Project Write-Up / Synopsis

1.	**Project Reference No.:** 46S_BE_0321
2.	**Title of the Project:** A PLANET SPY : FRAMEWORK FOR INSPECTION OF NATURAL CALAMITIES USING SATELLITE IMAGES
3.	**Name of the College:** JAIN COLLEGE OF ENGINEERING & TECHNOLOGY, HUBBALLI
4.	**Name of the Department:** COMPUTER SCIENCE AND ENGINEERING
5.	**Theme (as per KSCST poster):** A NEWER TECHNIQUES IN AIR POLLUTION CONTROL.
6.	**Name of project guide:** Name: Prof. TRUPTI THITE Email id: truptighatikar@gmail.com Contact No: 8660421075
7.	**Name of Team Members:** 1. Name: ANANDA VAISHNAVI USN No.: 2JH19CS006 Email id: anandavaishanvign@gmail.com Mobile No.: 7019304359  2. Name: KSHITEESH JAMADAR USN No.: 2JH19CS027 Email id: kshitrj@gmail.com Mobile No.: 87621 91369  3. Name: KAVYA PATTANASHETTI USN No.: 2JH18CS029 Email id: pattanashettikavya@gmail.com Mobile No.: 9380663177 

8.	**Team Leader of the Project:** **Name: ANANDA VAISHNAVI** **USN No.: 2JH19CS006** **Email id: anandavaishanvign@gmail.com** **Mobile No.: 7019304359**
9.	**Keywords: Natural calamities, CNN,Deforestation detection, forest fire detection**
10.	**Introduction/Background:** **The project presents A Planet Spy : Framework for planet inspection using satellite images using image processing techniques for automated vision systems used at Geo-Locations Area. In satellite imaginary research of automatic natural calamities detection is essential in monitoring large areas, and thus automatically detects. For this approach, automatic classifier CNN will be used for classification based on learning with some training samples of that to category. Finally, the simulated result shows that a used network classifier provides minimum error during training and better accuracy in classification.**
11.	**Objectives of the project:** 1. **To classify the natural calamity using CNN Classifier.** 2. **To detect the natural calamity using CNN method..** 3. **Compare the accuracy of the classifier with other conventional methods.**

