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# ILLEGAL FISHING DETECTION

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**Abstract:** Fishing businessesfacing amajorfinancialproblem throughouttheglobedueto illegalfishing. Through this illegal fishing, we are pushing many fish populations to extinction. This paper proposes illegal fishing using data analytics and machinelearning techniques.Inexisted papersthey useddata manipulation in illegalfishingdata because of that there was a delay in catching the illegal vessels and in that system the data given ismanual. In our paper, we are proposing data analytics to find these vessels.

We can gather the primary data from the Global Fishing Watch (GFW), we analyze this data and find the vessels whether they are used for illegal fishing or legal. Based on the sensors attached to the vessel we can find AIS location data, type of the vessel, and speed of the vessel. By our model, we can predict illegal fishing and can take necessary actions against the illegal fishing boats.

**Keywords**:IllegalFishing,Normalfishing,Regressionmodel,GFW

## INTRODUCTION:

Globally the fishing takes seafood worth up to $23.5 billion. Every year this fishing business grows efficiently. Illegal fishing is one of the big back steps in this business. Illegal fishing is defined as no authorization against conservation and management measures by Regional Fishery Management Organization (RFMOs).

Due to this type of fishing, we face issues in the economic growth of this business. Through this type of high-risk fishing, many of the species were extinct. Unreported fishing and illegal fishing are causing high damage to the economy illegal fishing is the loss worldwide is between $6 billion to $15 billion.

Whenever there is this type of issue it becomes a national issue and every vessel that has done such illegal activity will be facing severe punishment. These illegal fishing are monitored by the RFMOs. They check for the type of the vessel and they check the purpose if they suspect and king of illegal aspect they immediately act. They use the satellite for monitoring SAR (Synthetic aperture radar).

They monitor every vessel that enters the sea and record the data of every ship, the period of the ship in the sea, and its purpose. Through this, they stop such activity and protect the sea.

## MOTIVATION:

In the previous work on this illegal fishing project is done by the GMU engineering team. But the flaw in the previous project is that the decision is done based on the human decision. They used the basic techniques of data classificationso because of that they face issues in catching illegal fishing.

Thisdataiscapturedbutnotusedproperly.Thejudgmentis donebythisandthentheyproceedforthefurtherissue.So by this delay in decision making this system is not much successful in decreasing illegal fishing.

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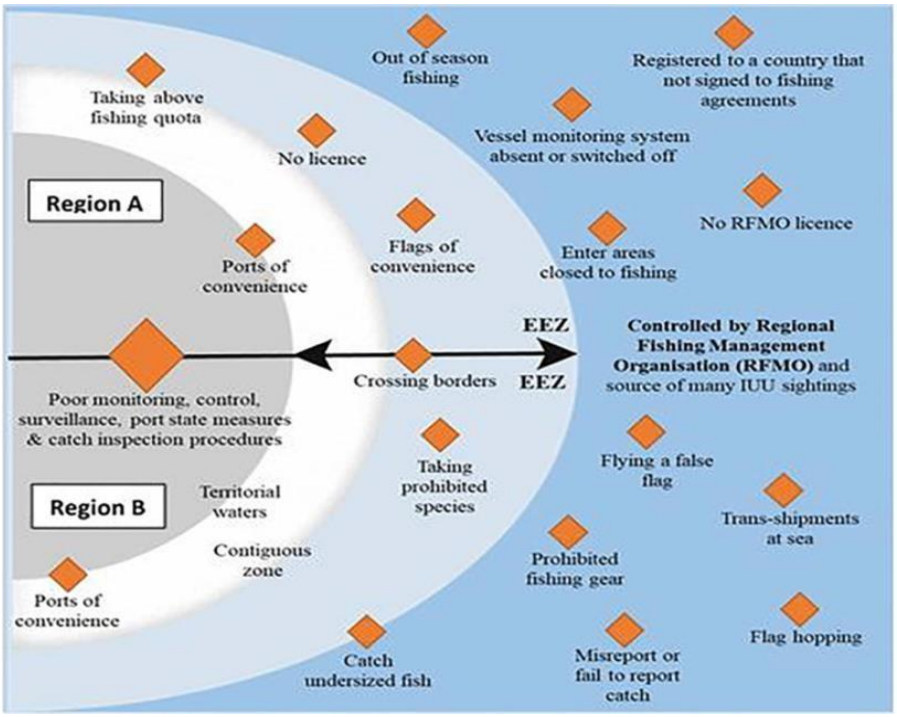
**ILLEGALFISHINGACTIVITIES:**




