Adverse Weather Object Detection using Customized models
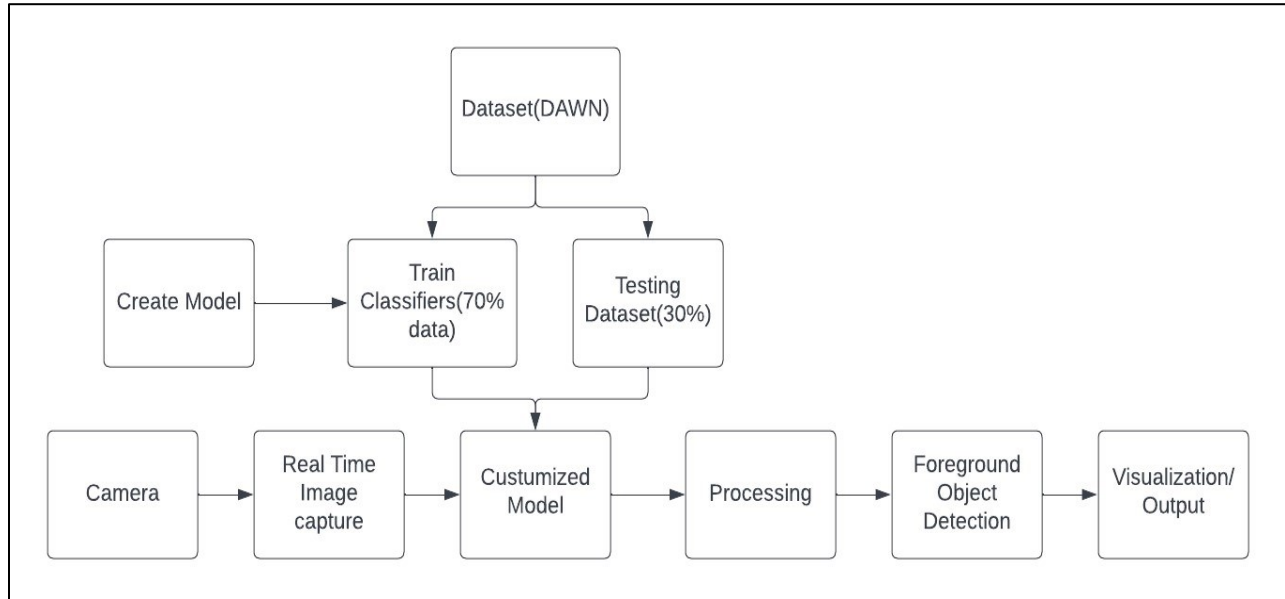
Project Perspective

In the past half of the decade, object detection approaches based on the convolutional neural network have been widely studied and successfully applied in many computer vision applications. However, detecting objects in inclement weather conditions remains a significant challenge because of poor visibility. Though deep learning-based object detection methods have achieved promising results on the conventional datasets, it is still **difficult to locate objects from the low-quality images captured in adverse weather conditions**. The existing techniques either have difficulties in balancing the tasks of image enhancement and object detection or often ignore the latent information beneficial for detection.
