

# **AI-ML BASED INTELLIGENT DE-SMOKING/DE-HAZING ALGORITHM**

**Problem Statement - SIH1417**

# OBJECTIVES

# OUR SOLUTION

## Detailed Problem Statement:

Design and Development of AI-ML based intelligent de-smoking/de-hazing algorithm for reproducing the real time video of the area under fire specifically for indoor fire hazards to aid the rescue operation.

## Objectives:

- Real time dehazing for videos and images
- Propose changes in the existing state of art models
- Reduce the latency of the model
- Propose new model architecture

## Solution 1:

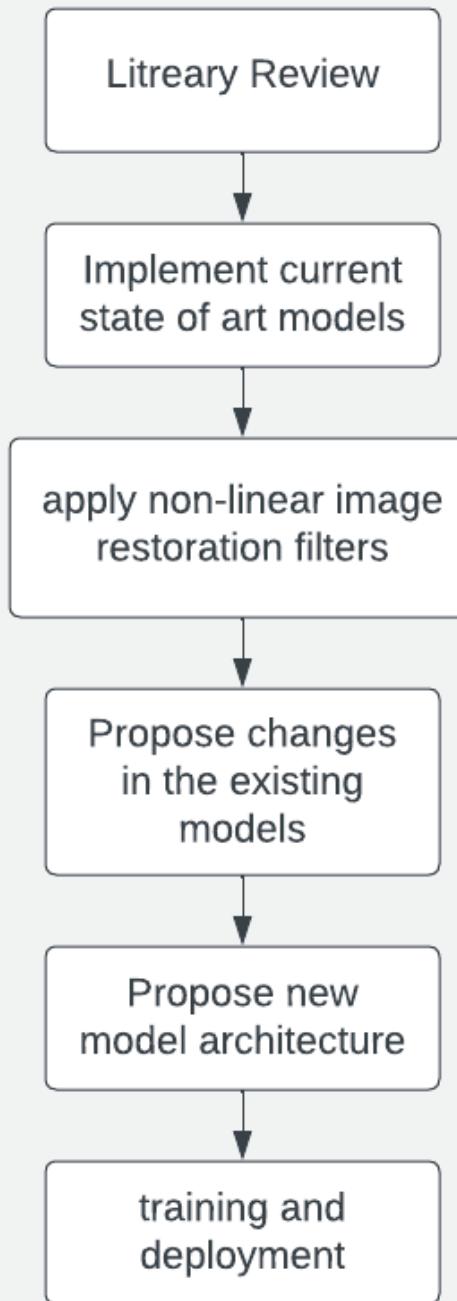
- Improved Scores of Lower Latency Model  
( Introduced Pixel Attention to GridDehazeNet )

## Solution 2:

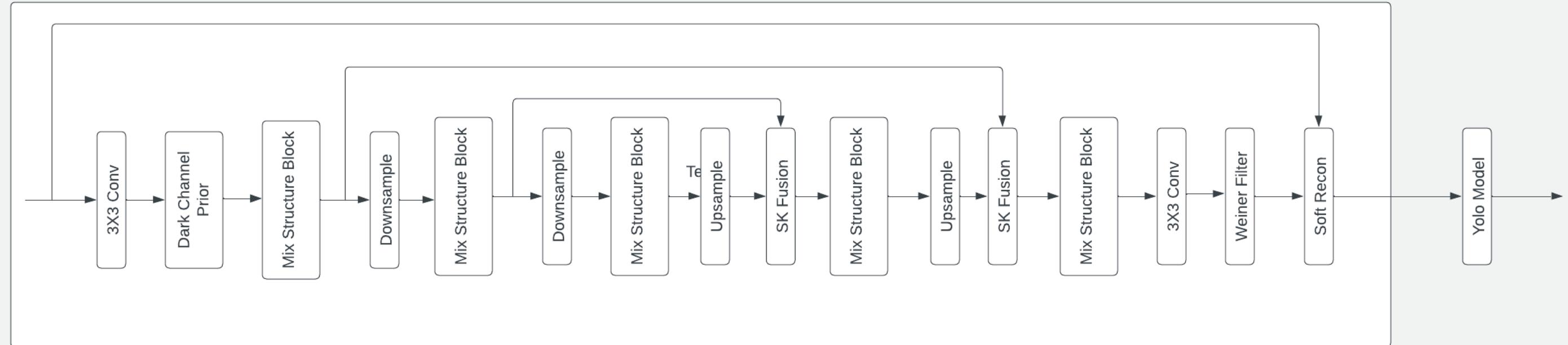
- Decrease latency of best performing model  
( Propose changes in MixDehazeNet model )

