HACK-N-LEAD

TEAM-15

TEAM NAME- TECHTEENS

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PROBLEM STATEMENT

Oil tankers in the oceans are exposed to harsh weather conditions. An added factor of machine malfunctioning leads to oil spillage which is very harmful for the aquatic environment.

The detection of oil slicks and early warning of the corresponding authorities is vital to attenuate the environmental disaster, control the oil spill dispersion and ensure that no human lives are in danger. Remote sensing has a crucial role towards this objective, since relevant approaches can offer efficient monitoring of marine environments and assist the oil spill detection.

Steps to solve the problem

- Extracting the dataset.
- Seperating the dataset into testing and training data.
- Training the model with CNN.
- After which test data is given to model and accuracy is found.
- Now a user interface is created for the user to input an image so that the model gives an output to classify if the image is of Oil Spill or Non Oil Spill.

Applications

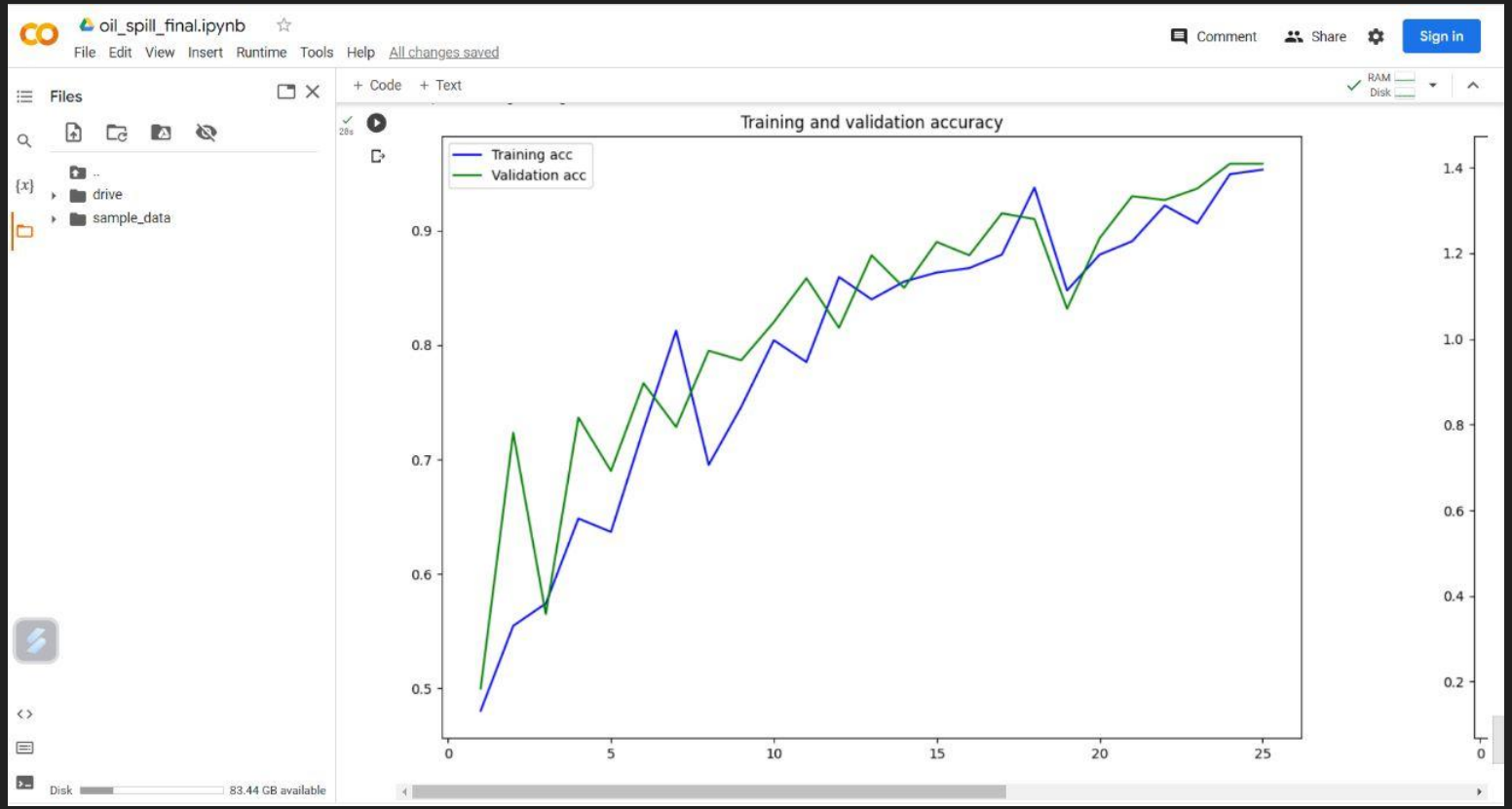
This model can be mainly used by the defence system, department of oceanography, and many other organizations for easy and fast detection of oil spills by tankers in the ocean for fast response.

