Drowsiness Detection Project Proposal

Technical Problem:
Driver fatigue causes approximately 20% of road accidents, resulting in significant human and economic losses.

Proposed Machine Learning Solution:
A. Technical Architecture:
● Convolutional Neural Network (CNN) for eye state classification
● Real-time image processing using OpenCV
● Binary classification: Drowsy vs. Awake states

B. Key Technical Components:
● Input: 48x48 pixel grayscale eye images
● 3 Convolutional Layers (32, 64, 128 filters)
● MaxPooling for feature reduction
● Dropout layers to prevent overfitting
● Softmax classification output

C. Technical Innovations:
● Data augmentation techniques
● Adaptive learning rate
● Robust feature extraction
● Minimal computational overhead

Implementation Strategy:
1. Technologies:
● Python
● TensorFlow/Keras
● OpenCV
● NumPy/Matplotlib

2. Performance Metrics:
● Accuracy > 95%
● Real-time inference
● Low false positive rate