# OUR APPROACH

## Current Work flow



## Proposed model overview



## Datasets used

### Training

RESIDE: A new large-scale benchmark consisting of both synthetic and real-world hazy images and it is divided into five subsets, each serving different training or evaluation purposes.

HAZE 4K: synthesized dataset with 4,000 hazy images, in which each hazy image has the associate ground truths of a latent clean image, a transmission map, and an atmospheric light map

### Testing

SOTS: it selects 500 indoor images which are non-overlapping with training images from RESIDE

# SOLUTION - 1

## GridDehazeNet

Ground Truth



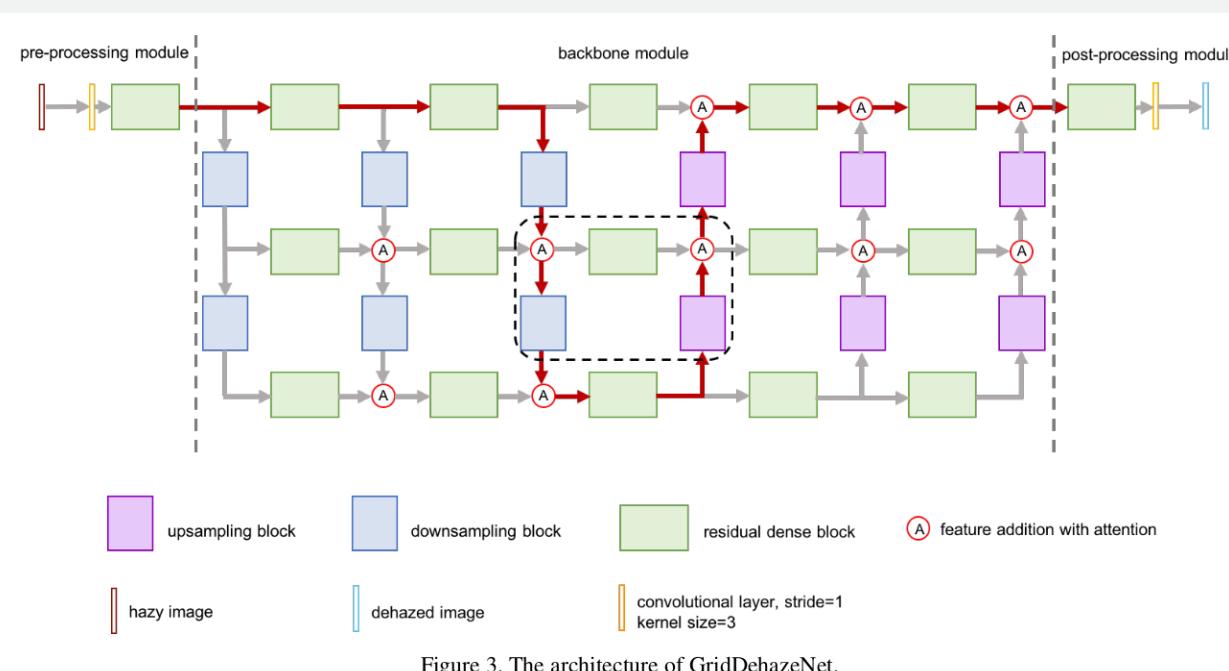
Hazy Image



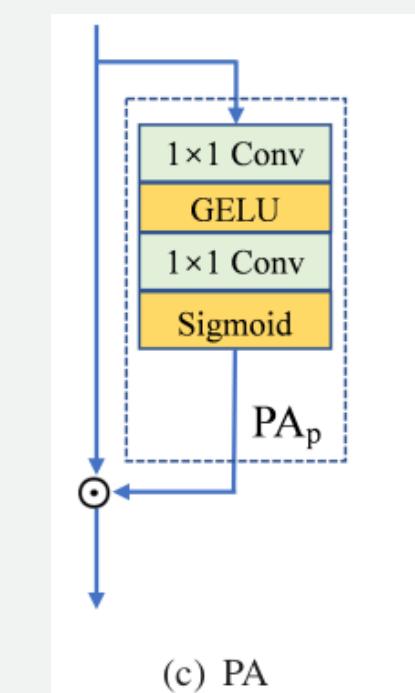
With our modification



Original model output



Grid Dehaze Net Architecture



Pixel Attention

**SCORES (With our modification):**  
**SSIM: 0.9841**  
**LATENCY: 9.91**

**SCORES (Original model):**  
**SSIM: 0.9836**  
**LATENCY: 9.905**

Added pixel Attention in the Residual Block

# TESTING CONDUCTED

**MixDehazeNet**

Hazy Image



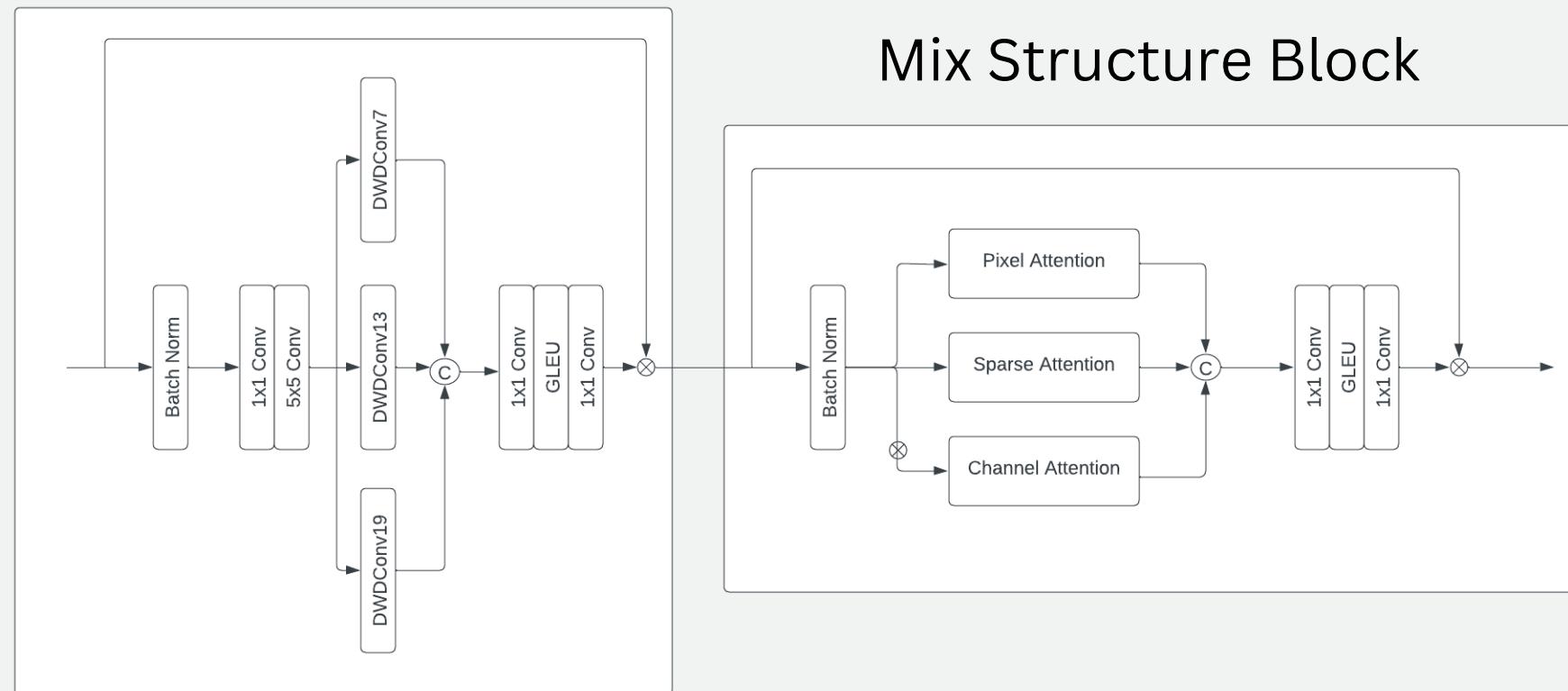
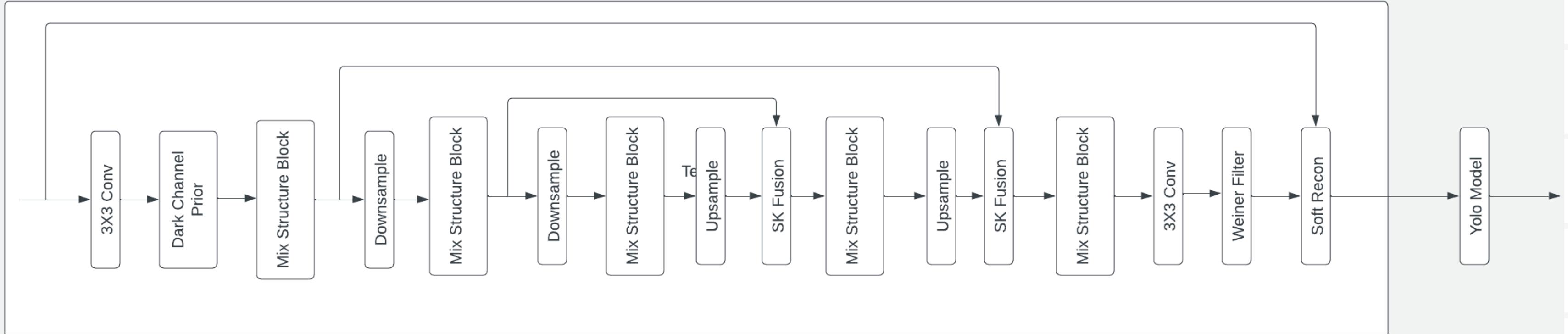
model output