ANALYSIS

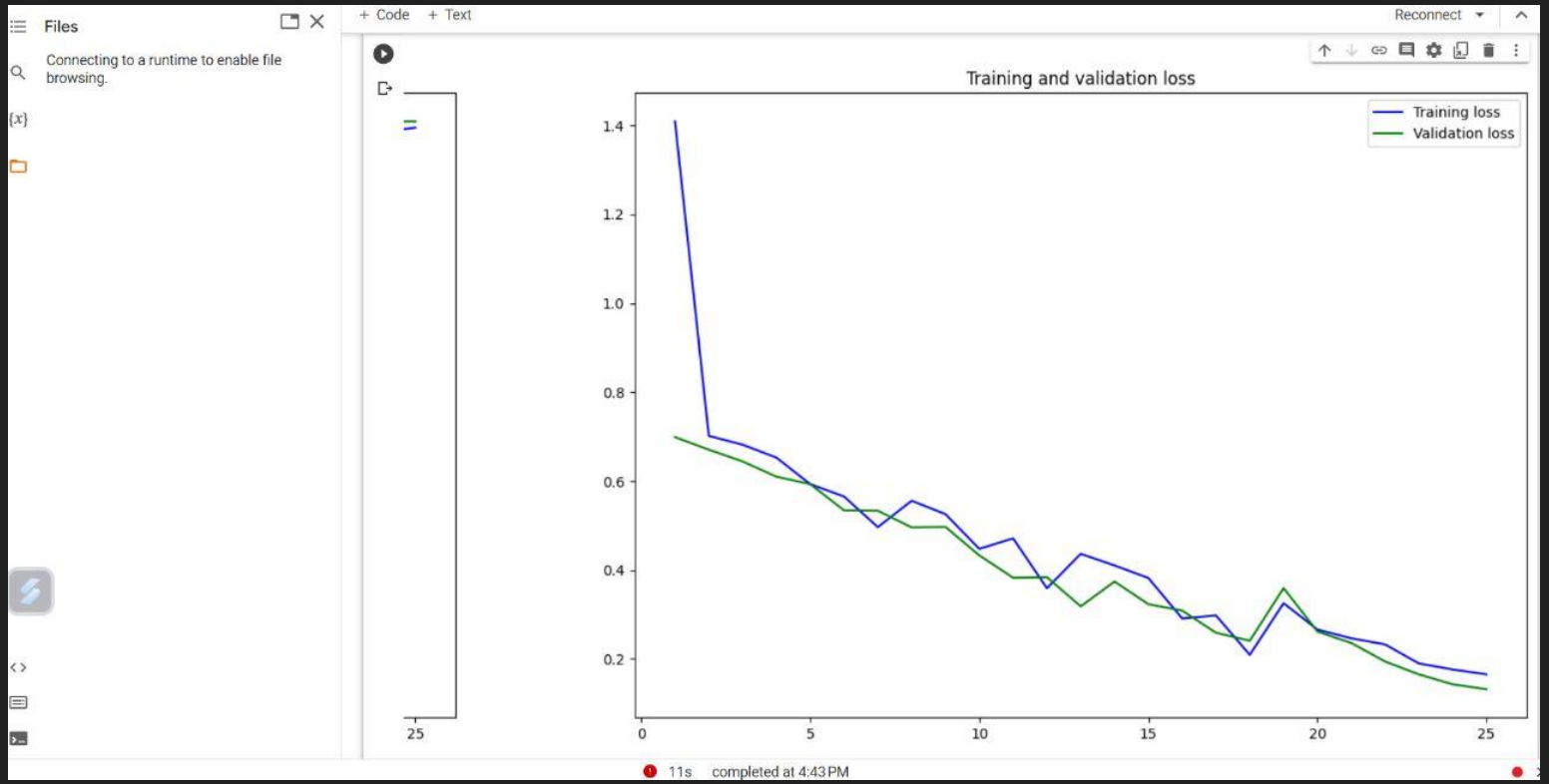
We look at solving this problem using the following steps

- Retrieve dataset of the SAR images of oil leakages
- Use this dataset to train a model which can predict an oil leakage based on the unusual movement of the ship (when it goes out of course), and the satellite images of region of the ship
- The model can predict early oil spills and revert to the concerned authorities to minimize the damage caused.

