SLUMBERKNIGHT

Track-Computer Vision

Team Quadrabyte

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PROBLEM STATEMENT

In this advanced round, we call upon the first round winners and other top participants to develop an even more advanced technology that can swiftly and precisely detect driver drowsiness or unease. The aim remains the creation of a system that can be integrated into vehicles for a substantial enhancement in road safety.

SOLUTION APPROACH

1. Real-time Monitoring and Alert System: Integrating the algorithm into the in-car camera system to enable real-time monitoring of the driver's facial expressions and eye movement System.

2. Eye Tracking and Facial Expression Analysis: Analyze features such as drooping eyelids, changes in lip curvature, and overall facial muscle movements associated with drowsiness.

3. Real-time Driver Assistance and Intervention: This will alert the driver and provide proactive interventions to prevent potential accidents.

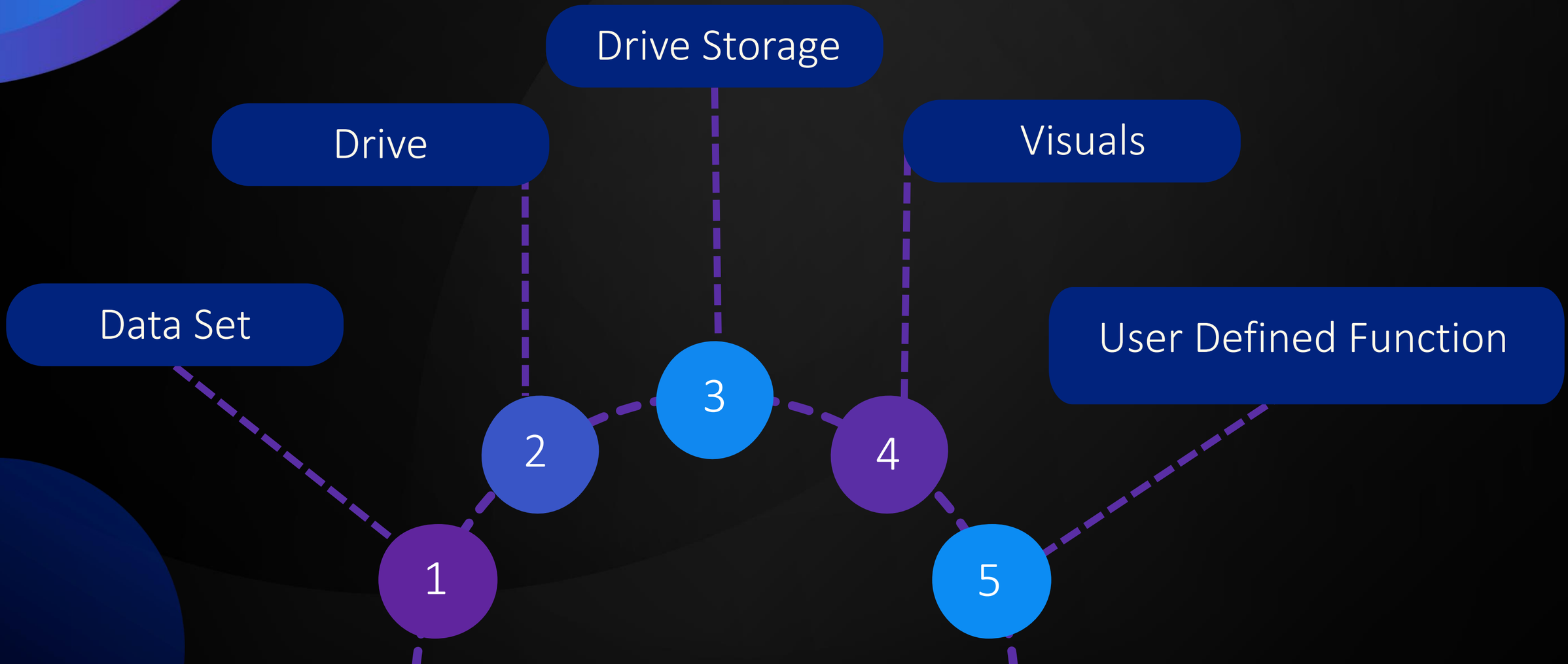
TECH STACK

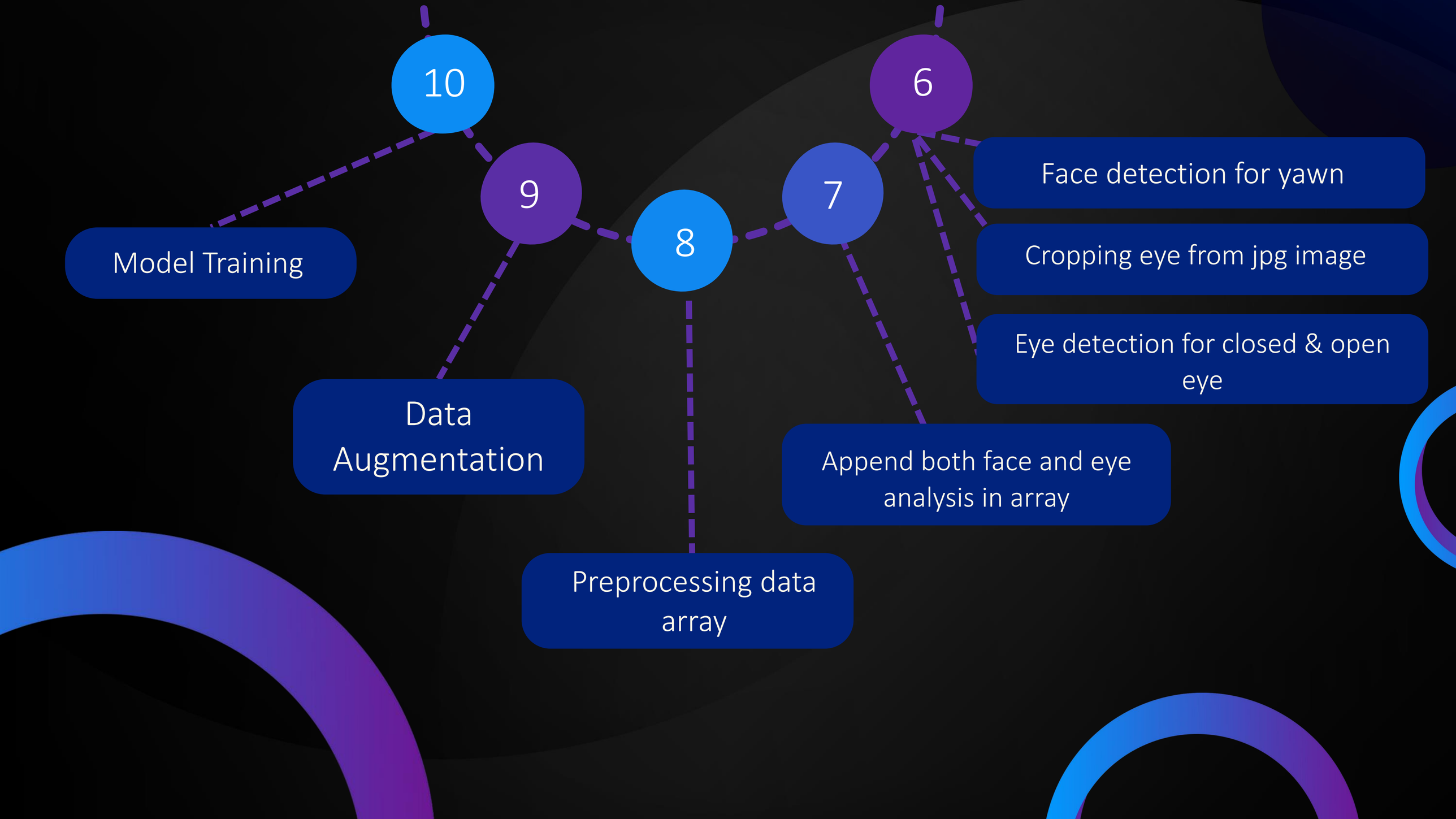
- OpenCV: It is a powerful open-source computer vision and machine learning software library that can be used for tasks such as image and video analysis.

