In this code, I did these things to increase the accuracy and number of dataset

1-Brightness

2-Rotation

3-Resolution

- from google .colab import drive
- import library
- Brightness and Rotarion Augmentation
- Resolution
- Define pathe
- Clean up previous runs if needed
- Perform the defined augmentations on the specified directories.
- create a file with results

This code provides a structured approach to image augmentation using brightness adjustment, rotation, and resolution enhancement

Purpose: This code mounts your Google Drive to the Colab environment, allowing you to access files stored in your Google Drive. • Function: drive.mount('/content/drive') prompts you to authenticate and grant access to your Google Drive.

```
from google.colab import drive
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, ca
```

os: Provides functions to interact with the operating system, such as reading and writing files. • cv2: OpenCV library for image processing tasks. • numpy: Library for numerical operations and array handling. • shutil: Provides functions for high-level file operations, such as copying and removing files. • ImageDataGenerator: A Keras class used to generate batches of tensor image data with real-time data augmentation.

```
import os #function to interact with system
import cv2
import numpy as np
import shutil
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

Brightness and Rotation Augmentation

Purpose: Augments images by applying brightness adjustments and rotations. • Parameters: • input_dir: Directory containing the original images. • output_dir: Directory where augmented images will be saved. • Steps: • Check if output_dir exists, and create it if not. • Define the augmentation options using ImageDataGenerator. • Loop through each image in input_dir. • Load each image in grayscale mode using OpenCV. • Expand dimensions to match the expected input shape for the generator. • Use the datagen.flow method to generate and save augmented images, stopping after 5 augmentations per original image.

```
def augment_brightness_rotation(input_dir, output_dir):
    if not os.path.exists(output_dir):
        os.makedirs(output_dir)

    datagen = ImageDataGenerator(
        brightness_range=[0.2, 1.0],
        rotation_range=40,
        rescale=1./255
    )

    for img_name in os.listdir(input_dir):
        img_path = os.path.join(input_dir, img_name)
        print(f"Processing image for brightness and rotation: {img_path}")

        image = cv2.imread(img_path, cv2.IMREAD_GRAYSCALE)
        if image is None:
            print(f"Failed to read image: {img_path}")
            continue

        image = np.expand_dims(image, axis=-1)
        image = np.expand_dims(image, axis=0)

        i = 0
        for batch in datagen.flow(image, batch_size=1, save_to_dir=output_dir,
            i += 1
            if i >= 5:
                break
```

Resolution Augmentation

Purpose: Augments images by increasing their resolution. • Parameters: • input_dir: Directory containing the original images. • output_dir: Directory where augmented images will be saved. • Steps: • Check if output_dir exists, and create it if not. • Loop through each image in input_dir. • Load each image in grayscale mode using OpenCV. • Resize the image by a factor of 2 using cubic interpolation. • Save the augmented image to output_dir.

```
def augment_resolution(input_dir, output_dir):
    if not os.path.exists(output_dir):
        os.makedirs(output_dir)

    for img_name in os.listdir(input_dir):
        img_path = os.path.join(input_dir, img_name)
        print(f"Processing image for resolution: {img_path}")

        image = cv2.imread(img_path, cv2.IMREAD_GRAYSCALE)
        if image is None:
            print(f"Failed to read image: {img_path}")
            continue

        # Correct indentation for the following two lines
        image = cv2.resize(image, None, fx=2, fy=2, interpolation=cv2.INTER_CUE
        output_path = os.path.join(output_dir, f'aug_res_{img_name}')
        cv2.imwrite(output_path, image)
```

Define pathe

```
# Define paths for the second augmentation (resolution)
input_dir1 = '/content/drive/MyDrive/Accident Detection From CCTV Footage/data/
output_dir1 = '/content/drive/MyDrive/daraset _update/val/Accident'  # Final ou
```

```
# Define paths for the first augmentation (brightness and rotation)
input_dir2 = '/content/drive/MyDrive/Accident Detection From CCTV Footage/data/
output_dir2 = '//content/drive/MyDrive/daraset _update/test/ata/val/Non Accider
```

Purpose: Remove existing directories and their contents to ensure a clean run. • Function: shutil.rmtree(dir_path) deletes the directory and all its contents

```
# Clean up previous runs if needed
for dir_path in [output_dir1, output_dir2]:
    if os.path.exists(dir_path):
        shutil.rmtree(dir_path)
```

```
import os  # Import the os module
import shutil  # Import shutil for directory operations

# Clean up previous runs if needed
for dir_path in [output_dir1, output_dir2]:
    if os.path.exists(dir_path):  # Now you can use os.path.exists
        shutil.rmtree(dir_path)
```

Purpose: Perform the defined augmentations on the specified directories. • Functions:

```
# First augment: Brightness and Rotation on the first input directory
augment_brightness_rotation(input_dir1, output_dir1)
```

```
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Processing image for brightness and rotation: /content/drive/MyDrive/Accide
```

```
# Second augment: Resolution on the second input directory
```

```
augment_resolution(input_dir2, output_dir2)

print("Augmentation completed.")
```

```
Processing image for resolution: /content/drive/MyDrive/Accident Detection
Processing image for resolution: /content/drive/MyDrive/Accident Detection
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Processing image for resolution: /content/drive/MyDrive/Accident Detection
Processing image for resolution: /content/drive/MyDrive/Accident Detection
Augmentation completed.
```

```
if not os.path.exists(output_dir1):
    os.makedirs(output_dir1)
```

```
if not os.path.exists(output_dir2):
    os.makedirs(output_dir2)
```