Ground Truth



# SOLUTION - 2



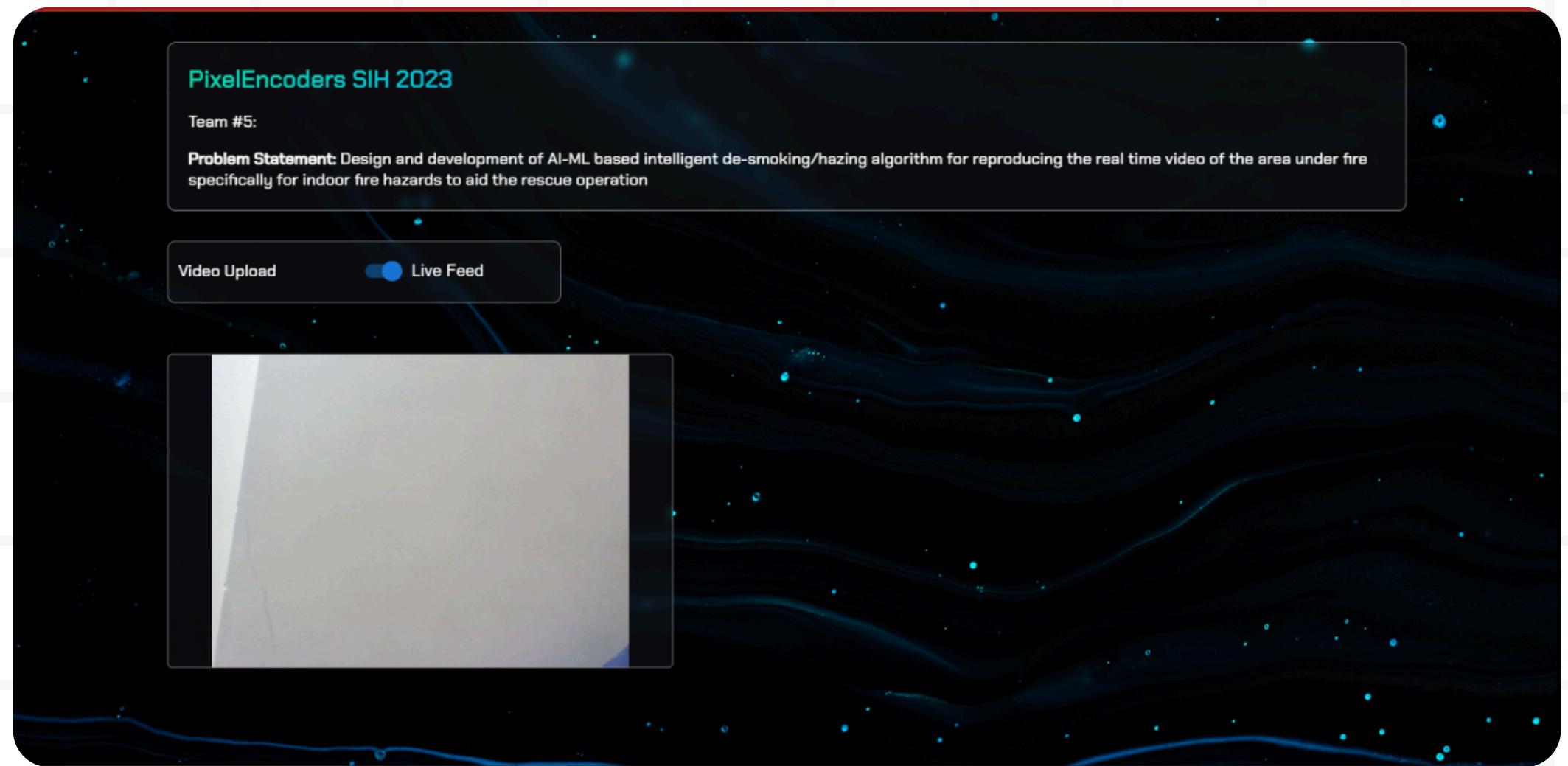