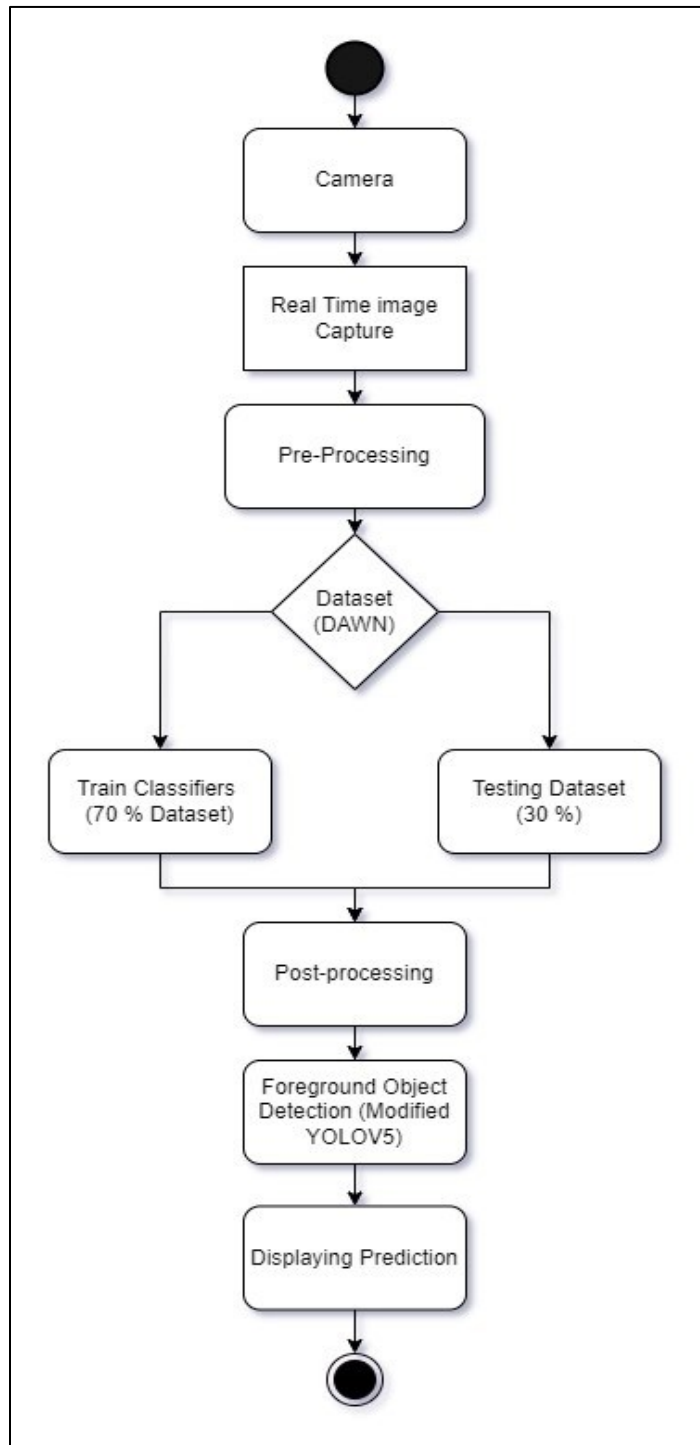
Under adverse weather conditions, real-time detection is required for object detection. Though real-time detection is possible, it is difficult to use in severe weather settings. As a result, the preceding solutions are insufficient in terms of a **trade-off between detection precision and detection time, limiting their use in lousy weather applications**.

Deep learning, which is based on neural networks, is a more advanced type of machine learning that can solve problems in various complicated application models that cannot be solved using typical statistical methods. We will develop a customized model for detecting objects in adverse weather. The proposed model will be accurate, sensitive, precise, and lightweight to be efficient to provide help for detecting objects in adverse weather conditions. The model will be evaluated on a **DAWN2020 dataset** which provides four classes of the weather classification system, fogy, rainy, snowy, and sandy. Though there is no standard dataset for weather conditions to follow in all detection systems, the accuracy metric is vital for comparing the performance of several models in this regard.
