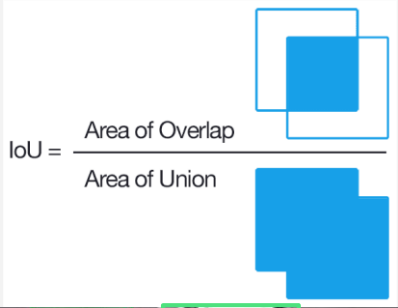
Polygon Coordinates

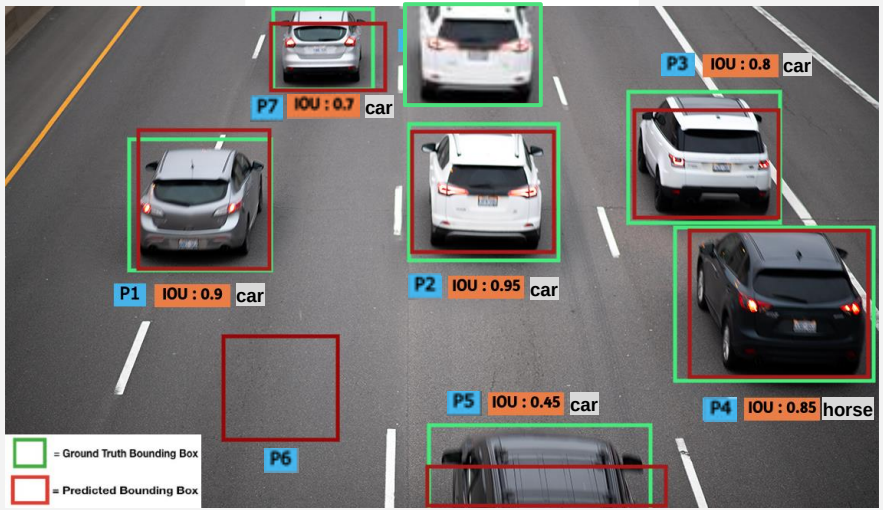
Model Architecture



Active Learning

Metric Explanation
AP





$$p_{interp}(r) = \max_{\tilde{r}:\tilde{r} \geq r} p(\tilde{r})$$

Interpolated Precision for a given Recall Value (r)

No	TP/FP @ IoU 0.5	Precision TP/(TP+FP))	Recall TP/(TP+FN))	Precision_ interp
P1	TP	1/1 = 1	1/3 = 0.33	1
P2	TP	2/2 = 1	2/4 = 0.5	1
P3	TP	3/3 = 1	3/5 = 0.6	1
P4	FN	3/3 = 1	3/5 = 0.6	1
P5	FP	3/4 = 0.75	3/5 = 0.6	1
P6	FP	3/5 = 0.6	3/5 = 0.6	1
P7	FP	4/6 = 0.67	4/6 = 0.67	0.67

Metric Explanation
AP

$$p_{interp}(r) = \max_{\tilde{r}:\tilde{r} \geq r} p(\tilde{r})$$

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No	TP/FP @ IoU 0.5	Precision TP/(TP+FP))	Recall TP/(TP+FN))	Precision_ interp
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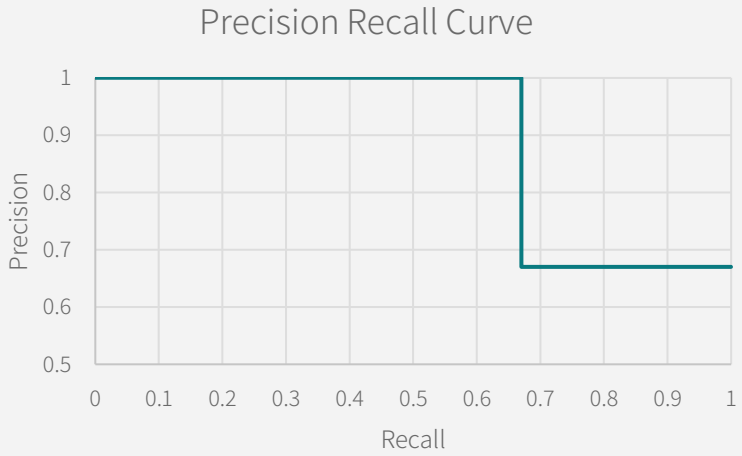
P5	FP	3/4 = 0.75	3/5 = 0.6	1
P6	FP	3/5 = 0.6	3/5 = 0.6	1
P7	FP	4/6 = 0.67	4/6 = 0.67	0.67

