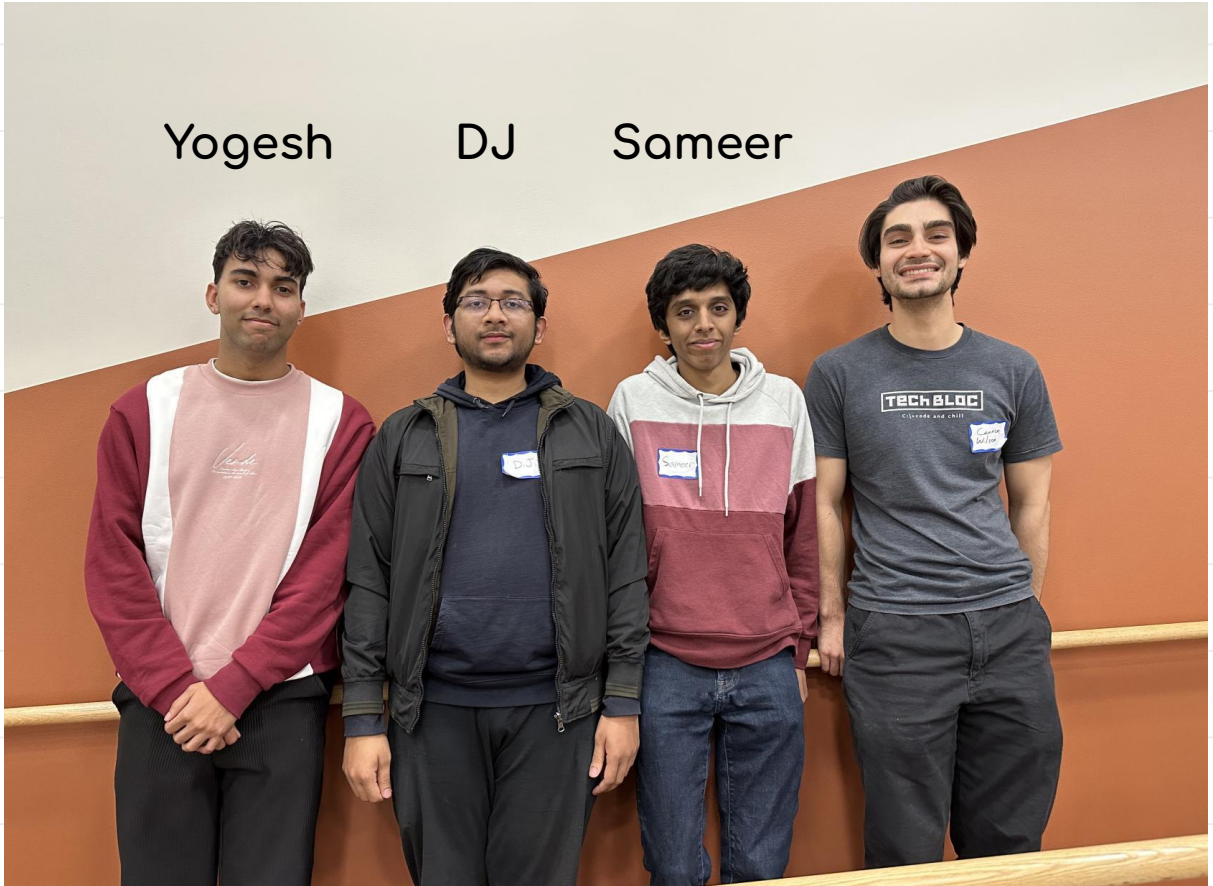
Web-Based Facial Recognition for Student Attendance

Kincannon Wilson

CheeseHacks



OVERVIEW

Detection sends image from video stream to backend

- liveness check
- converted into an embedding

Embedding is checked against known embeddings

PROGRESS

- Privacy concerns => Remove images from the server
- CSV files => MongoDB
- Test feasibility of large class size

