



# Towards Developing a Fatigue Detection Model Using Deep Learning Neural Network: "Kun Amn" Application as a Proof of Concept

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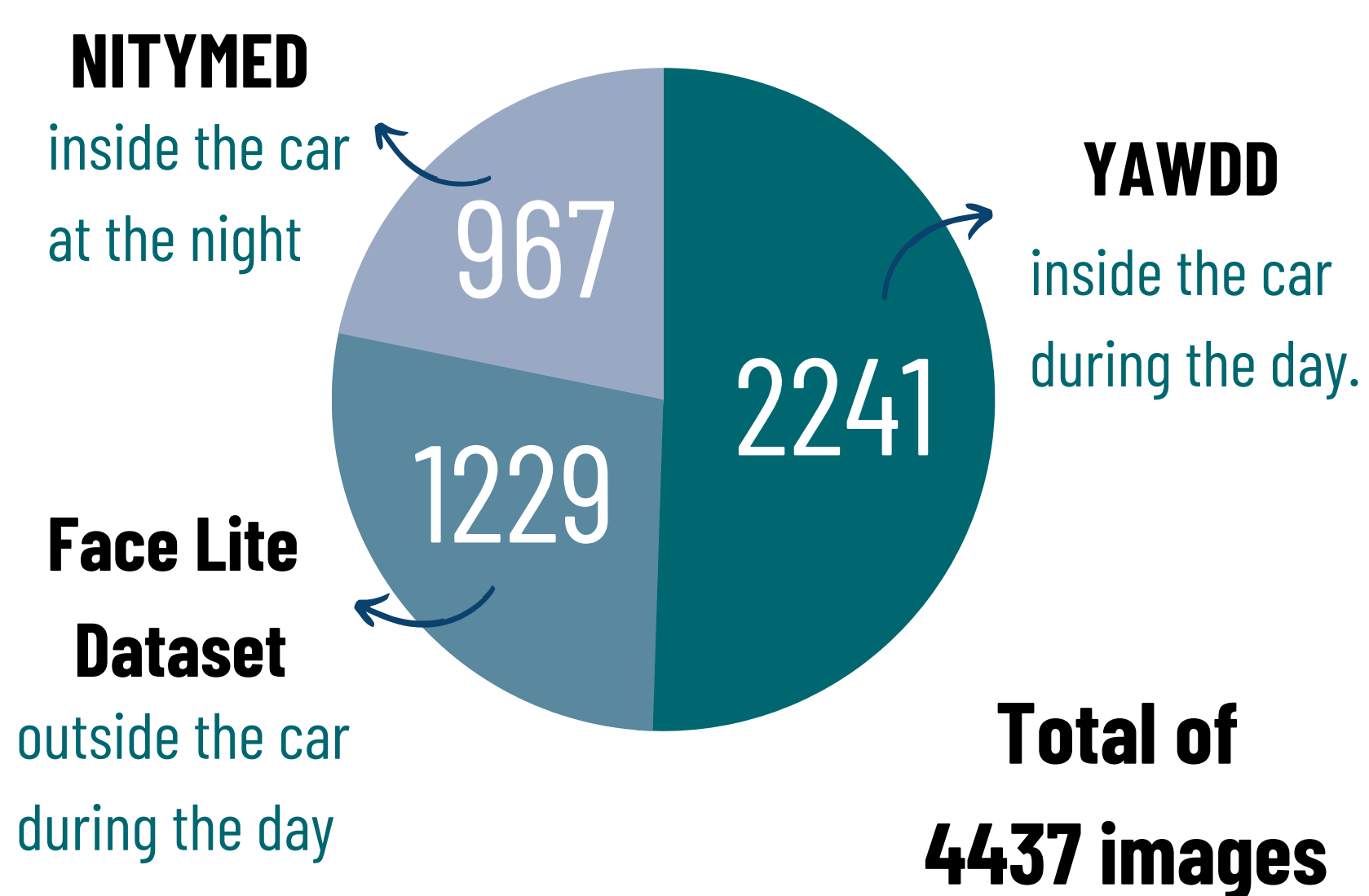


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## ABSTRACT

Fatigue is a feeling of constant tiredness that everyone experiences at some point in their life. Unfortunately, it results in severe consequences which can lead to errors and accidents. We proposed a General Fatigue Detection Model (GFDM) using Yolo algorithm. It detects individuals' fatigue symptoms through their eyes and mouths movements by phone's camera in real-time manner. GFDM can detect more than one person at the same time, which makes it a suitable model for many applications in different fields. Also, it accomplishes its task utilizing artificial intelligence algorithms and deep learning neural networks with average accuracy of 0.85. Since fatigue is a well-known risk factor in motor vehicle accidents, we developed "Kun Amn" application as a proof of concept. It aims to monitor drivers fatigue using the proposed GFDM and the smartphone camera towards avoiding traffic accidents.