12. Methodology:

1) Flow Chart

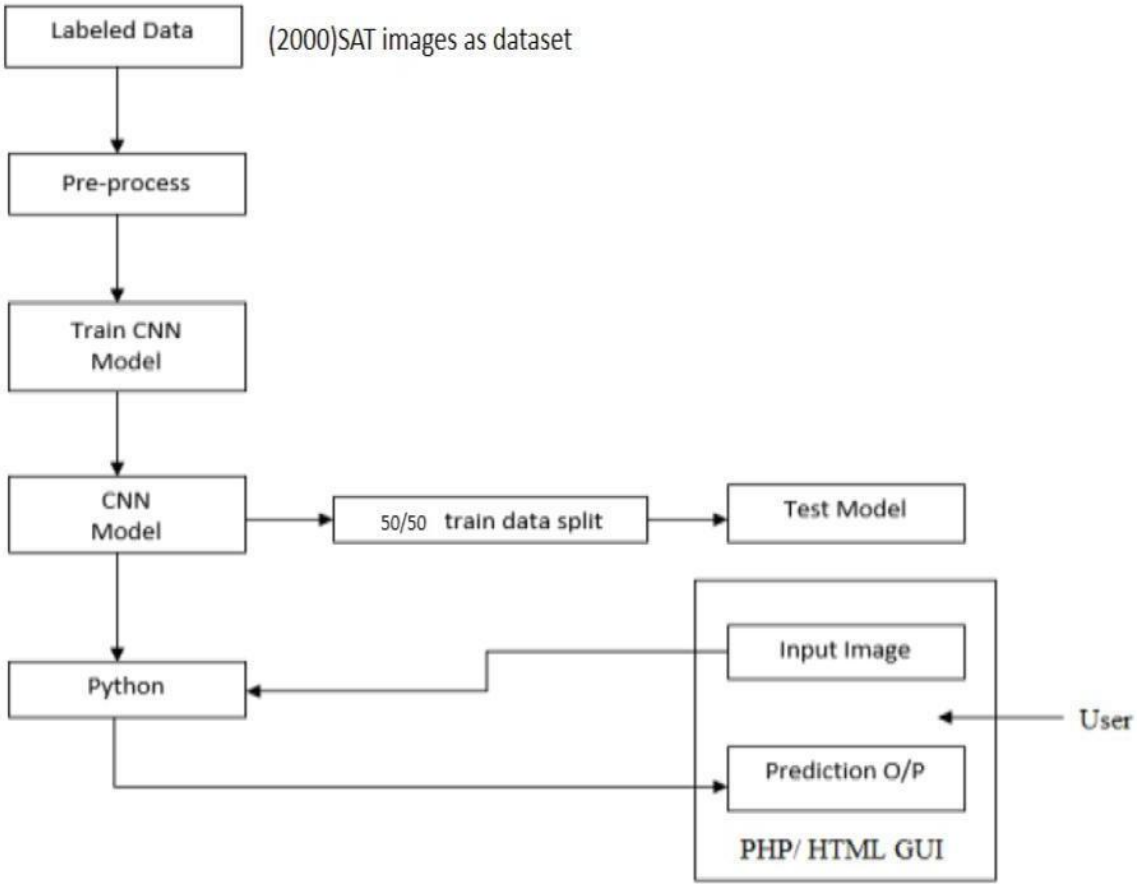


Fig 1: Block Diagram of the System

CNN architecture consists of two broad sections such as feature learning and classification section. In general, the satellite images feed into an input layer and end with an output layer. The hidden layer consists of different layers. Here, a satellite image and the output will be the class name of such an image also called the label of satellite Image In general, for this proposed architecture, each images with addition of neurons are augmented with considerable weights. Output of the augmentation process to the upcoming layers area processed and duplicated to next layer. Output layers show the prediction tasks for calculating neurons for this research.

Use Case block diagram:-

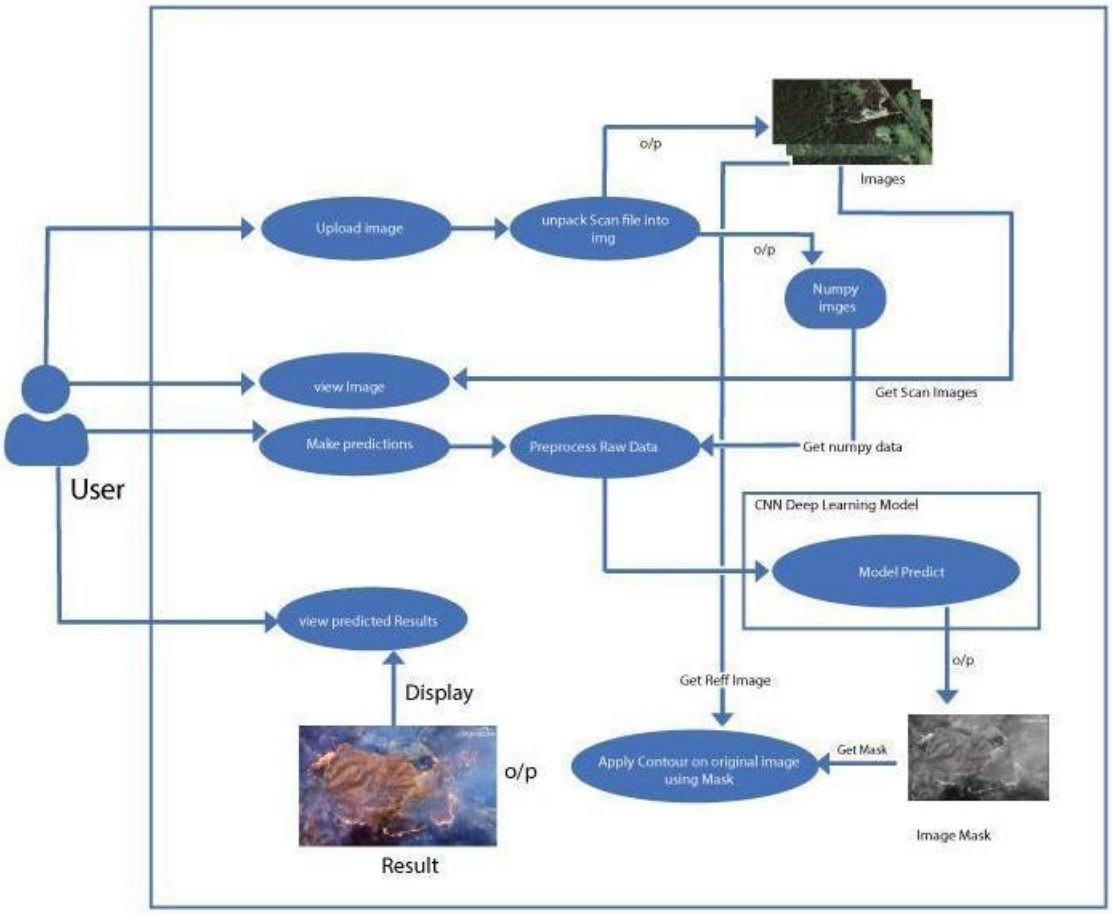


Fig 2:Use case block diagram

13. Results:

To analyse the performance of the model, the last result is achieved using parameters such as K-fold cross-validation using 10 folds. RGB-coloured image dataset with augmentation provides 15% best performance for the model. The researchers used the transferred learning