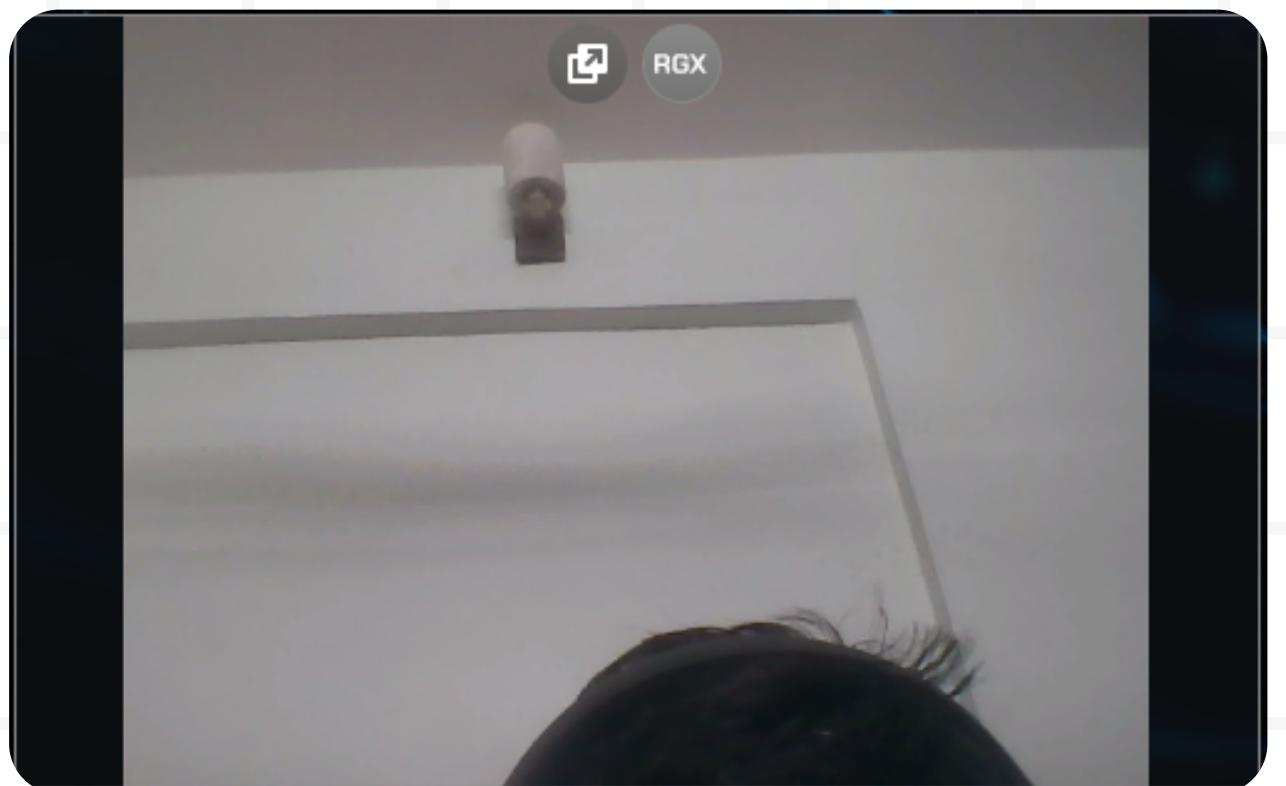
## Changes Added