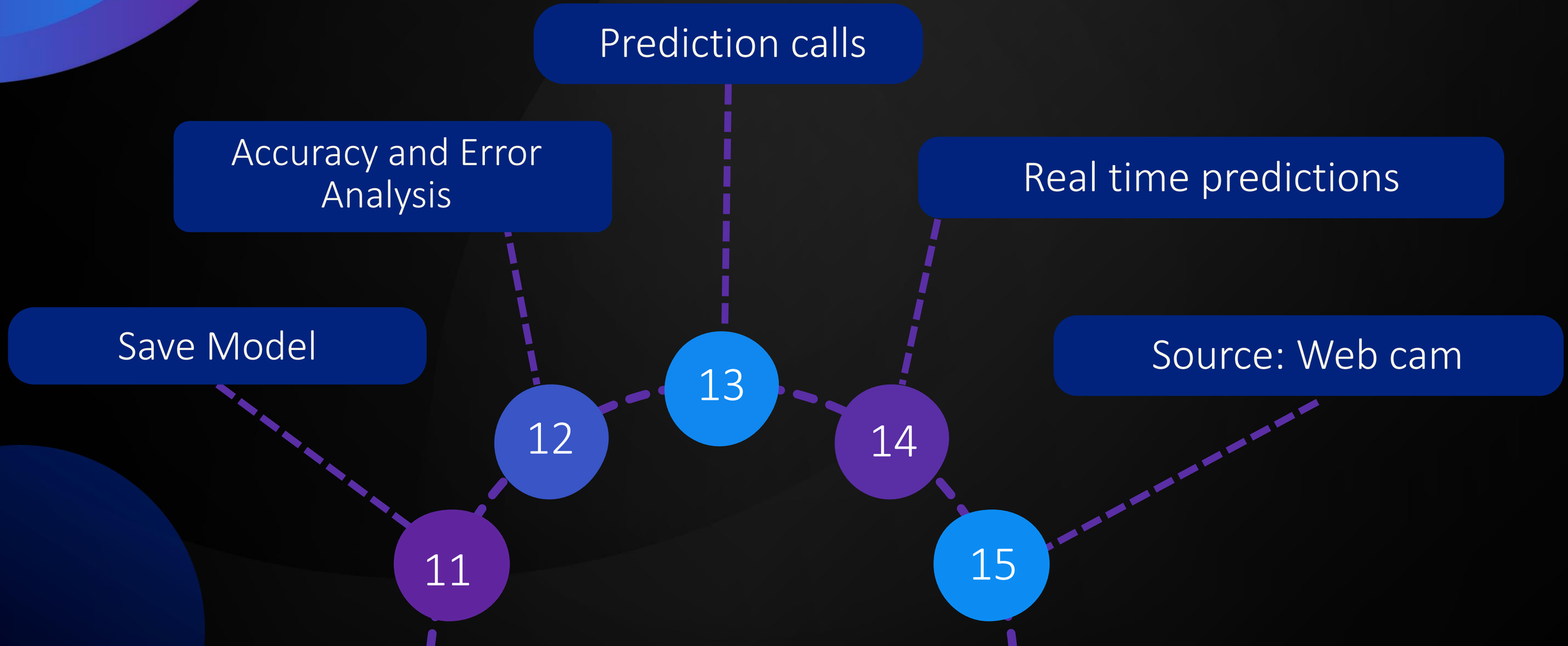
- TensorFlow: Libraries for building and training neural network models.

- CNN: It can process video frames in real time, allowing for continuous monitoring of the driver's facial expressions and eye movements.