CNN model and the grayscale dataset achieved 93.5% accuracy. However, colour is the main and most decisive feature in detection and classification; therefore, using a coloured dataset takes a long time to train the model to add performance even if it is a complex layer. The number of epoch with 500 iterations and the Adam optimization method is very significant to

boost the model performance by 10% and 5.2%, respectively. In the end, this developed CNN model achieves 93.5% , which are correctly classified. Additionally, the researcher has used different pre-processing techniques for noise removal. The main factors for the

misclassification of the result. 'The overall performance of the model, as shown in the confusion matrix, is 93.5% accurate'

Fig 3:Training accuracy and validation accuracy of the model

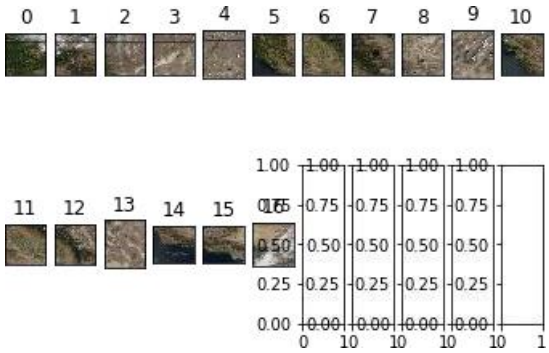


Fig4:Training loss and validation loss of the mode

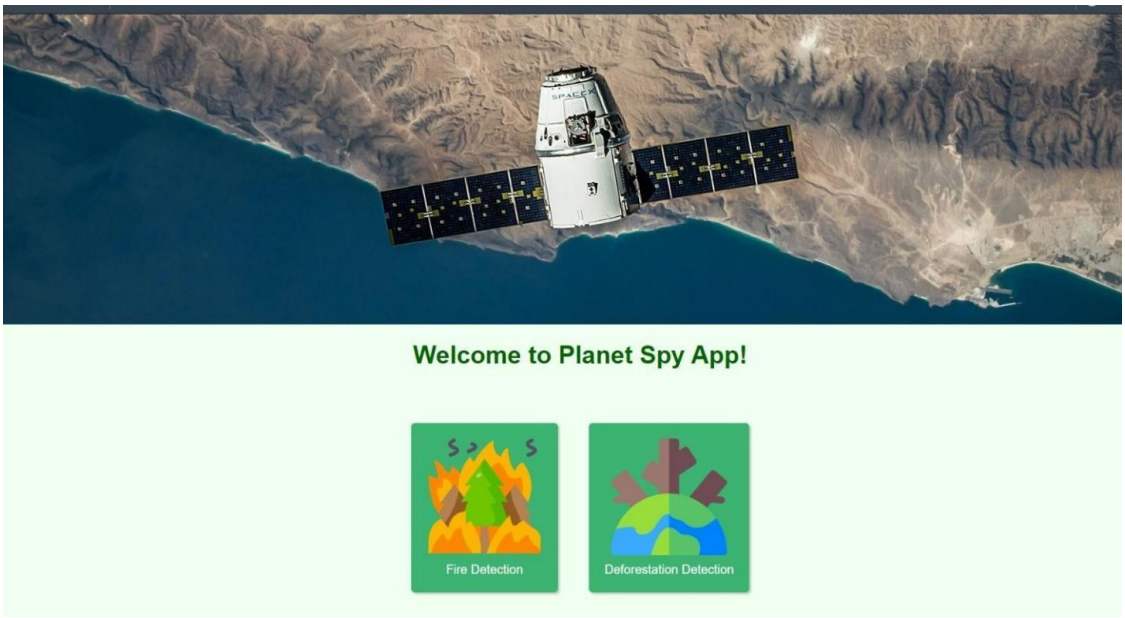


Fig 5: User interface of the application

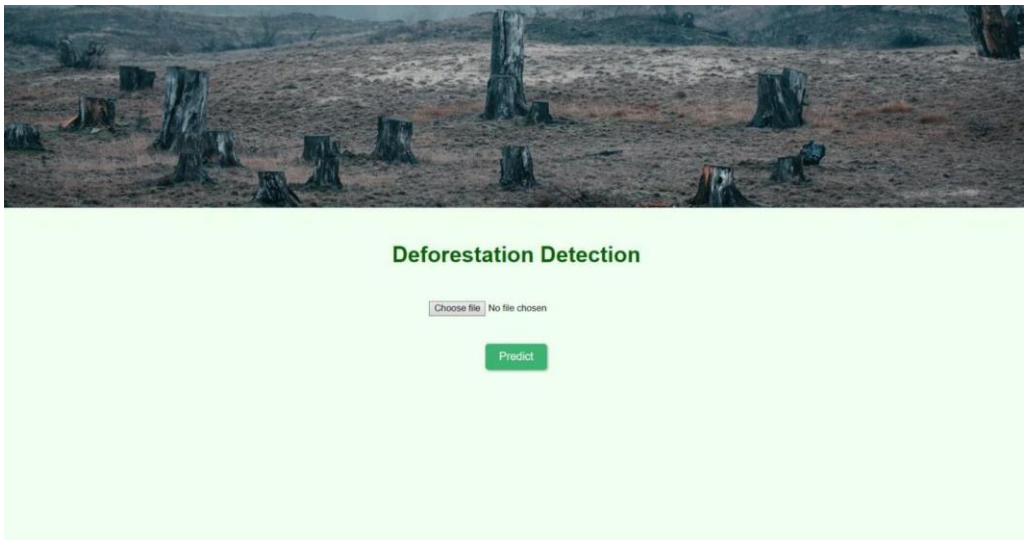


Fig 6: UI for Deforestation Detection

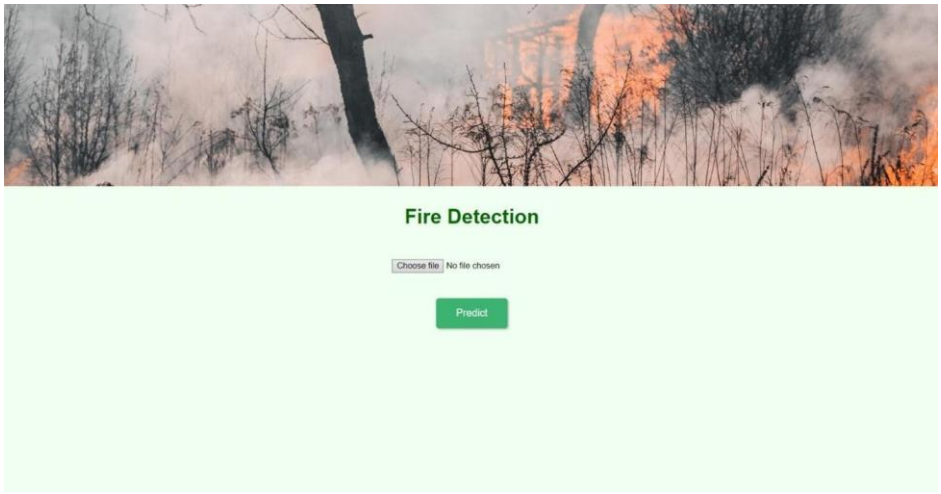


Fig 7: UI for Fire Detection

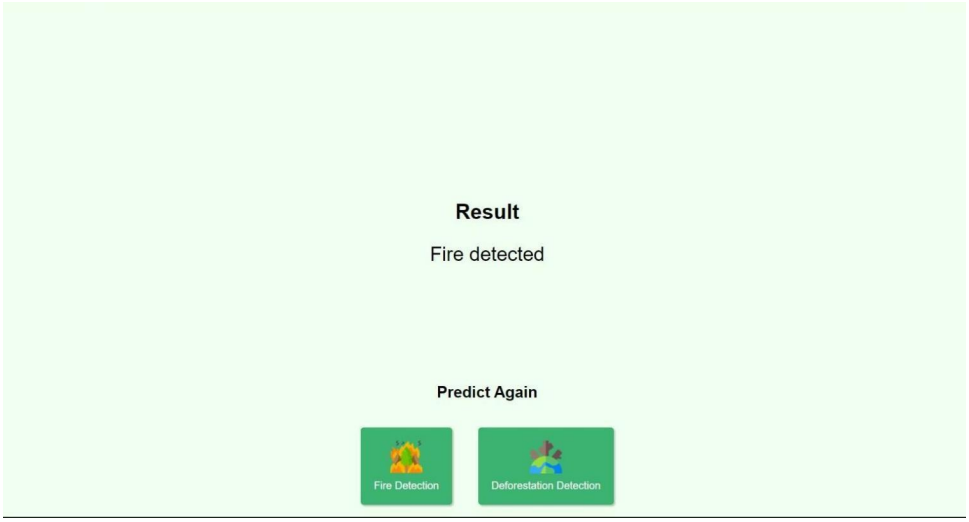


