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25MML0027

Video processing Lab

```
import cv2
import numpy as np
import tensorflow as tf
from tensorflow.keras.applications import MobileNetV2
import matplotlib.pyplot as plt
from tensorflow.keras.applications.mobilenet_v2 import preprocess_input,
decode_predictions

# Load pretrained MobileNetV2
model = MobileNetV2(weights='imagenet')

import cv2
import numpy as np

def extract_frames(video_path, max_frames=20):
    cap = cv2.VideoCapture(video_path)

    if not cap.isOpened():
        print("Error: Cannot open video")
        return np.array([])

    frames = []
    total_frames = int(cap.get(cv2.CAP_PROP_FRAME_COUNT))

    # Handle videos where frame count is 0
    if total_frames > 0:
        step = max(1, total_frames // max_frames)
    else:
        step = 1

    count = 0

    while True:
        ret, frame = cap.read()
        if not ret:
            break

        if count % step == 0:
            frame = cv2.resize(frame, (224, 224))
            frame = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB) # 🚫 Important

fix
        frames.append(frame)
```

```

        count += 1

    if len(frames) >= max_frames:
        break

cap.release()
print("Extracted frames:", len(frames))
return np.array(frames)

def classify_video(video_path):
    frames = extract_frames(video_path)

    if len(frames) == 0:
        print("No frames extracted!")
        return
    print("Frames shape:", frames.shape)
    if len(frames) == 0:
        print("No frames extracted!")
        return

    print("Frames shape:", frames.shape)

    for i in range(len(frames)):
        print("\n=====")
        print("Frame Index:", i)
        print("Pixel Matrix:\n")
        print(frames[i])    # Full 224x224x3 matrix

        # Display image
        plt.imshow(frames[i])
        plt.title(f"Frame {i}")
        plt.axis("off")
        plt.show()

    frames = preprocess_input(frames)
    predictions = model.predict(frames)

    # Average predictions across frames
    avg_pred = np.mean(predictions, axis=0)
    #top_pred = decode_predictions(np.expand_dims(avg_pred, axis=0), top=1)

    top_pred = decode_predictions(np.expand_dims(avg_pred, axis=0), top=5)

    for pred in top_pred[0]:
        print(pred[1], ":", round(pred[2]*100, 2), "%")

```

```

print("Final Prediction:", top_pred[0][0][1])

# Replace with your video path
video_path = "real_world_demo_video.mp4"
classify_video(video_path)

Extracted frames: 20
Frames shape: (20, 224, 224, 3)
Frames shape: (20, 224, 224, 3)

```

```

=====

```

```

Frame Index: 0
Pixel Matrix:

```

```

[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]

```

```

[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]

```

```

[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]

```

```

...

```

```

[[[ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]
  ...
  [ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]]]

```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

Frame 0



=====

Frame Index: 1

Pixel Matrix:

```
[[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]]
```

[233 206 133]]

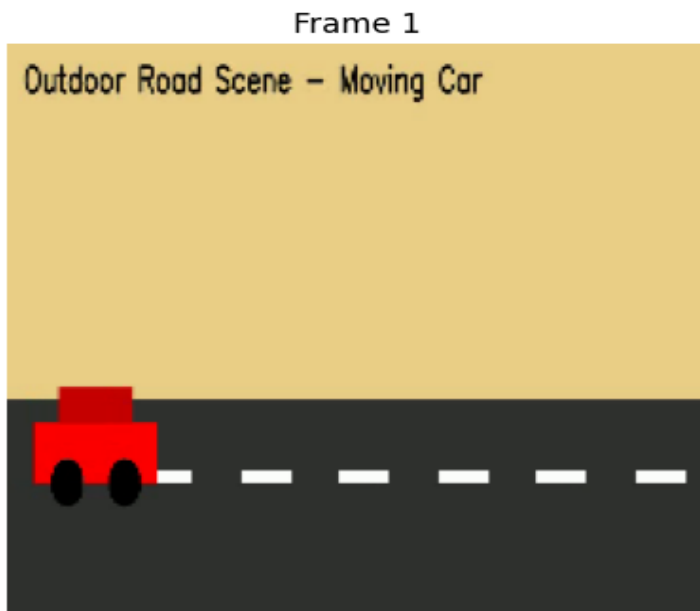
[[233 206 133]  
[233 206 133]  
[233 206 133]  
...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

...