**LITERATURESURVEY:**

**AGLOBALREVIEWOFILLEGAL,UNREPORTEDANDUNREGULATED(IUU)FISHING(KevinBray)**

**CollatedandEditedbyKevinBray[66]**

This paper reports the views of regional fisheries bodies, and others, on the extent and impact of IUU fishing and on possiblemeasuresto combatit.ThereviewconfirmsthatIUUfishing isofconsiderableconcernto theseorganizations. Common features of IUU fishing include the lack of effective control of fishing vessels by some flag States; the difficulty experienced by regional fisheries bodies in applying responsible fisheries management measures to thevessels of non-Parties, The review reports the specific measures already adopted, or under consideration, to combatIUU fishing in areas of national jurisdiction, within the regions of responsibility of regional fisheries bodies and on the high seas.

**2.1.1.(2017).KasperskySecurityBulletin:Overall StatisticalFor.Accessed: Jul.12,2018.[On line].Available: https://securelist.com/ksb-overallstatistics - 2017/83453/**

Albeit dynamic investigation is compelling in conducting the examination, it likewise implies more expense than static examination [3]. In this manner, it is important to locate a powerful mix plan to take care of these issues. In this work, we propose a malware order framework Malscore dependent on likelihood scoring and AI. We initially produce grayscale pictures from crude malware as static highlights and concentrate local API call successions by executing malware in the sandbox as unique highlights.

**2.1.3.AReinforcementLearningApproachtoTackleIllegal,UnreportedandUnregulatedFishing**

Illegal, unreported, and unregulated fishing is a worldwide problem that is causing local and global financial losses, depleting natural resources, changing our diverse ecosystem, and causing undue pressure upon the fishing industry.This paper presents a Reinforcement-Learning-based approach to response generation once this type of fishing event has been detected. The FuzzyActor-Critic Learning technique is used to train one or more pursuers to effectively catch an evader. This technique is utilized on both the pursuer and evader vessel agents to simulate real-world illegal and unreported fishing pursuit events.

**DeepNetsSpotlightIllegal,Unreported,Unregulated(IUU)Fishing**

The need for increased global surveillance and enforcement efforts to combat Illegal, Unreported, Unregulated (IUU) fishingis wellknown.This paperdescribesthe currentresearchstatus indevelopinga noveltechnique ofassociating

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Automated Identification System (AIS) anti-collision messages to satellite vessel detects.Each detected ship imagehas a wealth of information which allows the development of dark ship tracking and identification. A dark ship is a shipthat is not broadcasting AIS.

**Estimating the Worldwide Extent of Illegal Fishing David J. Agnew1 *, John Pearce2, Ganapathiraju Pramod3, Tom Peatman2, Reg. Watson3, John R. Beddington1,4, Tony J. Pitcher3**

Illegal and unreported fishing contributes to overexploitation of fish stocks and is a hindrance to the recovery of fish populations and ecosystems. This study is the first to undertake a worldwide analysis of illegal and unreported fishing. Reviewing the situation in 54 countries and on the high seas, we estimate that lower and upper estimates of the total value of current illegal and unreported fishing losses worldwide are between $10 billion and $23.5 billion annually, representingbetween11and26 milliontonnes. Ourdataareof sufficient resolutiontodetect regional differencesin the level and trend of illegal fishing over the last 20 years, and we can report a significant correlation between governance and the level of illegal fishing. This paper provides the baseline against which successful action to curb illegal fishing can be judged.