Fig 8: Result of Deforestation Detection

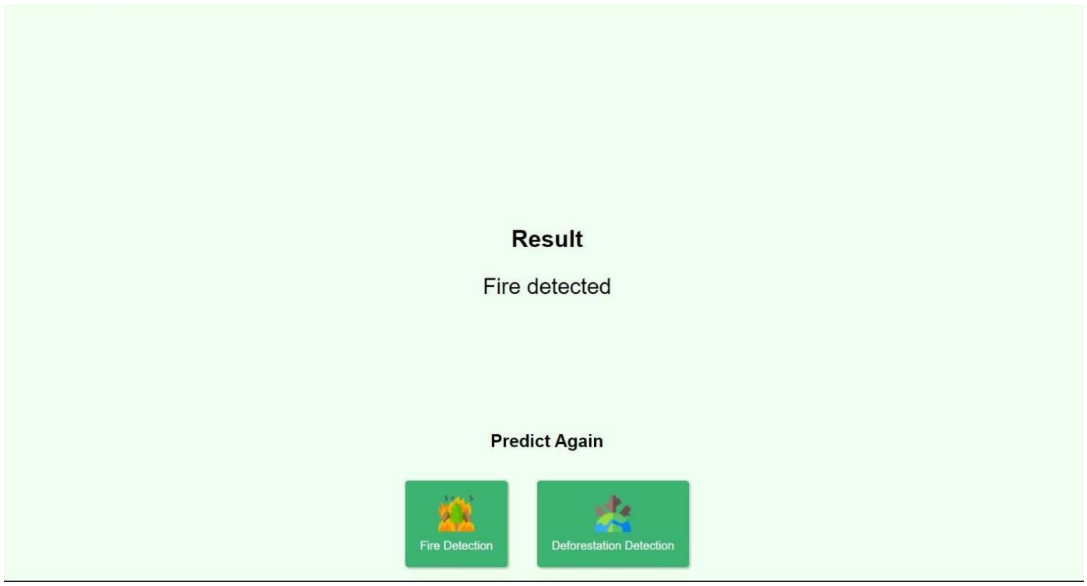


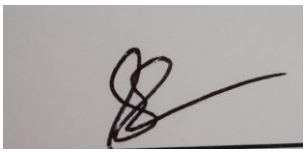
Fig 9: Result of Fire Detection

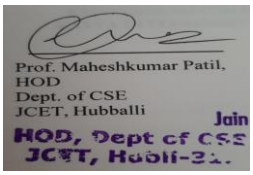
14. Conclusion:

This deep learning-based model was implemented using Python and Keras dataset, and Jupyter was used as a development environment. Different experiments have been undergone in this research study to get an efficient model by customizing various parameters such as

	dataset colour, number of epochs, augmentation, and regularization methods. RGB-coloured image dataset with augmentation provided 15% best performance for the model. The numbers of epoch and regularization methods are very significant to boost the model performance by 10% and 5.2%, respectively. The proposed prototype has achieved the highest efficiency of 93.5% for identifying inspection of natural calamity. Developments of such automated systems are used to assist the meteorologist and experts to identify calamity more accurately. Obtained results evidence that the designed system for the farmers are much helpful in order to reduce the complexity, time, and cost.furthermore, same approach can be used to deduce various other calamities along the same model.
15.	**Scope for future work:** **This study leaves a wide scope for future investigations.** **1. Enhanced accuracy: As Convolutional Neural Networks (CNN) and satellite imaging technology evolve, the future scope of natural disaster identification is predicted to improve significantly.** **2. Early warning systems: By combining CNN-based natural disaster detection algorithms with satellite imagery, early warning systems can be created.** **3. Rapid response and resource allocation: Natural disaster detection using CNN offers faster response times and more efficient resource allocation.** **4. Better disaster management and preparedness: Using CNN and satellite imagery to detect natural calamities improves disaster management and preparedness.** **5. Climate change monitoring is included in the future application of natural disaster detection using CNN and satellite pictures.**

Jain College of Engineering & Technology, Hubballi-580032.





Prof. TRUPTI THITE

Email id: truptighatikar@gmail.com
Contact No.: 8660421075

Prof.MAHESHKUMAR PATIL

Email id: jcethbl.hodme@gmail.com
Contact No.: 7204113920