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]]



=====

Frame Index: 2

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

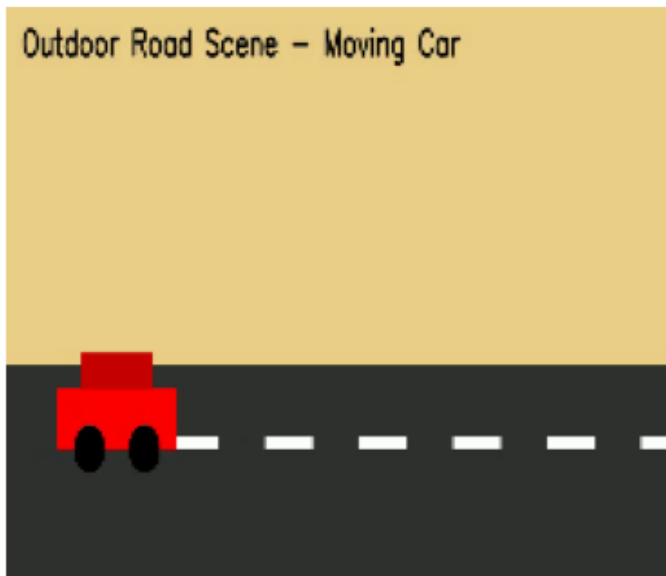
...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

Frame 2



```
=====
Frame Index: 3
Pixel Matrix:
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

...

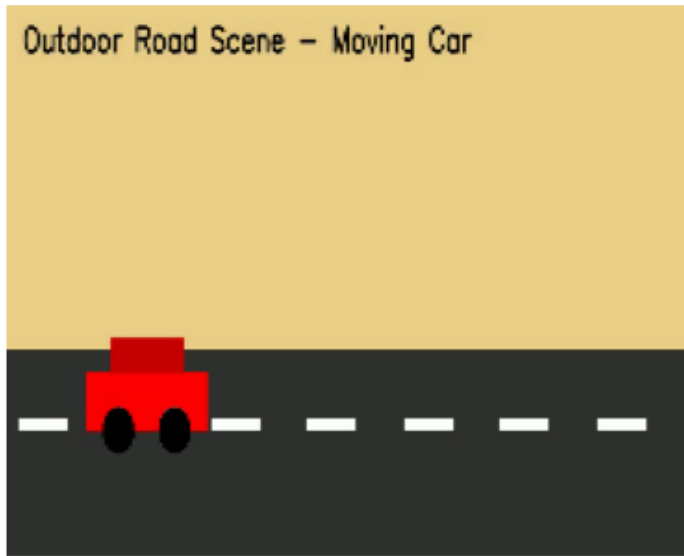
```
[[[ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]
  ...
  [ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]]]
```

```
[[[ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]
  ...
  [ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]]]
```

```
[[[ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]
  ...
  [ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]]]
```



Frame 3



=====

Frame Index: 4

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

...

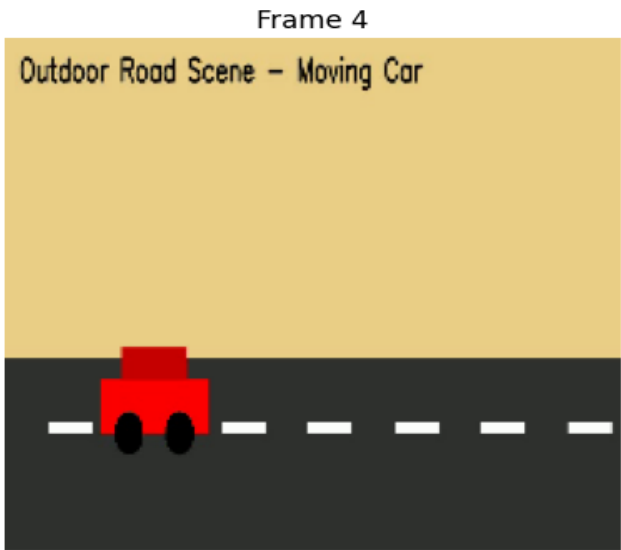
```