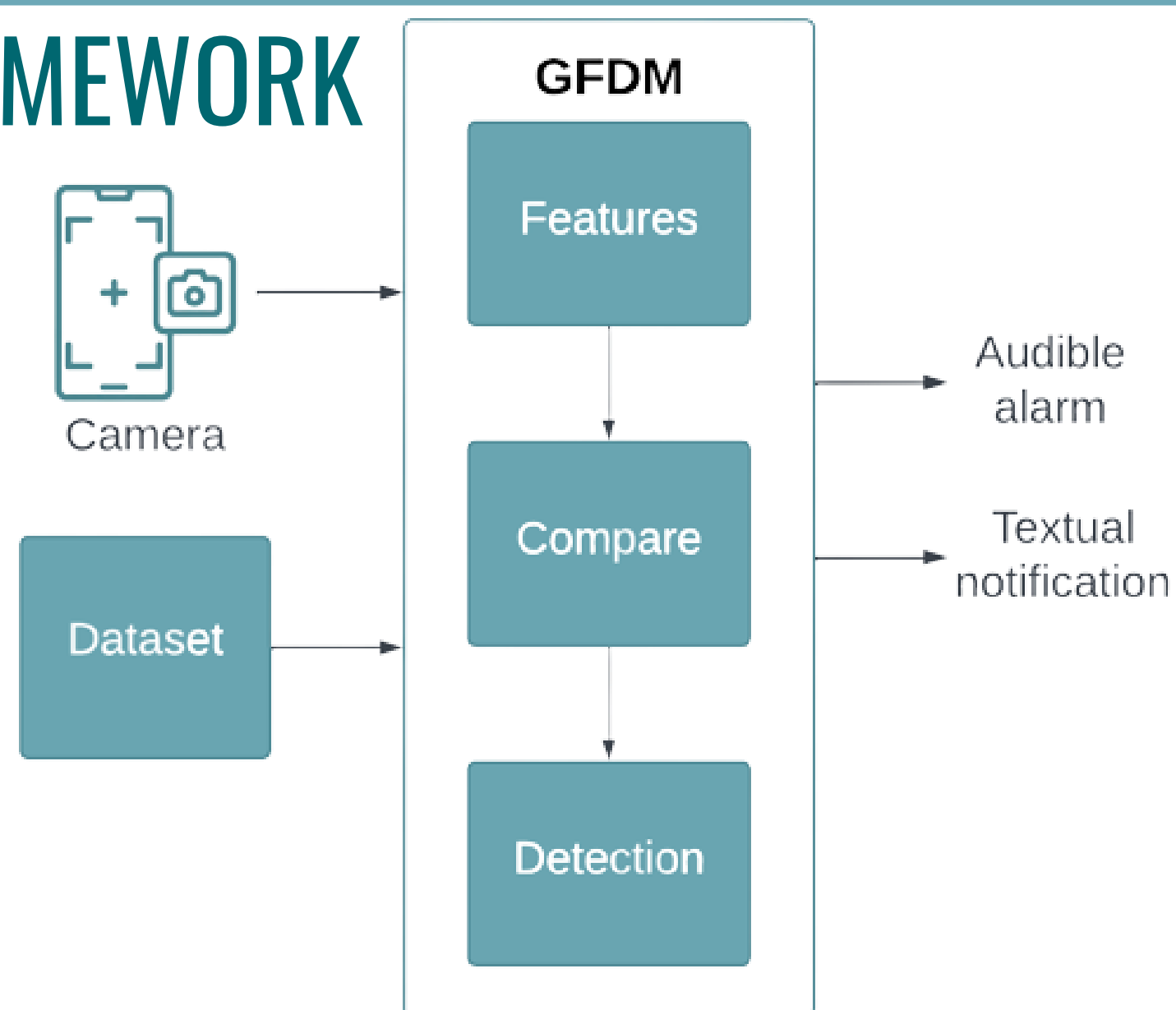
## DATASET COLLECTION



## RESULTS

TEST TYPE		OEPEN EYES		CLOSED EYES		YAWN	NO YAWN
		without glasses	with glasses	without glasses	with glasses		
Videos	day	0.63	0.66	0.82	0.73	0.74	0.80
	night	0.86	0.75	0.47	0.32	0.91	0.78
Webcam	day	0.87	0.83	0.85	0.79	0.79	0.81
	night	0.87	0.70	0.86	0.78	0.80	0.83

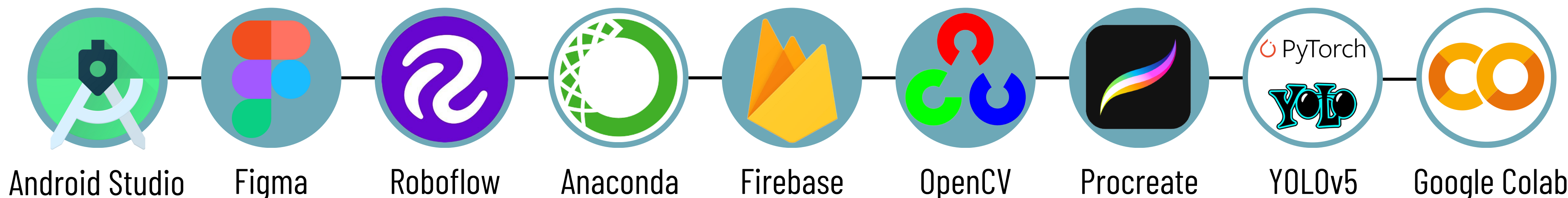
## FRAMEWORK



## FUTURE WORK

- Linking GFDM model with our "Kun Amn" application.
- Notification messages when drowsiness is detected and an alert when sleep is detected.
- Contact with emergency contacts and the paramedic center and tracking the arrival of the ambulance.
- Link Kun Amn to a smart watch to obtain more accurate results.

## TOOLS:



## CONCLUSION

- We developed a model-based fatigue detection system based on CNN Deep Learning.
- The system was designed to detect through the camera and using YOLO algorithm.
- The GFDM detected drowsiness in closed and open eyes and yawning mouth.
- It has achieved average accuracy of 0.85.
- Although it can be utilized in several areas like helping identify driver fatigue, there is room for performance improvement and better facial feature recognition.

CONTACT



REFERENCES