- Dark Channel Prior
- Weiner Filter
- Sparse Attention
- Object Detection model

# OVERALL APPLICATION

## Tech Stack:

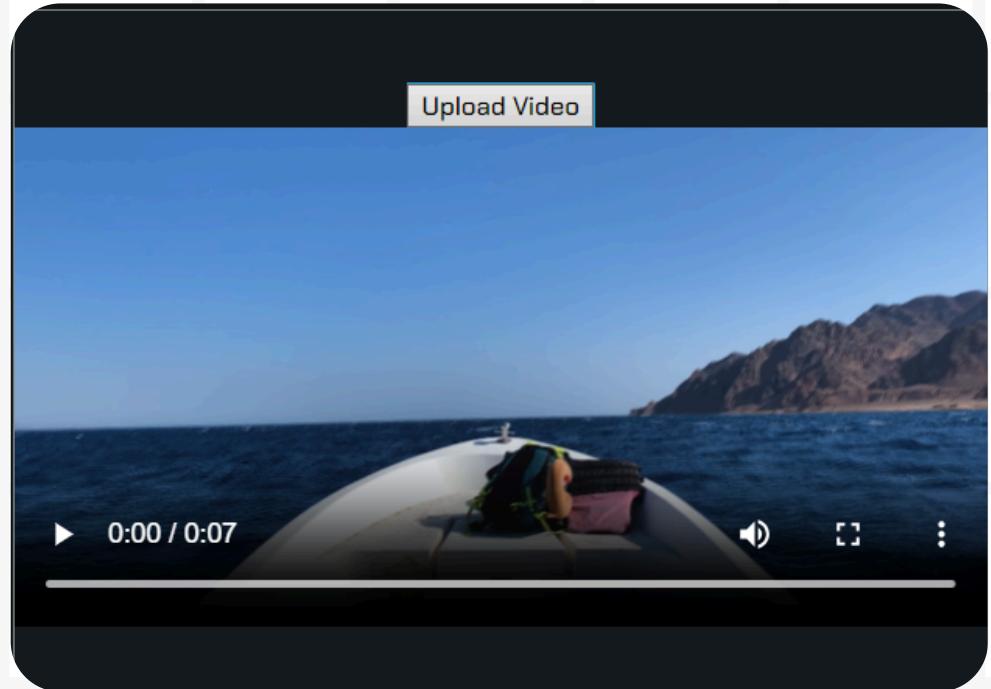