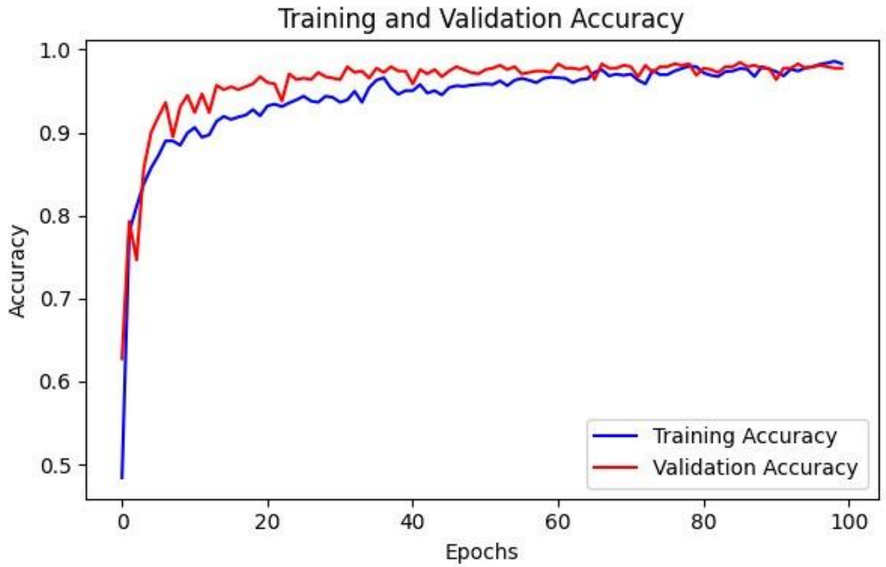
FLOWCHART

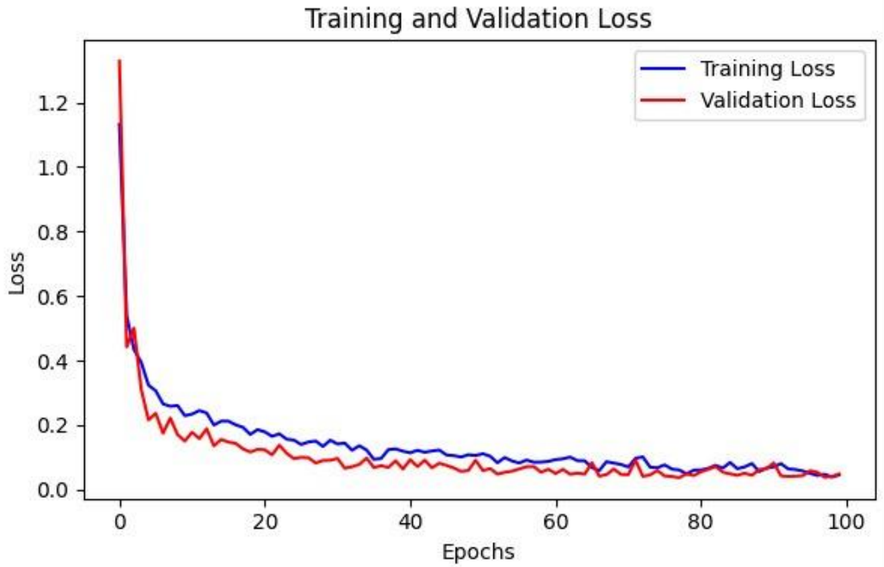

Drive Storage
Drive
Visuals
Data Set
User Defined Function
3
2
4
1
5

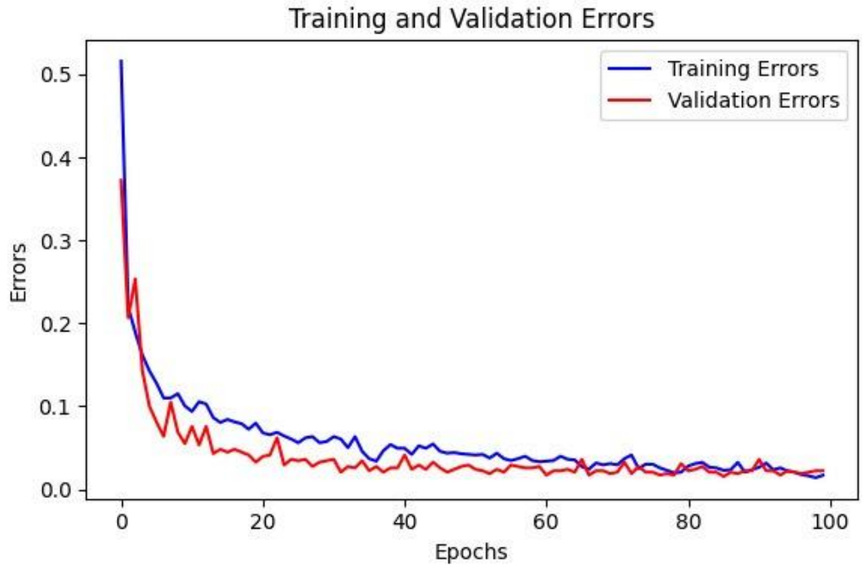

10
Model Training
9
Data Augmentation
8
Preprocessing data array
7
Append both face and eye analysis in array
6
Face detection for yawn
Cropping eye from jpg image
Eye detection for closed & open eye

