Basic Details of the Team and Problem Statement

Ministry : Ministry of Defence

PS Code: 1417

Problem Statement Title: AI-ML based intelligent de-smoking/de-hazing algorithm

Team Name: FlareVision

Team Leader Name: Karunya Harikrishnan

Institute Code (AISHE):

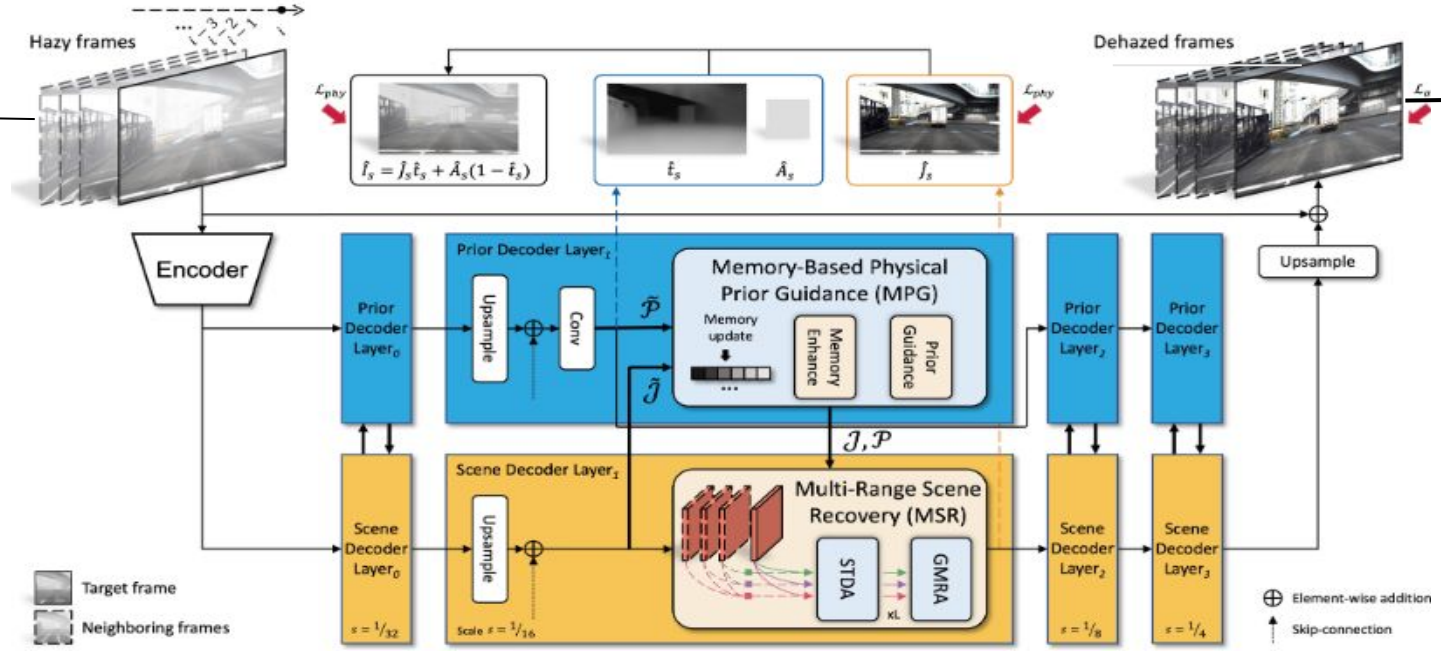
Institute Name: Shiv Nadar University

Idea/Approach Details

MAP-Net, a U-Net-based image dehazing framework, features an encoder, prior decoder, and scene decoder.

- **Components**: MAP-Net comprises an encoder, a prior decoder, and a scene decoder.
- **Feature Enhancement:** memory-based guidance and multi-range scene radiance recovery to enhance features and align temporal data.
- **Predictions:** The prior decoder to predict transmission and atmospheric light.
- **Scene Radiance Generation:** The scene decoder to generate clear scene radiance.
- **Upsampling:** Pixel shuffle layers to upsample.
- **Refinement:** Residual prediction is employed to refine the final dehazed output.

Input



MAP-Net to de-haze the input stream

Output

De-hazed stream to YOLO model

Fire extinguisher count, human count and detected objects

Technology stack:

- python
- pytorch
- torchvision
- Yolov8

Idea/Approach Details

Use Cases:

- **Fire Scene Visibility Enhancement**: Improve visibility in fire-affected areas by removing smoke and haze from real-time video feeds.
- **Fire Extinguisher Detection**: Detect the location of fire extinguishers within the premises to aid in fire control.
- **Flammable Object Detection**: Identify and track flammable objects or materials near the fire to reduce the risk of explosions or fire spread.
- **Human Count**: Count the number of people in the fire-affected area for resource allocation and ensuring evacuation.
- **Integration with Fire Alarm Systems**: Automatically trigger the algorithm when a fire is detected for immediate response.

Future Scope:

- **Optimal Path to Exit**: Determine the safest and quickest exit routes for evacuation, reducing the risk to occupants.

- **Post-Incident Analysis**: Analyze video footage and data after the fire incident for lessons learned and investigations.

Dependencies / Show stopper :

- **Quality of the video feed**
- **Availability of computational power**
- **Lack of Data**: Insufficient or low-quality training data can hinder model development.
- **Hardware Limitations**: Inadequate computational resources can result in slow processing.
- **Integration Challenges**: Incompatibility with existing systems can impede adoption.
- **Algorithm Performance**: Ineffective algorithm performance in real-world scenarios.
- **Cost and Resource Constraints**: Exceeding budget or resource capacities.

Team Member Details

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