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]

```



```

=====
Frame Index: 5
Pixel Matrix:

[[[233 206 133]
  [233 206 133]
  [233 206 133]

```

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

...

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]]



=====

Frame Index: 6

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]]]
```

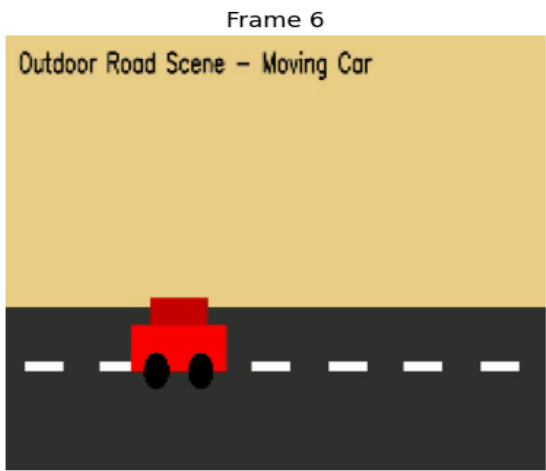
```

[ 46  48  45]
...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]

```



```

=====
Frame Index: 7
Pixel Matrix:

```

```

[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]

```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

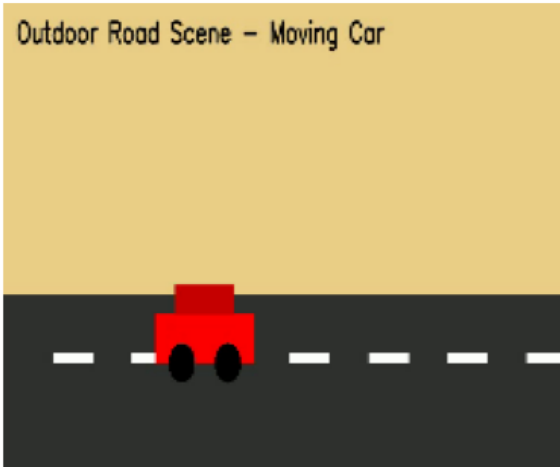
...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

Frame 7



=====

Frame Index: 8

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

...

```
[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
```

```

...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]

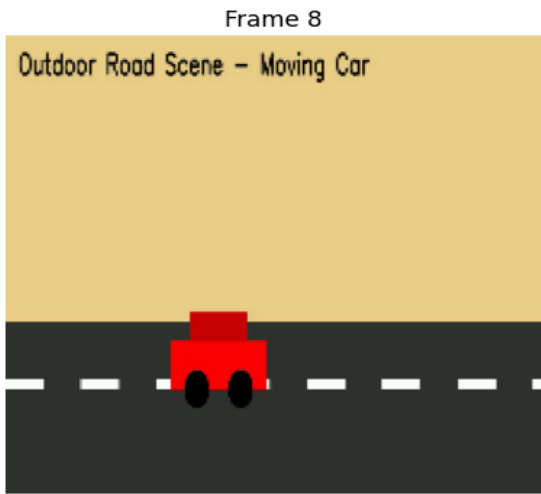
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]

...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]

...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]]

```



```
=====
```

Frame Index: 9

Pixel Matrix:

```

[[[233 206 133]
  [233 206 133]
  [233 206 133]

...
[233 206 133]
[233 206 133]
[233 206 133]]]

```



```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```



=====

Frame Index: 10

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

...

```
[[ 46  48  45]
```

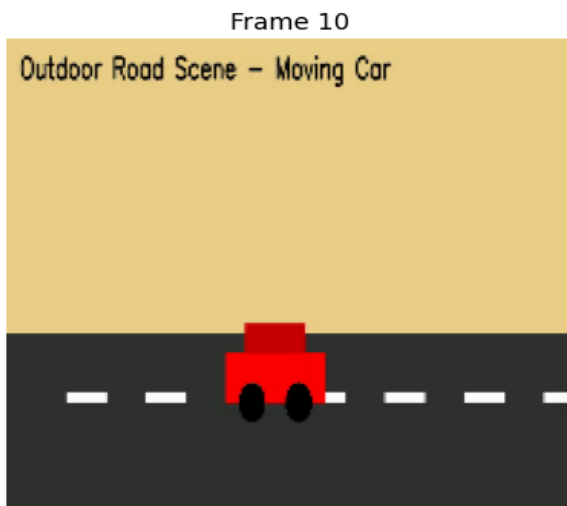
```

[ 46  48  45]
[ 46  48  45]
...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]

```



=====

Frame Index: 11

Pixel Matrix:

```

[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]]]

```

[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]  
...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]  
...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

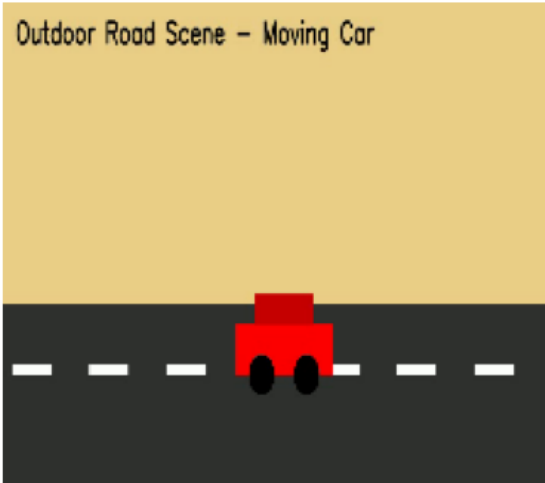
...

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]]

Frame 11



=====

Frame Index: 12

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
```

```

[ 46  48  45]
...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]

```

Frame 12



=====

Frame Index: 13  
Pixel Matrix:

```

[[[233 206 133]
  [233 206 133]
  [233 206 133]

```

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

...

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]]

Frame 13



=====

Frame Index: 14

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]]]
```



```
[233 206 133]
[233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]]
```

Frame 14



=====

Frame Index: 15

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]]]
```

```
[233 206 133]
[233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

Frame 15



=====

Frame Index: 16

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]]]
```

```
[233 206 133]
[233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]]
```

Frame 16

Outdoor Road Scene - Moving Car



=====

Frame Index: 17

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]]]
```

```
[233 206 133]
[233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]]
```

Frame 17

Outdoor Road Scene - Moving Car



=====

Frame Index: 18

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]]]
```



```
[233 206 133]
[233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

Frame 18

Outdoor Road Scene - Moving Car



=====

Frame Index: 19

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]]]
```

```
[233 206 133]
[233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

...

```
[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

Frame 19



```
=====
Frame Index: 20
Pixel Matrix:
```

```
-----
IndexError                                Traceback (most recent call last)
/tmp/ipython-input-2003751610.py in <cell line: 0>()
    93 # Replace with your video path
    94 video_path = "real_world_demo_video.mp4"
--> 95 classify_video(video_path)

/tmp/ipython-input-2003751610.py in classify_video(video_path)
    68     print("Frame Index:", i)
    69     print("Pixel Matrix:\n")
--> 70     print(frames[i])    # Full 224x224x3 matrix
    71
    72     # Display image
```

IndexError: index 20 is out of bounds for axis 0 with size 20

```

import cv2
import numpy as np
import tensorflow as tf
import matplotlib.pyplot as plt
import math
from tensorflow.keras.applications import MobileNetV2
from tensorflow.keras.applications.mobilenet_v2 import preprocess_input,
decode_predictions

model = MobileNetV2(weights='imagenet')

def extract_frames(video_path, max_frames=20):
    cap = cv2.VideoCapture(video_path)

    if not cap.isOpened():
        print("Error: Cannot open video")
        return np.array([])

    frames = []
    total_frames = int(cap.get(cv2.CAP_PROP_FRAME_COUNT))

    if total_frames > 0:
        step = max(1, total_frames // max_frames)
    else:
        step = 1

    count = 0

    while True:
        ret, frame = cap.read()
        if not ret:
            break

        if count % step == 0:
            frame = cv2.resize(frame, (224, 224))
            frame = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)
            frames.append(frame)

        count += 1

        if len(frames) >= max_frames:
            break

    cap.release()
    print("Extracted frames:", len(frames))
    return np.array(frames)