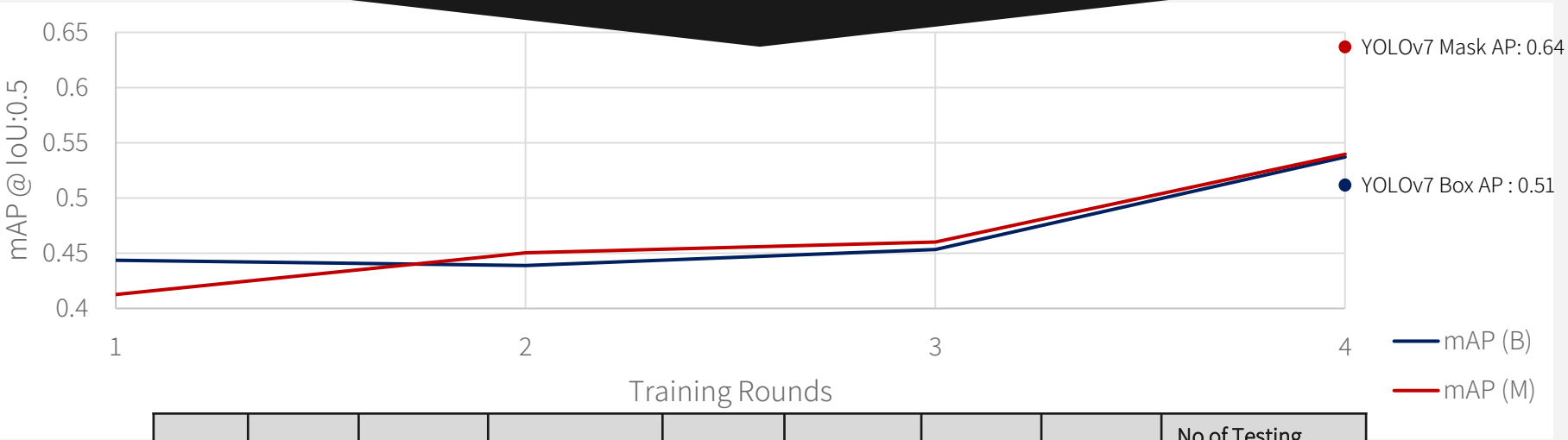


$$AP = \frac{1}{11} \sum_{r \in \{0, 0.1, 0.., 0.9, 1\}} p_{inter\_p}(r)$$

$$= \frac{1}{11}(1 + 1 + 1 + 1 + 1 + 1 + 1 + 0.67 + 0.67 + 0.67 + 0.67$$

AP ≈ 0.879

Active Learning Metrics



Round	No of Training Images*	No of Validation Images	Weights	mAP_0.5 (B)	mAP_0.5 (M)	Precision	No of Testing Images	No of Testing Images send for annotate below 70% confidence *
1	543	55	Yolov7 weight	0.4436	0.4127	0.7289	1000	100
2	843	55	Yolov7 weight	0.4389	0.4504	0.7891	1000	100
3	1196	55	weight from R2	0.4535	0.4602	0.7558	1000	100
4	1413	75	weight from R3	0.5372	0.5396	0.8639	1000	100