React js  
Express  
Node js  
Python



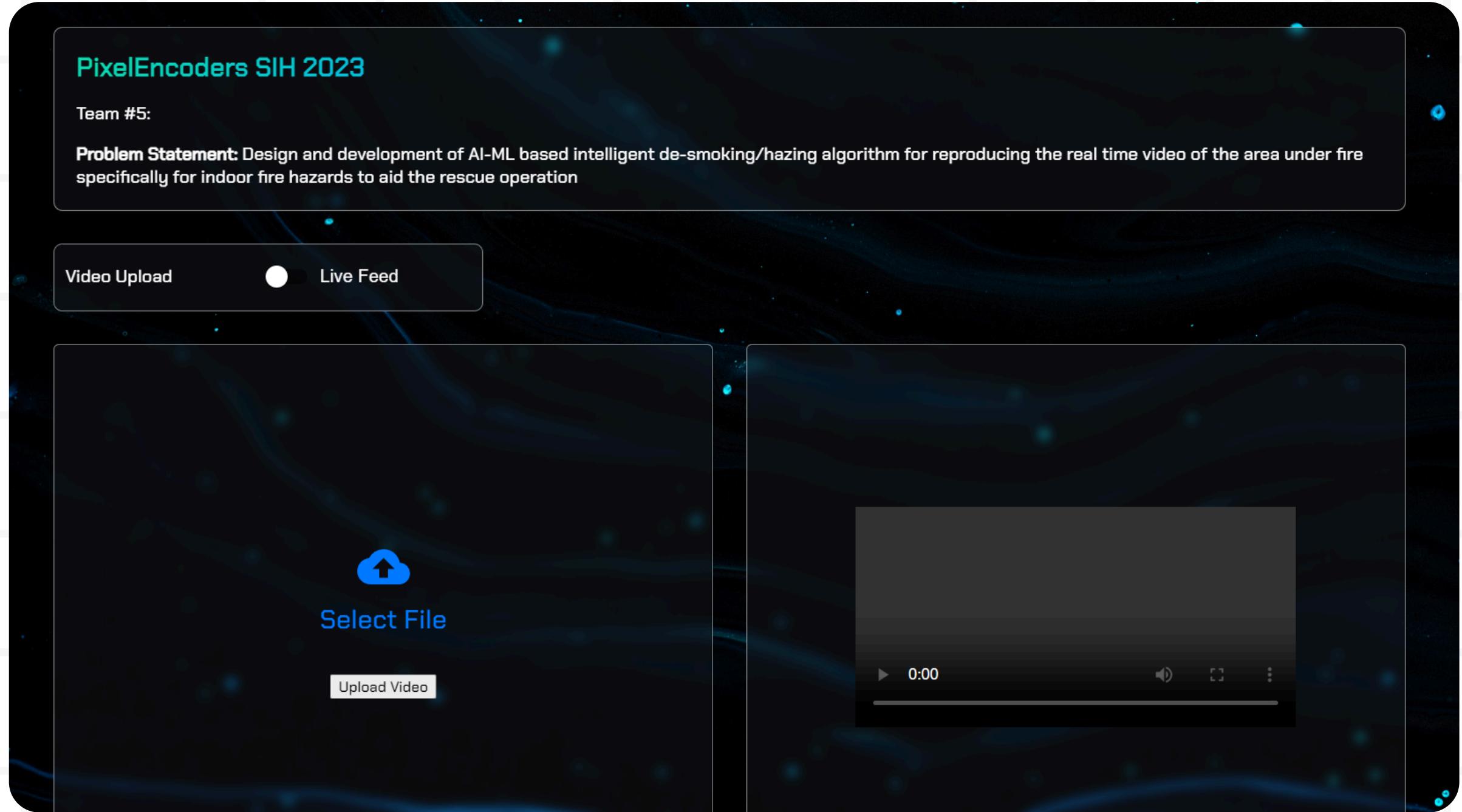
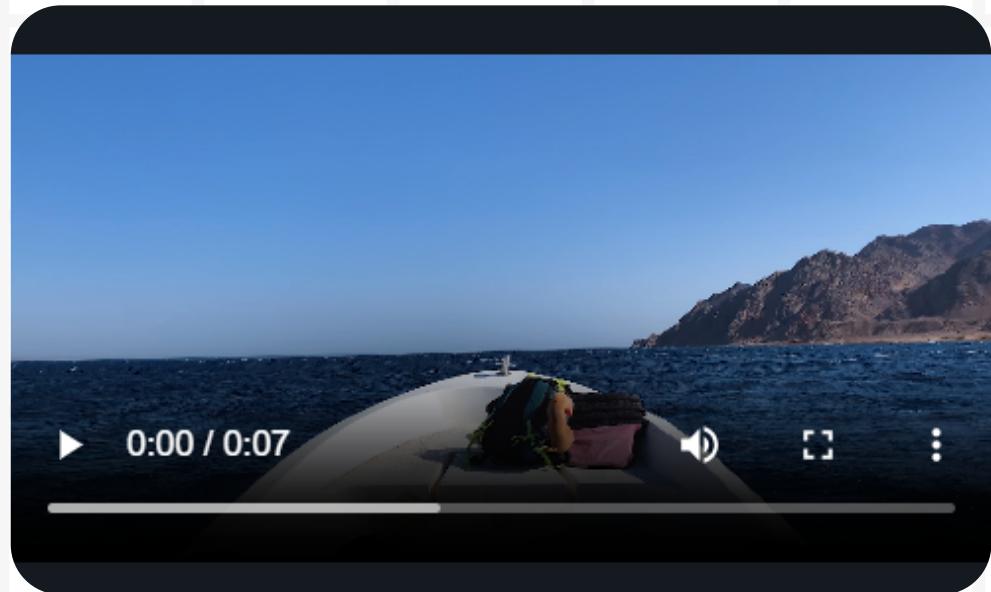
Live Video Feed