```

```

def show_frames_grid(frames, cols=5):
    num_frames = len(frames)
    if num_frames == 0:
        print("No frames to display.")
        return

    rows = math.ceil(num_frames / cols)

    plt.figure(figsize=(4 * cols, 3 * rows))

    for i in range(num_frames):
        plt.subplot(rows, cols, i + 1)
        plt.imshow(frames[i])
        plt.title(f"Frame {i}")
        plt.axis("off")

    plt.tight_layout()
    plt.show()

def classify_video(video_path, max_frames=20, grid_cols=5,
print_pixel_matrices=False):
    frames = extract_frames(video_path, max_frames=max_frames)

    if len(frames) == 0:
        print("No frames extracted!")
        return

    print("Frames shape:", frames.shape)

    if print_pixel_matrices:
        for i in range(len(frames)):
            print("\n=====")
            print("Frame Index:", i)
            print("Pixel Matrix:\n")
            print(frames[i])

    show_frames_grid(frames, cols=grid_cols)

    frames_pre = preprocess_input(frames.astype(np.float32))
    predictions = model.predict(frames_pre, verbose=0)

    avg_pred = np.mean(predictions, axis=0)
    top_pred = decode_predictions(np.expand_dims(avg_pred, axis=0), top=5)

    print("\nTop-5 Predictions (avg over frames):")

```

```

for pred in top_pred[0]:
    print(pred[1], ":", round(pred[2] * 100, 2), "%")

print("\nFinal Prediction:", top_pred[0][0][1])

```

```

video_path = "real_world_demo_video.mp4"
classify_video(
    video_path,
    max_frames=20,
    grid_cols=0,
    print_pixel_matrices=False
)

```

Extracted frames: 20

Frames shape: (20, 224, 224, 3)

```

-----
ZeroDivisionError                                Traceback (most recent call last)
/tmp/ipython-input-103609295.py in <cell line: 0>()
     99
    100 video_path = "real_world_demo_video.mp4"
--> 101 classify_video(
    102     video_path,
    103     max_frames=20,

/tmp/ipython-input-103609295.py in classify_video(video_path, max_frames,
grid_cols, print_pixel_matrices)
     83         print(frames[i])
     84
--> 85     show_frames_grid(frames, cols=grid_cols)
     86
     87     frames_pre = preprocess_input(frames.astype(np.float32))

/tmp/ipython-input-103609295.py in show_frames_grid(frames, cols)
     53         return
     54
--> 55     rows = math.ceil(num_frames / cols)
     56
     57     plt.figure(figsize=(4 * cols, 3 * rows))

```

ZeroDivisionError: division by zero

## Errors solved

```
import cv2
import numpy as np
import tensorflow as tf
import matplotlib.pyplot as plt
import math
from tensorflow.keras.applications import MobileNetV2
from tensorflow.keras.applications.mobilenet_v2 import preprocess_input,
decode_predictions
```