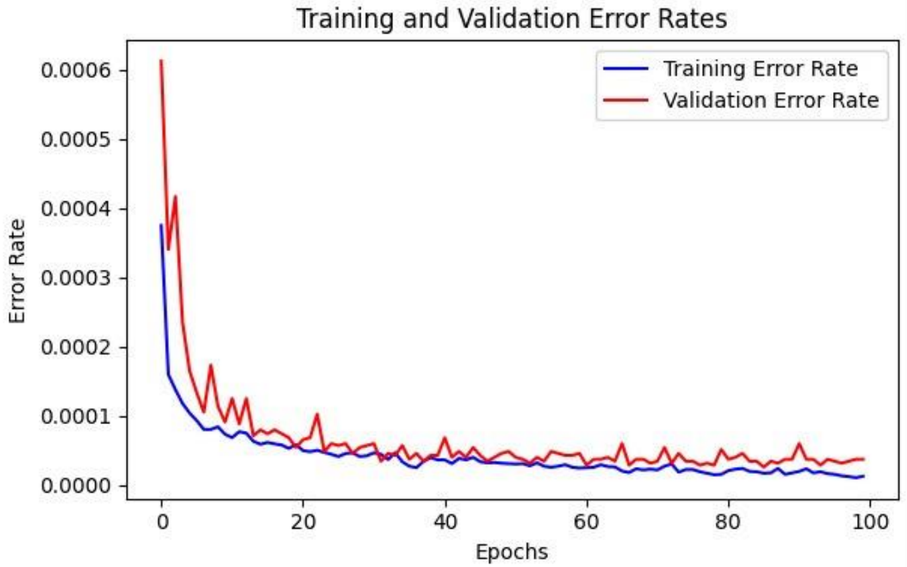

Prediction calls
Accuracy and Error Analysis
Real time predictions
Save Model
Source: Web cam
13
12
14
11
15

ANALYSIS





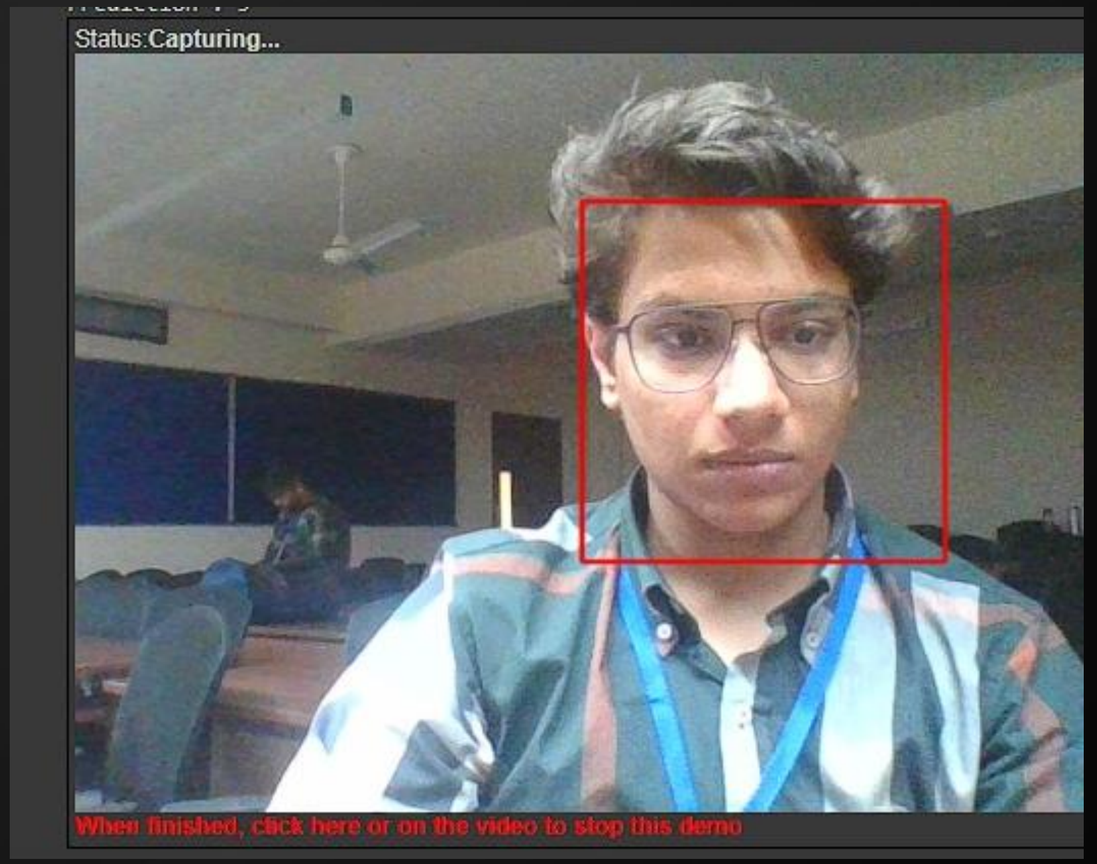




- The model has higher accuracy and a lower loss rate.
- The predictions made are pretty accurate with lower error rates.
- The model is improving predictions over time.
- It is converging to a solution.