**AFRAMEWORKTOLEARNBEHAVIOURSOFFLAGOFCONVENIENCEFISHINGVESSEL ACTIVITIES**

Flag of convenience (FOC) vessels is a common practice in which vessel owners register their ship in another country other than the ship owners. This policy creates difficulties in enforcing regulations from the owner's company. Mainly, FOC vessels are usually a part of the dark fleet. These vessels are typically invisible to the authorities because they are registered abroad and create problems for management. In fisheries, illegal, unreported, and unregulated (IUU) activitiesoften use FOCvesselsas cover. Typically, the country of origin isunable to track vessels registered as FOCs. Thus third-party information must be acquired to detect FOC interactions with domestic vessels. In this research, with theGlobalFishing Watch providing information on FOCsand along with ourdata aggregation techniques,methodsare developed to detect and monitor FOC vessels conducting activities with domestic vessels and enforce laws to prevent IUU actions.

**SATELLITEMONITORINGPROVIDESADVANTAGEINENDINGILLEGALFISHING**

To find suspected illegal fishers, national authorities have long relied on conventional maritime patrols, which are costly, inefficient, often dangerous, and largely ineffective. After Pew and our partners weighed options for abetter way to end illegal fishing, we turned to the skies. Eyes on the Seas goes well beyond simply using satellites to track vessel movement. Each user, such as a government agency or fishery management body, can tailor the system. For example,users can specifywhich areaof theocean tomonitor and whether toincludevessel data from allboats oronly certain ones. The platform recognizes the telltale patterns of fishing and generates alerts, in near-real-time, when suspicious activity is detected, such as vessels fishing inside a marine reserve or a known illegal operator fishing in an area where it is banned.

**THEOBJECTIVEOFTHEPROJECT:**

Currently, there are very few models or analytics that exist for detecting illegal fishing without the physical search andseizure by law enforcement human resources. Modeling both fishing behavior and the illegal fishing enterprise willexpose the data necessary to model and predict potential illegal fishing activity to focus law enforcement humanresourceson physically searching areaswith ahigherprobability of detecting illegalactivity.By using shipping vesselson board trackers, a methodology has started to be derived for describing typical fishing behavior using data from legalfishers. Multiple institutions are collecting and refining this data as well as developing algorithms to detect illegalactivities. Leveraging their work as a starting point and fusing these and other data sources an effective model can bedeveloped to identify IUU fishing. Even with the available data trying to solve this problem globally is a very difficulttask. It will be important to scope the project to a specific region, potentially targeting only certain fish populations tomake the models more meaningful.

**IMPLEMENTATION:**

We are using linear regression to train the data which in turn uses ensembling learning. Linear regression is one of the easiest and most popular Machine Learning algorithms. It is a statistical method that is used for predictive analysis. Linear regression makespredictionsfor continuous/realor numericvariablessuch as **sales,salary,age, product price,**
etc.Alinearregressionalgorithmshowsalinearrelationshipbetweenadependent(y)andoneormoreindependent(y)

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variables, hence called linear regression. Since linear regression shows the linear relationship, which means it findshow the value of the dependent variable is changing according to the value of the independent variable.

**Algorithm:** Random Forest is a popular machine learning algorithm that belongs to the supervised learning technique. ItcanbeusedforbothClassificationandRegressionproblemsinML.Itisbased ontheconcept of **ensemble learning,** which is a process of combining multiple classifiers to solve a complex problem and improve theperformance of the model.

