Haze Feature Extraction System

1. Feature Components

1.1 Dark Channel Prior

- Represents the minimum intensity in a local region
- Helps identify haze-opaque regions
- Lower values indicate clearer atmosphere

1.2 Transmission Map

- Estimates the portion of light that reaches the camera
- Values closer to 1 indicate less haze
- Used to quantify haze density

1.3 Atmospheric Light

- Estimates the intensity of atmospheric light
- Higher values indicate more scattered light
- Key indicator of haze presence

1.4 Image Statistics

- Contrast: Measures intensity variation
- Saturation: Color intensity measurement
- Haze Density: Combined metric of opacity

2. Usage Example

```
from haze_features import HazeFeatureExtractor

# Initialize extractor
extractor = HazeFeatureExtractor()

# Extract features from image
features = extractor.extract_features(image)

# Access individual features
dark_channel = features['dark_channel_mean']
```

```
transmission = features['transmission_mean']
atmospheric = features['atmospheric_light']
contrast = features['contrast']
saturation = features['saturation']
haze_density = features['haze_density']
```

3. Feature Ranges

Feature	Range	Interpretation
Dark Channel Mean	[0, 1]	Lower = Clearer
Transmission Mean	[0, 1]	Higher = Clearer
Atmospheric Light	[0, 255]	Higher = Hazier
Contrast	[0, 1]	Higher = Clearer
Saturation	[0, 1]	Higher = Clearer
Haze Density	[0, 1]	Higher = Hazier