*# Loading pretrained MobileNetV2*

*# This loads MobileNetV2 trained on ImageNet (1000 classes).*

*# So it can predict common object categories like "dog", "car", "laptop", etc.*

```
model = MobileNetV2(weights='imagenet')
```

```
def extract_frames(video_path, max_frames=20):
```

```
    cap = cv2.VideoCapture(video_path)
```

```
    if not cap.isOpened():
```

```
        print("Error: Cannot open video")
```

```
        return np.array([])
```

```
    frames = []
```

```
    total_frames = int(cap.get(cv2.CAP_PROP_FRAME_COUNT))
```

```
    # If total_frames is known and > 0:
```

```
    # step decides how frequently to sample frames so we don't take every  
single frame.
```

```
    # Example: If total_frames=200 and max_frames=20, step=10 => take every  
10th frame.
```

```
    #
```

```
    # If total_frames is 0 (some videos return 0 for CAP_PROP_FRAME_COUNT):
```

```
    # we fall back to step=1 (try reading sequentially).
```

```
    if total_frames > 0:
```

```
        step = max(1, total_frames // max_frames)
```

```
    else:
```

```
        step = 1 # putting step=1 ensures we can still extract frames even if  
frame count is unknown
```

```
    count = 0
```

```
    while True:
```

```
        ret, frame = cap.read()
```

```
        if not ret:
```

```
            break
```



```

    if count % step == 0:
        frame = cv2.resize(frame, (224, 224))
        frame = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB) # BGR -> RGB
        frames.append(frame)

    count += 1

    if len(frames) >= max_frames:
        break

cap.release()
print("Extracted frames:", len(frames))
return np.array(frames)

def show_frames_grid(frames, cols=5):
    """Display frames together in a single figure as a grid."""
    num_frames = len(frames)
    if num_frames == 0:
        print("No frames to display.")
        return

    rows = math.ceil(num_frames / cols)

    plt.figure(figsize=(4 * cols, 3 * rows))

    for i in range(num_frames):
        plt.subplot(rows, cols, i + 1)
        plt.imshow(frames[i])
        plt.title(f"Frame {i}")
        plt.axis("off")

    plt.tight_layout()
    plt.show()

def classify_video(video_path, max_frames=20, grid_cols=5,
print_pixel_matrices=False): #corrected the error with frames=5
    frames = extract_frames(video_path, max_frames=max_frames)

    if len(frames) == 0:
        print("No frames extracted!")
        return

    print("Frames shape:", frames.shape)

    # Printing pixel matrices
    if print_pixel_matrices:
        for i in range(len(frames)):

```

```

        print("\n=====")
        print("Frame Index:", i)
        print("Pixel Matrix:\n")
        print(frames[i])

# Showing all frames together instead of one-by-one
show_frames_grid(frames, cols=grid_cols)

# Preprocess + predict
frames_pre = preprocess_input(frames.astype(np.float32))
predictions = model.predict(frames_pre, verbose=0)

# Average predictions across frames
avg_pred = np.mean(predictions, axis=0)

# Decode top-5
top_pred = decode_predictions(np.expand_dims(avg_pred, axis=0), top=5)

print("\nTop-5 Predictions (avg over frames):")
for pred in top_pred[0]:
    print(pred[1], ":", round(pred[2] * 100, 2), "%")

print("\nFinal Prediction:", top_pred[0][0][1])

video_path = "real_world_demo_video.mp4"
classify_video(
    video_path,
    max_frames=20,           # how many frames to sample
    grid_cols=5,            # how many columns in the grid display
    print_pixel_matrices=True # set True ONLY if you really want to print
matrices
)
Extracted frames: 20
Frames shape: (20, 224, 224, 3)

=====
Frame Index: 0
Pixel Matrix:

[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]

[[233 206 133]

```

```
[233 206 133]
[233 206 133]
...
[233 206 133]
[233 206 133]
[233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

=====

Frame Index: 1

Pixel Matrix:

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
```

```
[233 206 133]
[233 206 133]
[233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

=====

Frame Index: 2

Pixel Matrix:

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

```
[[[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]]
```

...

```
[[[ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]
  ...
  [ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]]]
```

```
[[[ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]
  ...
  [ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]]]
```

```
[[[ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]
  ...
  [ 46  48  45]
  [ 46  48  45]]]
```

[ 46 48 45]]]

=====

Frame Index: 3

Pixel Matrix:

[[[233 206 133]  
[233 206 133]  
[233 206 133]  
...  
[233 206 133]  
[233 206 133]  
[233 206 133]]]

[[233 206 133]  
[233 206 133]  
[233 206 133]  
...  
[233 206 133]  
[233 206 133]  
[233 206 133]]]

[[233 206 133]  
[233 206 133]  
[233 206 133]  
...  
[233 206 133]  
[233 206 133]  
[233 206 133]]]

...

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]]

[[ 46 48 45]

```
[ 46  48  45]
[ 46  48  45]
...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]]
```

=====

Frame Index: 4

Pixel Matrix:

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

...