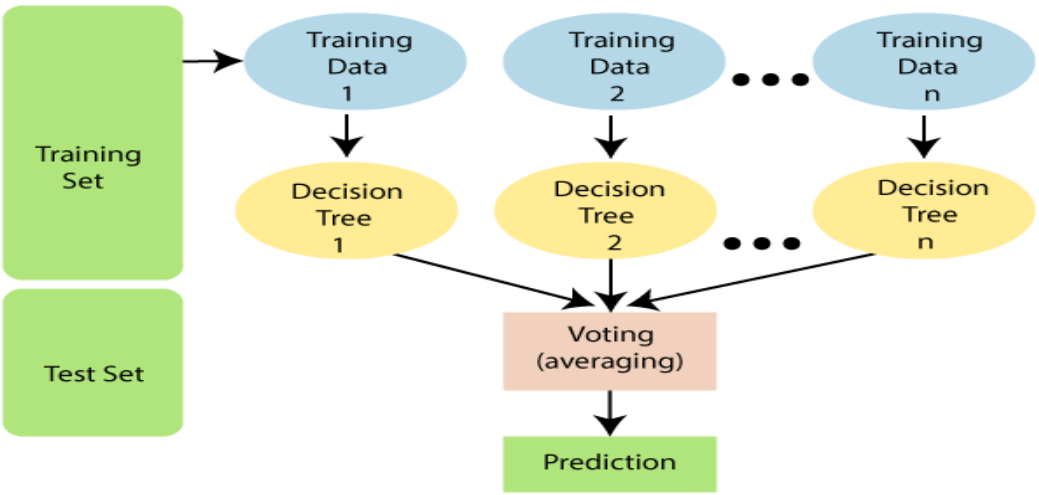
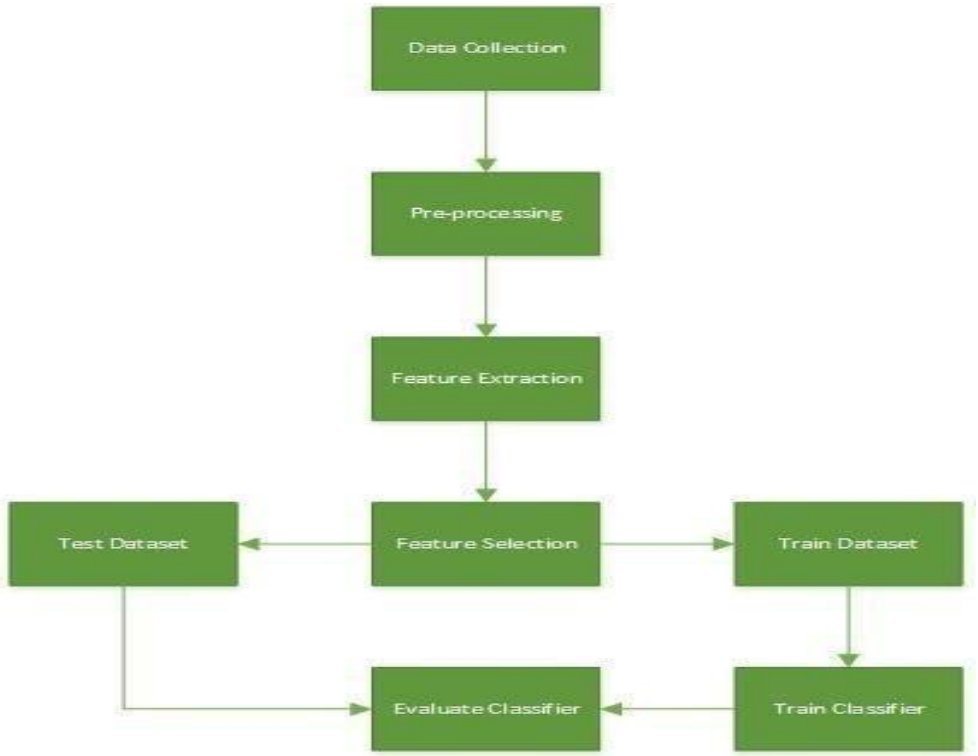



**Fig:workingoftherandomforestalgorithm**

**Workingofthe algorithm:**
**Step-1:**SelectrandomKdatapointsfromthetrainingset.
**Step-2:**Buildthedecisiontreesassociatedwiththeselecteddatapoints(Subsets).
**Step-3:**ChoosethenumberNforthedecisiontreesthatyouwantto build.
**Step-4:**RepeatStep1&2.