IMPLIMENTATION

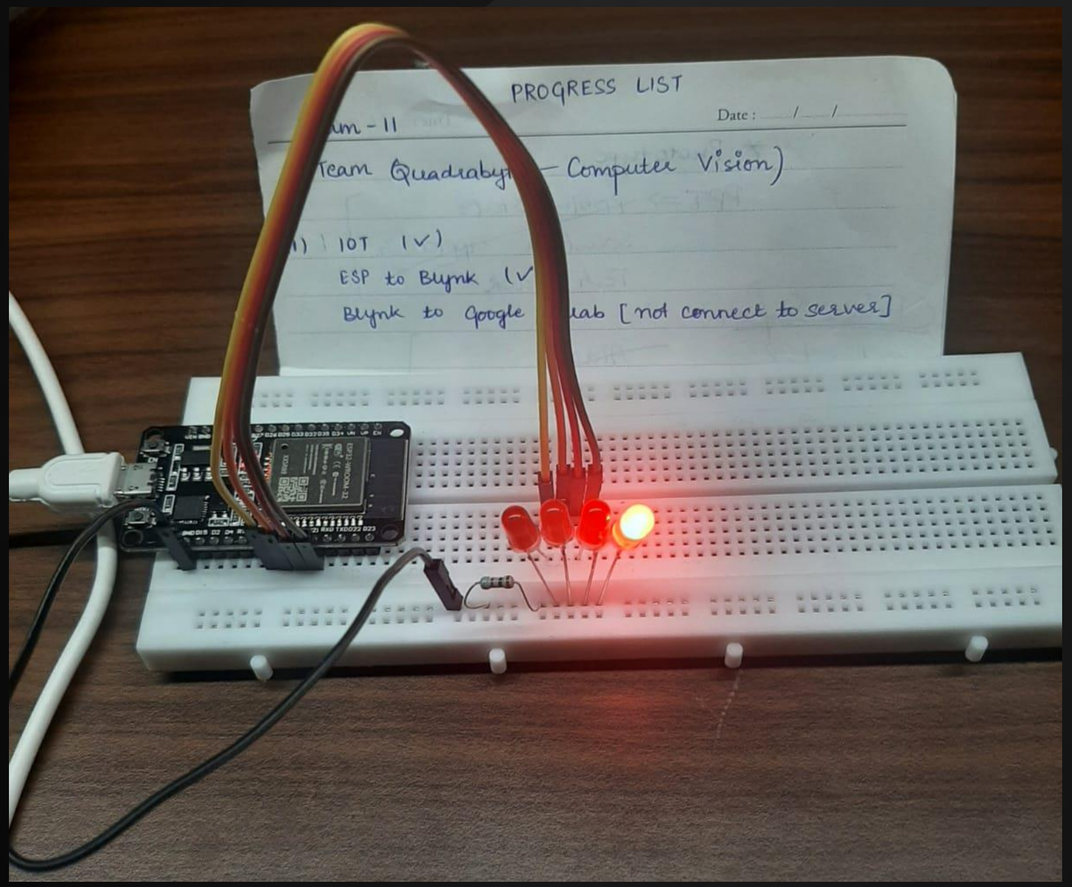
```
1/1 [==============================] - 0s 82ms/step
Prediction : 3
1/1 [==============================] - 0s 20ms/step
Prediction : 3
1/1 [==============================] - 0s 24ms/step
Prediction : 3
1/1 [==============================] - 0s 18ms/step
Prediction : 3
1/1 [==============================] - 0s 19ms/step
Prediction : 3
1/1 [==============================] - 0s 22ms/step
Prediction : 3
1/1 [==============================] - 0s 19ms/step
Prediction : 3
1/1 [==============================] - 0s 30ms/step
Prediction : 3
1/1 [==============================] - 0s 18ms/step
Prediction : 3
1/1 [==============================] - 0s 18ms/step
Prediction : 3
1/1 [==============================] - 0s 21ms/step
Prediction : 3
1/1 [==============================] - 0s 21ms/step
Prediction : 3
1/1 [==============================] - 0s 34ms/step
Prediction : 3
```