BEFORE

Input

MTCNN

Cropped Image

Resnet

512

Embedding

Cosine similarity

Match

AFTER

Input

MTCNN

Cropped Image

Liveness Detection

Resnet

512

Embedding

Cosine similarity

Match

Fail

Display Error

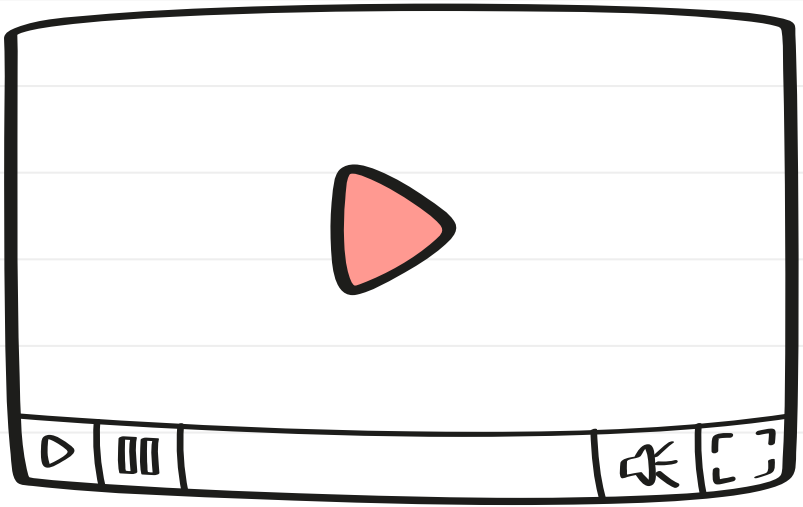
LIVENESS DETECTION

Dataset	Year	#Subjects	#Data(V/I)	#Annotation
Replay-Attack	2012	50	1,200 (V)	
CASIA-MFSD	2012	50	600 (V)	
3DMAD	2014	14	255 (V)	
MSU-MFSD	2015	35	440 (V)	
Msspoof	2015	21	4,704 (V)	
HKBU-MARs V2	2016	12	1,008 (V)	
MSU-USSA	2016	1,140	10,260 (I)	1
Oulu-NPU	2017	55	5,940 (V)	
SiW	2018	165	4,620 (V)	
CASIA-SURF	2018	1,000	21,000 (V)	
CSMAD	2018	14	260 (V), 17 (I)	
HKBU-MARs V1 +	2018	12	180 (V)	
SiW-M	2019	493	1,628 (V)	
CelebA-Spoof	2020	10,177	625,537 (I)	43

LIVENESS DETECTION

Model	Backbone	Parm. (MB)	Recall (%)↑			AUC↑	EER (%)↓	APCER (%)↓	BPCER (%)↓	ACER (%)↓
			FPR = 1%	FPR = 0.5%	FPR = 0.1%					
Auxiliary* [19]	-	22.1	97.3	95.2	83.2	0.9972	1.2	5.71	1.41	3.56
BASN [12]	VGG16	569.7	98.9	**97.8**	**90.9**	**0.9991**	1.1	4.0	1.1	2.6
AENet$_{\mathcal{C},\mathcal{S},\mathcal{G}}$	ResNet-18	42.7	**98.9**	97.3	87.3	0.9989	**0.9**	**2.29**	**0.96**	**1.63**

DEMO!



FEASIBILITY STUDY

Processing	MTCNN	Liveness	Resnet	Embedding search
0.0075	0.05 - 0.10	0.19 - 0.25	0.03	0.001

FEASIBILITY STUDY (CONT.) - EMBEDDING SEARCH

3	50	200	1000
0.001	0.006	0.025	0.3 - 1

WEAKNESSES

- Sensitive to lighting, movement, and face pose
- Lag because of HTTP traffic
- Embedding search is slow for large class sizes

NO GO!

THANKS!

Please add questions/comments on Piazza