Training and validation accuracy



Training and validation loss



Accuracy of the model

The model provides 95 percent accuracy in its predictions

```
8/8 [==============================] - 34s 4s/step - loss: 0.2912 - accuracy: 0.8672 - val_loss: 0.3090 - val_accuracy: 0.8783
Epoch 17/50
8/8 [==============================] - 35s 5s/step - loss: 0.2980 - accuracy: 0.8789 - val_loss: 0.2590 - val_accuracy: 0.9150
Epoch 18/50
8/8 [==============================] - 34s 4s/step - loss: 0.2095 - accuracy: 0.9375 - val_loss: 0.2412 - val_accuracy: 0.9100
Epoch 19/50
8/8 [==============================] - 33s 4s/step - loss: 0.3256 - accuracy: 0.8477 - val_loss: 0.3595 - val_accuracy: 0.8317
Epoch 20/50
8/8 [==============================] - 30s 4s/step - loss: 0.2663 - accuracy: 0.8789 - val_loss: 0.2618 - val_accuracy: 0.8933
Epoch 21/50
8/8 [==============================] - 28s 4s/step - loss: 0.2467 - accuracy: 0.8906 - val_loss: 0.2362 - val_accuracy: 0.9300
Epoch 22/50
8/8 [==============================] - 29s 4s/step - loss: 0.2329 - accuracy: 0.9219 - val_loss: 0.1945 - val_accuracy: 0.9267
Epoch 23/50
8/8 [==============================] - 29s 4s/step - loss: 0.1901 - accuracy: 0.9062 - val_loss: 0.1655 - val_accuracy: 0.9367
Epoch 24/50
8/8 [==============================] - 34s 5s/step - loss: 0.1765 - accuracy: 0.9492 - val_loss: 0.1432 - val_accuracy: 0.9583
Epoch 25/50
8/8 [==============================] - ETA: 0s - loss: 0.1656 - accuracy: 0.9531
Reached 95% accuracy so cancelling training1
8/8 [==============================] - 28s 4s/step - loss: 0.1656 - accuracy: 0.9531 - val_loss: 0.1321 - val_accuracy: 0.9583
```

Image of an oil spill

```
i=0
for nospill_test_file in os.listdir("/content/drive/MyDrive/dataset/test/Oil Spill"):
    img = Image.open(f"/content/drive/MyDrive/dataset/test/Oil Spill/{nospill_test_file}")
    plt.imshow(img)
    plt.title(nospill_test_file)
    plt.show()
    i+=1
    if i==5:
        break
```

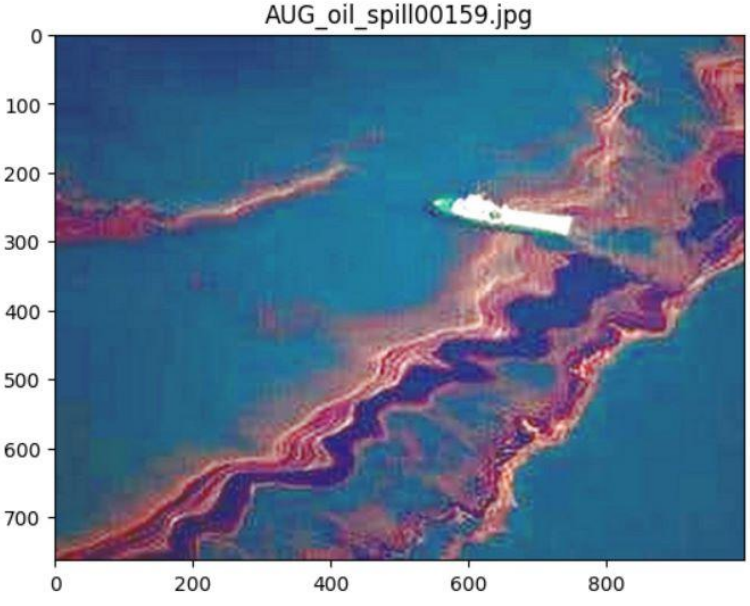
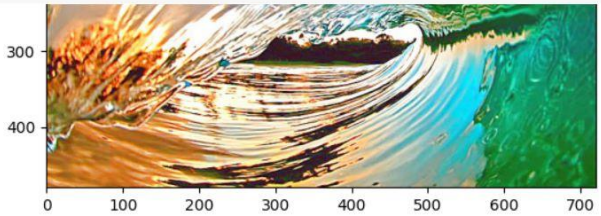
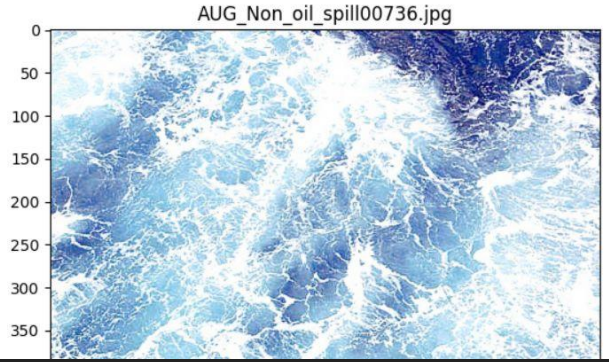


Image of a non oil spill

```
i=0
for oilspill_train_file in os.listdir(f"/content/drive/MyDrive/dataset/train/Non Oil Spill"):
    img = Image.open(f"/content/drive/MyDrive/dataset/train/Non Oil Spill/{oilspill_train_file}")
    plt.imshow(img)
    plt.title(oilspill_train_file)
    plt.show()
    i+=1
    if i==5:
        break
```





Future Enhancements

- Our model can further be integrated with IoT technology to bring into effect the usage of alarms,notifications and so on.
- It has an additional advantage of identifying unknown ships in the ocean which are not the part of the AIS feed and tend to control as much illegal export or import of goods.

THANK YOU