**Stepsinvolved:**



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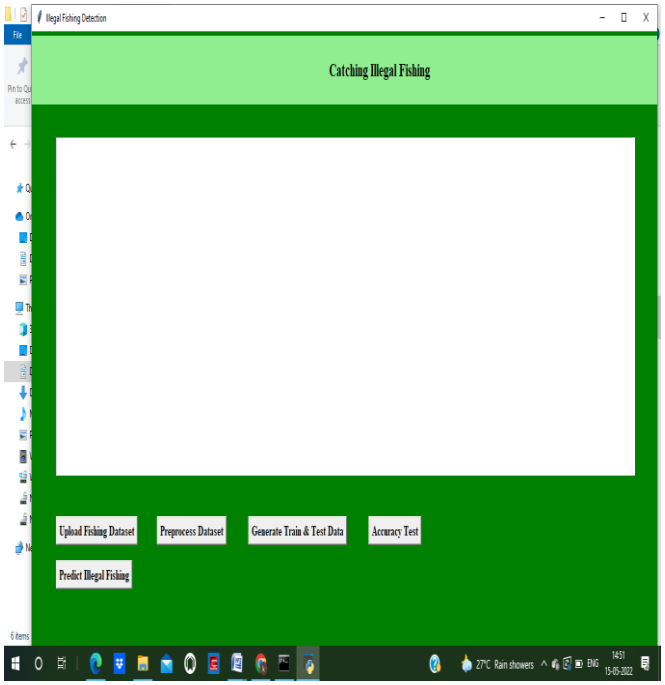
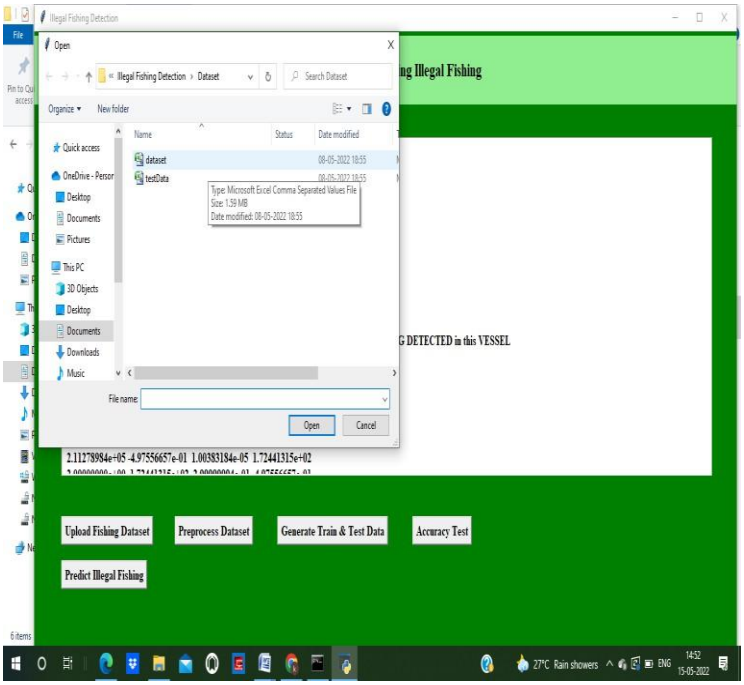
The above steps are the process that is involved in the development of the system. Initially, the dataset is collected, and it is then made to undergo processing and feature extraction. Then the data is trained into the system by using the random forest classifier. Therefore, whenever the test data is given to the system, it checks selected features of the data with the trained feature by
testingusingthesameclassifierusedbefore.Theapplicationuses80%datasetfortrainingand20%fortesting.