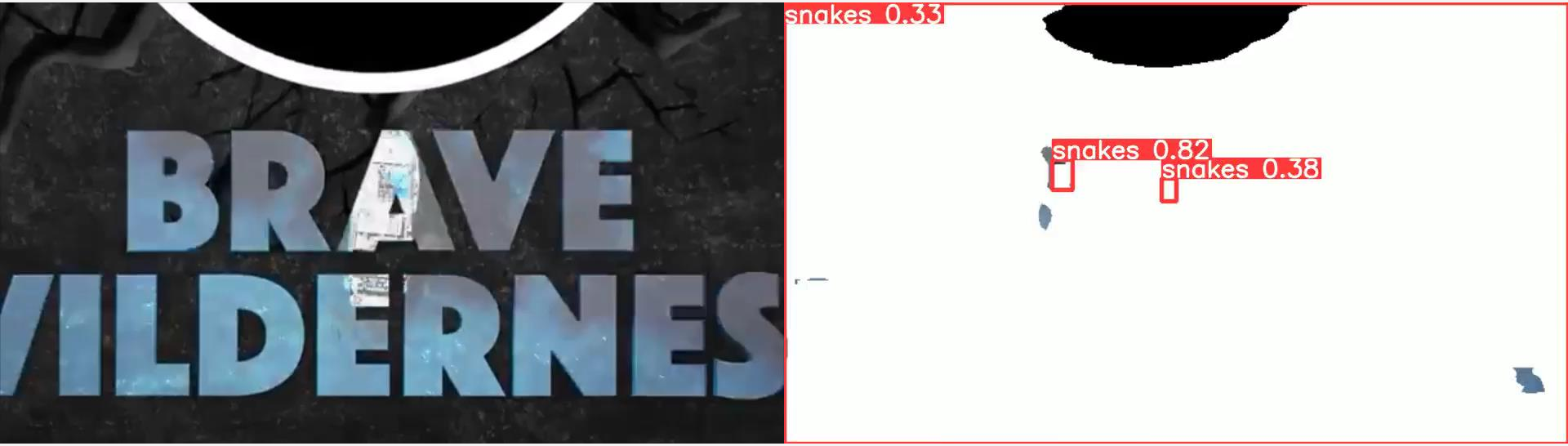
*Only the first 100 images are annotated

Streamlit

SHOWCASE

https://bit.ly/3g96L3J

Video Segmentation Example



Source: [Deadliest Job in America - Snake Milker! - YouTube]

CONCLUSION

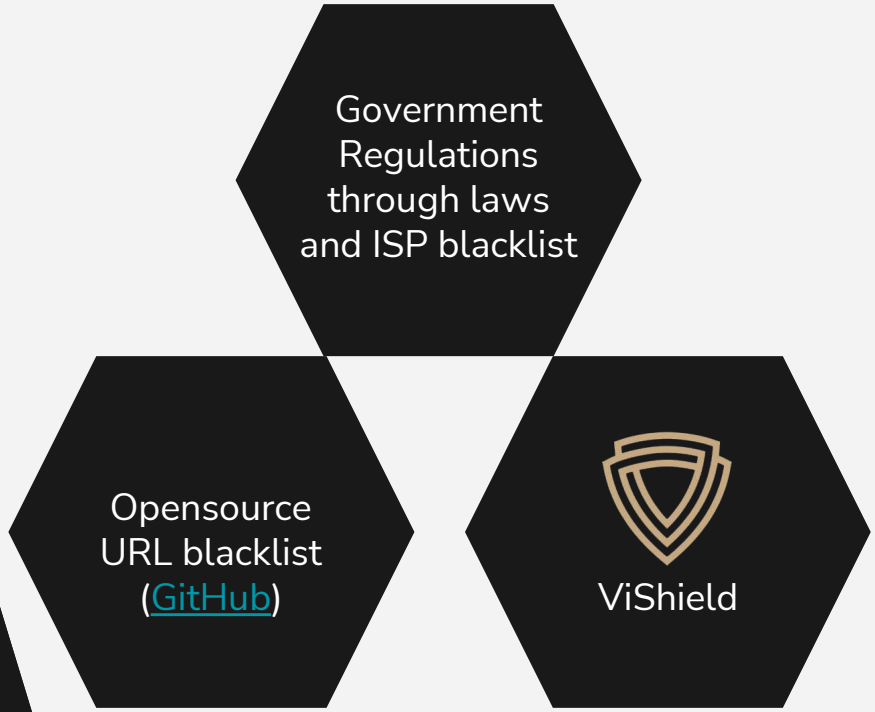
Success Factors Evaluation

Tasks	Factors	Outcomes
Image Classification	Validation Image Accuracy >	0.9586
Image Classification	Functioning Chrome Extension	Yes
Instance Segmentation	mAP_0.5(B)	0.5372
Instance Segmentation	mAP_0.5(M)	0.5396
Instance Segmentation	Functioning Streamlit App	Yes

Recommendations

Always rely on multiple redundancies to perform our task reliably and effectively

3 Prong Approach



Future Steps

- Allow real time streaming of output logs from model to Streamlit
- Continue to improve on Instance Segmentation mAP results
- Explore deeper on video instance segmentation such as IDOL
- Expand feature to allow segmentation on YouTube or Live Stream
- Expand filter classes beyond dogs, cats, snakes, tropophobia images, such as car type, car plate which can be used for autonomous driving

THANKS

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Special Thanks:
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