Real Time analysis

Source: Web cam

IMPLIMENTATION



Real Time analysis Results: Predictions = Eye Open

Hardware: EPS32, Server: Blynk IOT

MARKET PROSPECT

Feasible

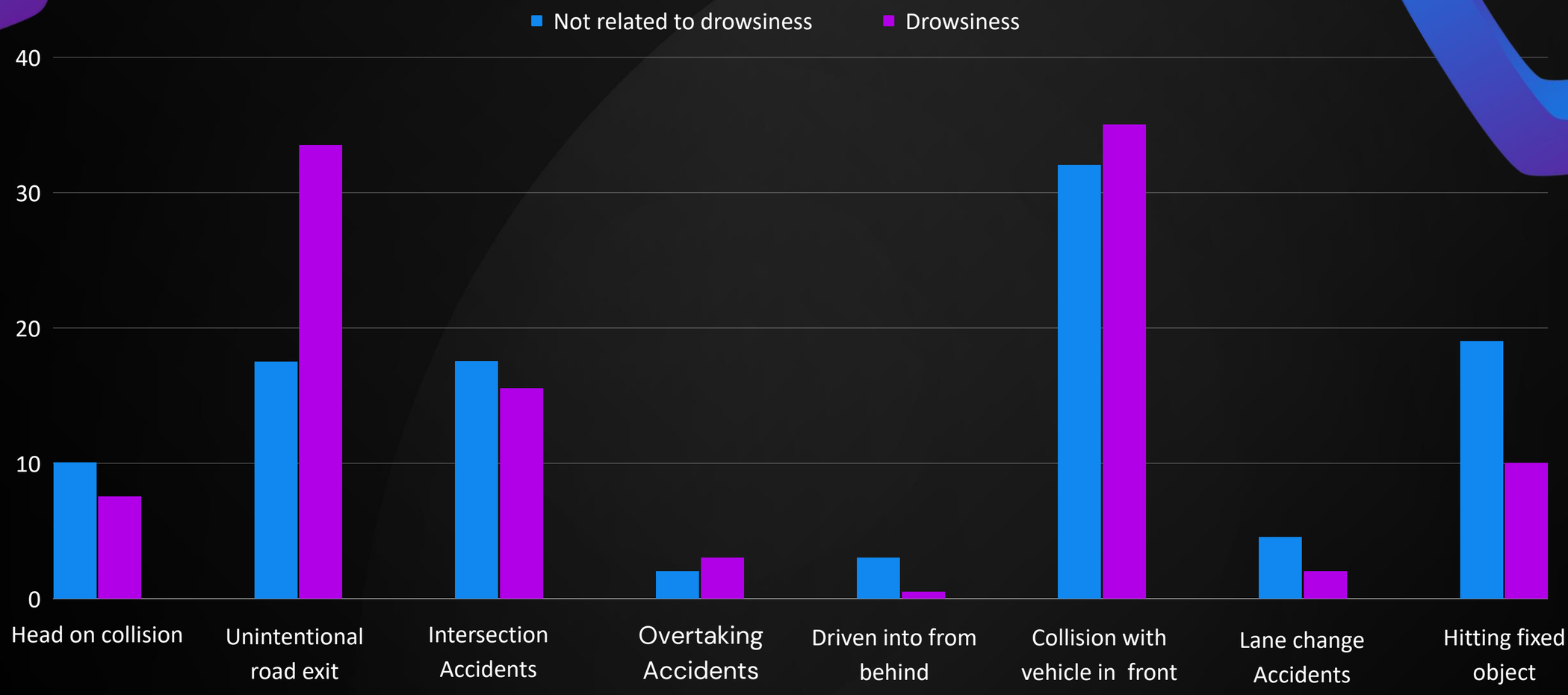
Scalable

Cost Efficient

Accuracy

Minimum Time

STATISTICS


Not related to drowsiness
Drowsiness
40
30
20
10
0
Head on collision
Unintentional road exit
Intersection Accidents
Overtaking Accidents
Driven into from behind
Collision with vehicle in front
Lane change Accidents
Hitting fixed object

FUTURE SCOPE

Adaptive vehicle control

Integration with autonomous driving

Public safety and security

Sustainable manufacturing

THANK YOU