**RESULTS:**




Intheabovescreen,wehavetoclickonthe'UploadFishingDataset'buttontouploadadataset




In the above screen,I am selecting and uploading the 'dataset.csv'file and then clicking on the 'Open'button to load the dataset and to get the below screen

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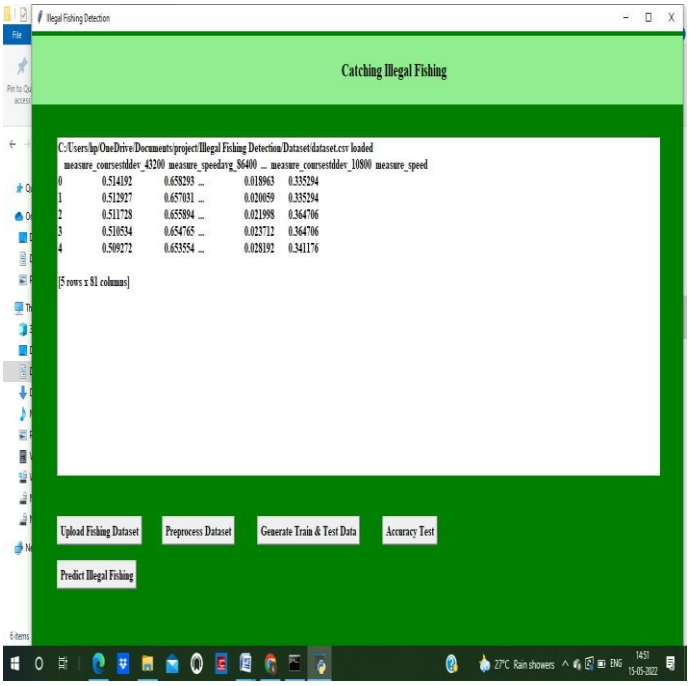
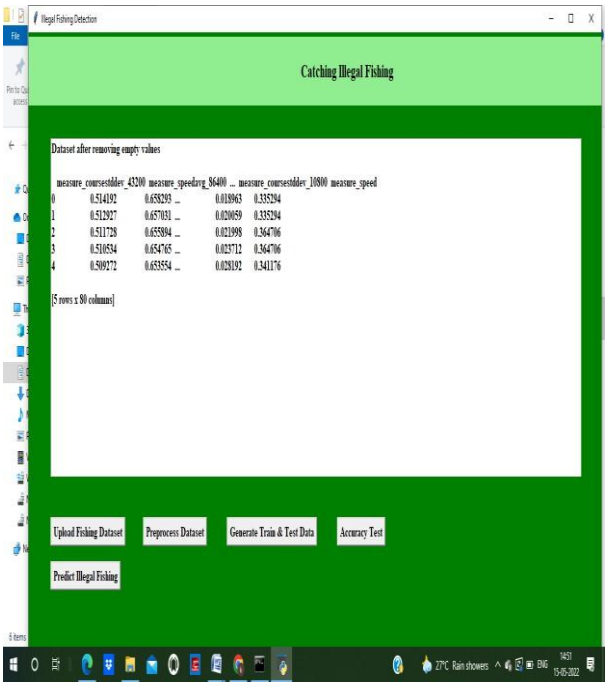



In the above screen, we can see the dataset loaded and I am displaying a few records from the dataset in the text area in the above graph I am displaying several normal fishing records and the number of illegal fishing records. In the above graph, the x-axis represents class label values 0 and 1 (where 0 means normal fishing and 1 means illegal fishing) and the y-axis represents the count of records in that class label. Now click on the 'Preprocess Dataset' button to replace empty values with 0




In the above screen, all empty values in the dataset are replaced with 0 and the dataset is ready now click on the 'Generate Train & Test Data' button to split the dataset into training and testing where the application used 80% of the dataset for training and 20% for testing.