```
[[[ 46  48  45]
   [ 46  48  45]
   [ 46  48  45]
   ...
   [ 46  48  45]
   [ 46  48  45]
   [ 46  48  45]]]
```

```
[[[ 46  48  45]
   [ 46  48  45]
   [ 46  48  45]
   ...
```

```
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

=====

Frame Index: 5

Pixel Matrix:

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```



```

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]

```

=====

Frame Index: 6

Pixel Matrix:

```

[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]

```

```

[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]

```

```

[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]

```

...

```

[[ 46  48  45]
 [ 46  48  45]

```

```

[ 46  48  45]
...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]

```

=====

Frame Index: 7

Pixel Matrix:

```

[[[233 206 133]
  [233 206 133]
  [233 206 133]
...
  [233 206 133]
  [233 206 133]
  [233 206 133]]

[[233 206 133]
 [233 206 133]
 [233 206 133]
...
 [233 206 133]
 [233 206 133]
 [233 206 133]]

[[233 206 133]
 [233 206 133]
 [233 206 133]
...
 [233 206 133]
 [233 206 133]
 [233 206 133]]

```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

=====

Frame Index: 8

Pixel Matrix:

```
[[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
```

```
[233 206 133]
...
[233 206 133]
[233 206 133]
[233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

=====

Frame Index: 9  
Pixel Matrix:

```
[[[233 206 133]
 [233 206 133]
 [233 206 133]
...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
...
 [233 206 133]
```

```
[233 206 133]
[233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

...

```
[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
 ...
 [ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]]
```

```
[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
 ...
 [ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]]
```

```
[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
 ...
 [ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]]]
```

=====

Frame Index: 10

Pixel Matrix:

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

=====

Frame Index: 11

Pixel Matrix:

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
```

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]

...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

...

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]

...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]]

=====  
Frame Index: 12

Pixel Matrix:

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

...

```
[[[ 46  48  45]
   [ 46  48  45]
   [ 46  48  45]
   ...
   [ 46  48  45]
   [ 46  48  45]
   [ 46  48  45]]]
```

```
[[[ 46  48  45]
   [ 46  48  45]
   [ 46  48  45]
   ...
   [ 46  48  45]
   [ 46  48  45]
   [ 46  48  45]]]
```

```
[[[ 46  48  45]
   [ 46  48  45]
   [ 46  48  45]
   ...
   [ 46  48  45]]]
```



```
[ 46  48  45]
[ 46  48  45]]]
```

=====

Frame Index: 13

Pixel Matrix:

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

=====

Frame Index: 14

Pixel Matrix:

```
[[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]]
```

...

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

```
[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
```

```
...
[ 46  48  45]
[ 46  48  45]
[ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]

...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]
```

```
=====
Frame Index: 15
Pixel Matrix:
```

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]

 [[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]

 [[233 206 133]
  [233 206 133]
  [233 206 133]
  ...
  [233 206 133]
  [233 206 133]
  [233 206 133]]

...

 [[ 46  48  45]
  [ 46  48  45]
  [ 46  48  45]
  ...
  [ 46  48  45]
  [ 46  48  45]]]
```

```

[ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]

[[ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]
 ...
 [ 46  48  45]
 [ 46  48  45]
 [ 46  48  45]]]

```

=====

Frame Index: 16  
Pixel Matrix:

```

[[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]

[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]

[[233 206 133]
 [233 206 133]
 [233 206 133]
 ...
 [233 206 133]
 [233 206 133]
 [233 206 133]]

...

[[ 46  48  45]

```

```
[ 46 48 45]
[ 46 48 45]
...
[ 46 48 45]
[ 46 48 45]
[ 46 48 45]]

[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
...
 [ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]]]

[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
...
 [ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]]]
```

=====

Frame Index: 17

Pixel Matrix:

```
[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]

[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]
   [233 206 133]]]

[[[233 206 133]
   [233 206 133]
   [233 206 133]
   ...
   [233 206 133]
   [233 206 133]]]
```

[233 206 133]]

...

[[ 46 48 45]

[ 46 48 45]

[ 46 48 45]

...

[ 46 48 45]

[ 46 48 45]

[ 46 48 45]]

[[ 46 48 45]

[ 46 48 45]

[ 46 48 45]

...

[ 46 48 45]

[ 46 48 45]

[ 46 48 45]]

[[ 46 48 45]

[ 46 48 45]

[ 46 48 45]

...

[ 46 48 45]

[ 46 48 45]

[ 46 48 45]]]

=====

Frame Index: 18

Pixel Matrix:

[[[233 206 133]

[233 206 133]

[233 206 133]

...