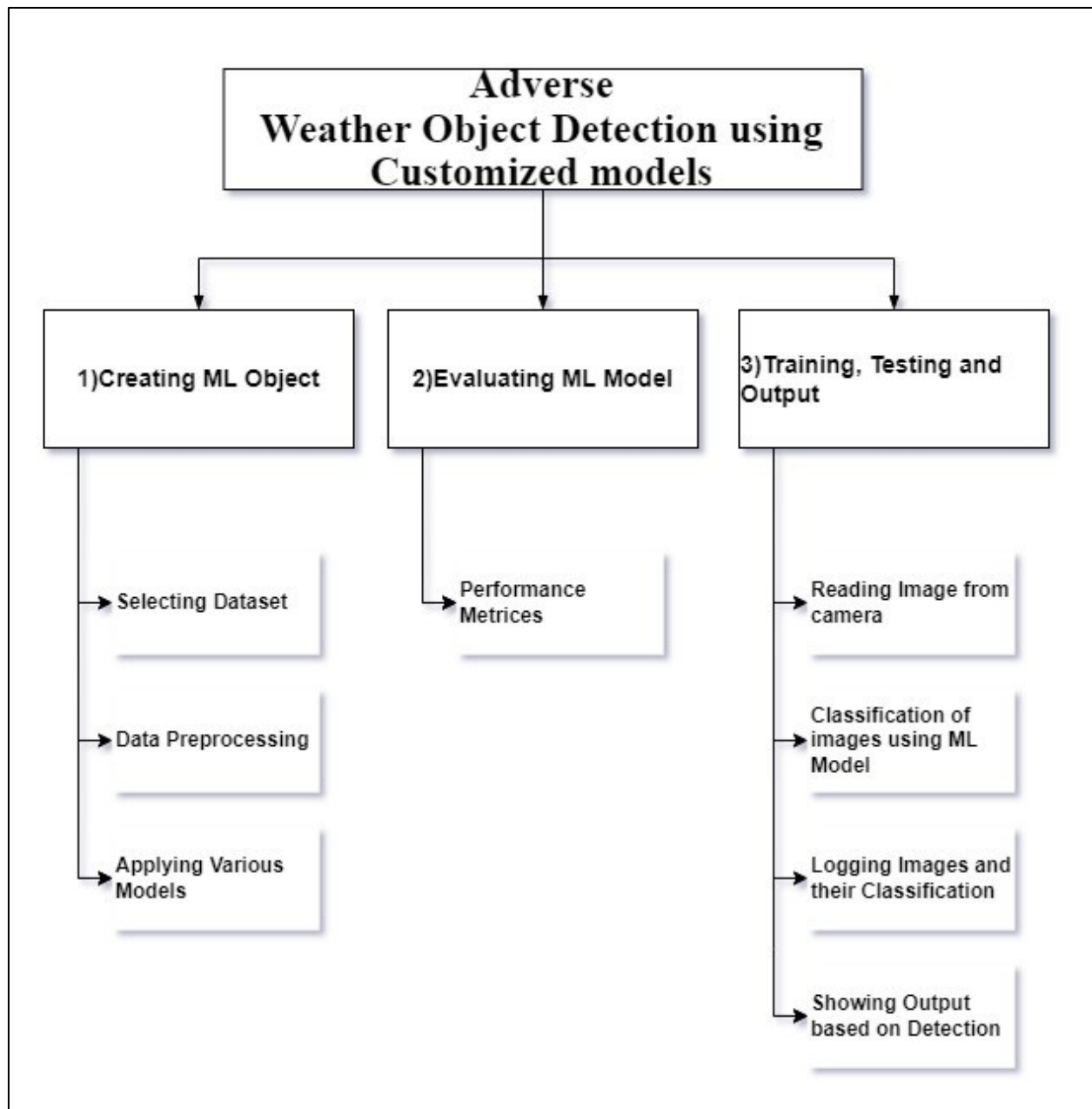
Block Diagram

Activity Diagram

Work Breakdown Structure

```
                        Adverse
              Weather Object Detection using
                   Customized models

        │                    │                    │
        ▼                    ▼                    ▼
┌──────────────┐    ┌──────────────────┐    ┌────────────────────┐
│1)Creating ML │    │2)Evaluating ML   │    │3)Training, Testing  │
│  Object      │    │  Model           │    │  and Output         │
└──────────────┘    └──────────────────┘    └────────────────────┘
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- Selecting Dataset
- Data Preprocessing
- Applying Various Models

- Performance Metrices

- Reading Image from camera
- Classification of images using ML Model
- Logging Images and their Classification
- Showing Output based on Detection

Note: This is not an exact report. It is just to showcase the blueprint of the project. The details and additional material can be accessed when asked for a permission.