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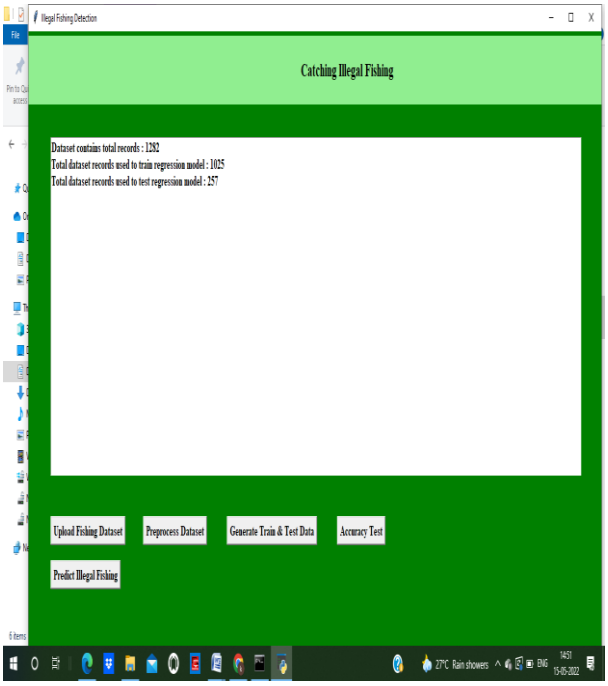
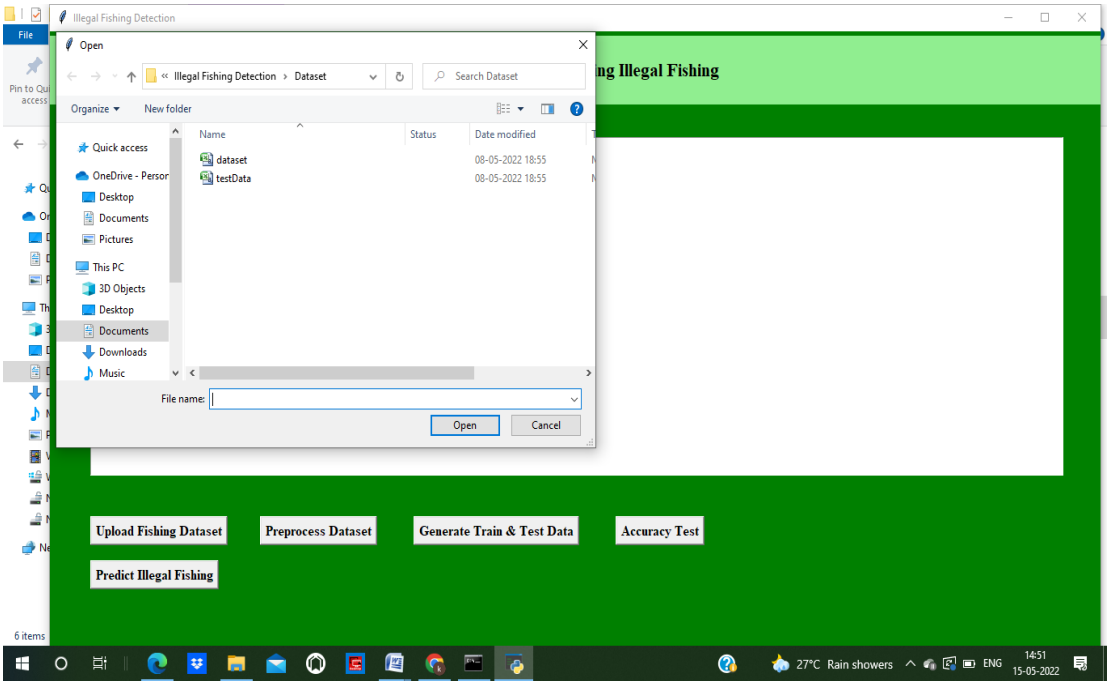



In the above screen, the dataset contains 1282 records and applications using 1025 records for training and 257 records for testingnow trainand test data isreadynow clickon the'Accuracy Test'button totrainregression withabout dataset and then calculate prediction accuracy on the test data