[233 206 133]

[233 206 133]

[233 206 133]]

[[233 206 133]

[233 206 133]

[233 206 133]

...

[233 206 133]

[233 206 133]

[233 206 133]]

[[233 206 133]

```
[233 206 133]
[233 206 133]
...
[233 206 133]
[233 206 133]
[233 206 133]]
```

...

```
[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
...
 [ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]]
```

```
[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
...
 [ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]]
```

```
[[ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]
...
 [ 46 48 45]
 [ 46 48 45]
 [ 46 48 45]]]
```

=====

Frame Index: 19

Pixel Matrix:

```
[[[233 206 133]
 [233 206 133]
 [233 206 133]
...
 [233 206 133]
 [233 206 133]
 [233 206 133]]
```

```
[[233 206 133]
 [233 206 133]
 [233 206 133]
...
```

[233 206 133]  
[233 206 133]  
[233 206 133]]

[[233 206 133]  
[233 206 133]  
[233 206 133]  
...  
[233 206 133]  
[233 206 133]  
[233 206 133]]

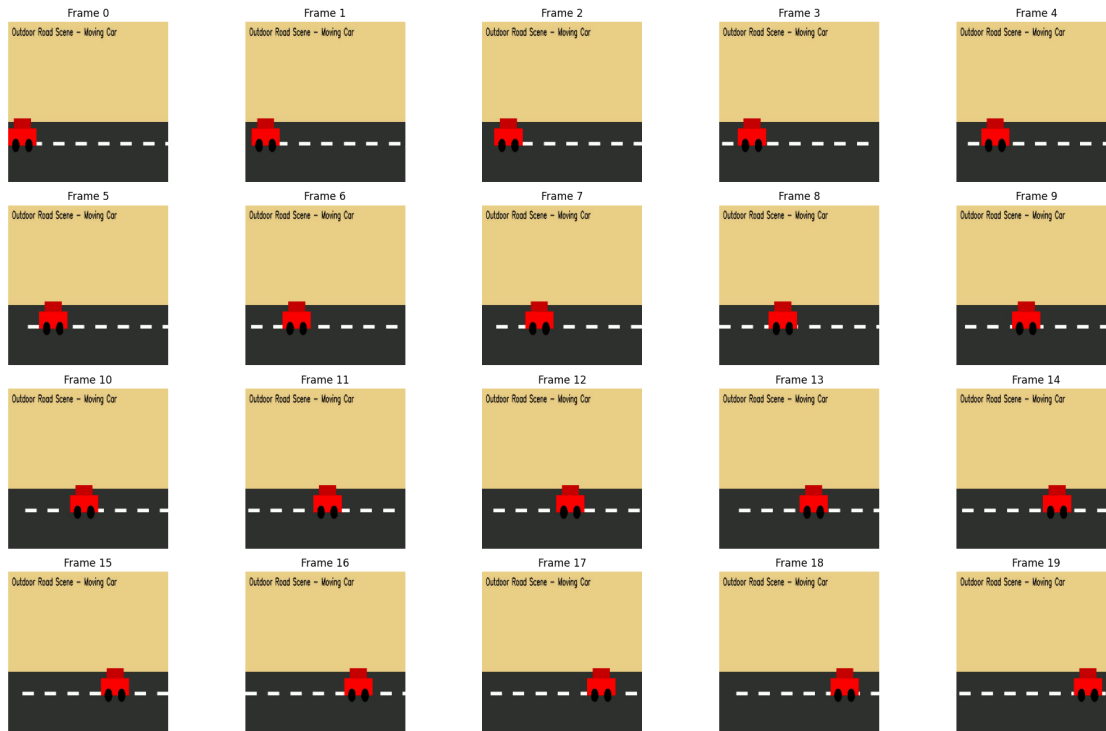
...

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]

[[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]  
...  
[ 46 48 45]  
[ 46 48 45]  
[ 46 48 45]]]





Top-5 Predictions (avg over frames):

digital\_clock : 63.84 %

traffic\_light : 9.13 %

switch : 1.43 %

computer\_keyboard : 1.32 %

matchstick : 0.85 %

Final Prediction: digital\_clock