# OVERALL APPLICATION

## UI To Upload Video for Processing



## Resultant Video after processing



Complete View of Application

# FUTURE GOALS AND APPLICATIONS

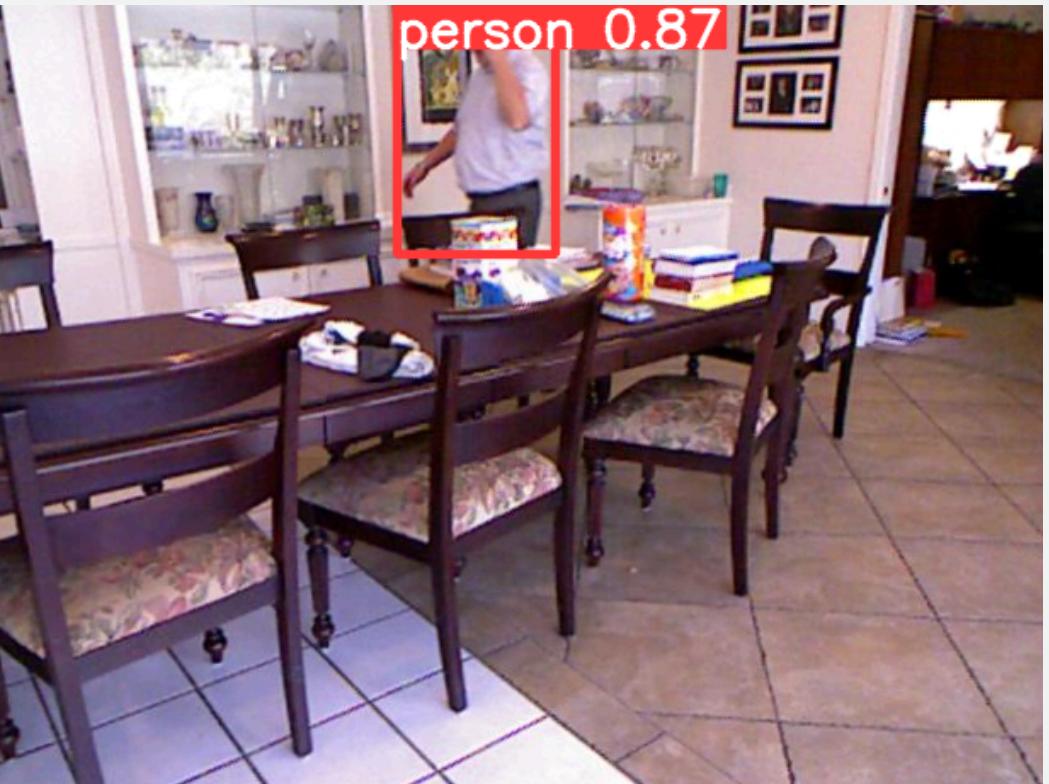
## Applicatons:

- Better visual in cars
- Assitance to fire fighters
- Real-time dehazing in aeroplanes
- Search and rescue operations

## Future Goals:

- Image Segmentation
- Lower latency
- Real time de-hazing
- Deplyment

**MixDehazeNet + Yolov5**



**Hazy Image**