In the above screen, we got 84% accuracy for test data using the regression model now click on the 'Predict Illegal Fishing' button to upload test data, and then the regression model will predict whether the test data is having normal or illegal fishing




In the above screen select and upload the 'testData.csv' file and then click on the 'Open' button to load the test data and to get the below result

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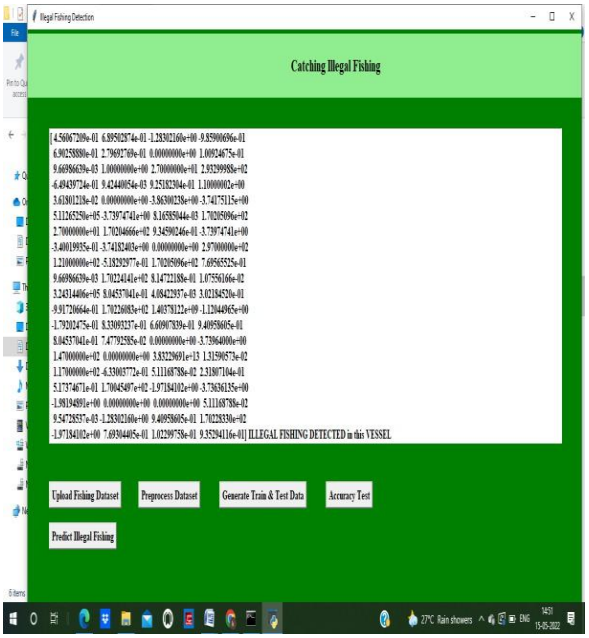
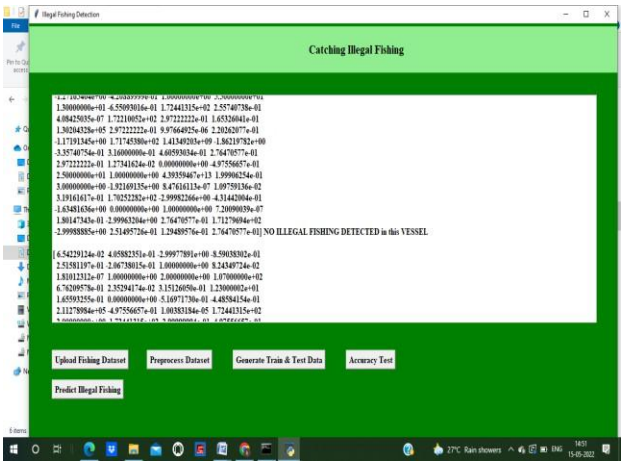



In the above screen in the square bracket, we can see vessel test values and after the square bracket, we can see prediction results as 'ILLEGAL FISHING DETECTED in this VESSEL' or 'NO ILLEGAL FISHING DETECTED in this VESSEL'. You can scroll down above the screen text area to view all records.




In the abovescreen for thesecondvessel, we got thepredicted result as 'No Illegal Fishing Detected'and youcan scroll down the above text area to view all results.

## CONCLUSION:

Our project concludes that It is our responsibility to protect our seafood and to keep many fishes alive. IUU fishing is one of the many to improve our fishing resources around the world and secure the health of our oceans. Now IUU's latest technology is used to monitor the vessel's location, their course, and records every detail of the vessel which enters the oceans. By the use of our project, we protect the unreported fishing and can find illegal fishing vessels. By mear of SAR satellite, we can continuously monitor the geographical location and can record every detail. to keep monitoring such activities even google has formed the GFW (Global fishing watch) utilizes all the activities to stopsuch illegal activities. So employing all this, we can reduce unreported, illegal fishing

As the system detects the region where the illegal fishing is being done, the law enforcement team does not need tovisit every major harbor for investigation and they can easily catch the illegal fishers within a less time using this system. Thereby it reduces their time of investigation and they do not need to waste their as in the manual process.

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