Face Liveness Detection Using Machine Learning

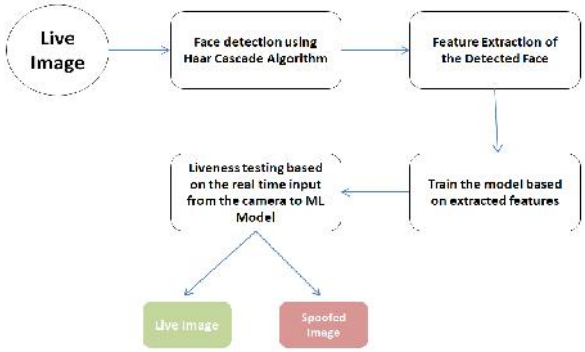
Ankita Londhe[1], Pallavi Shinde[2], Kanchan Marne[3], Prasanna Dangat [4]
[1, 2, 3, 4] Dept of Computer
[1, 2, 3, 4]RMD Sinhgad College Of Engineering

Abstract- *It should mainly include introduction, motivation,outcome and innovation if any. they even have a photo or video on their smart phone that they could hold up to the camera responsible for performing face recognition .*

Keywords- Biometric system,SVM(support vector machine), GLCM (Gray Level Co Occurrence Matrix), Feature Extraction, Haar Cascade Algorithm, Grdient Boost classifier.

I. INTRODUCTION

It helps to significantly raising the level of difficulty of spoofing attacks.It has all the potential to enhance security, reliability and effectiveness of biometric system and protect against unauthorized access. We can use on live things like Bank, Financial industry. We can implementation different biometric-like fingerprint, eye iris. In liveness detection, to avoid the spoofing attack, an antispoofing feature that depends on blinking of eyes, moment of lip, and someother facial expressions are considered. We provide the system which denied unauthorized access.In era of internet social media based communications for individual became fast and easy, which brings a simpler communication(interaction) with individuals, but incorporates numerous security threats. The one of these is transferring and sharing photographs of yourself with the entire world on the web. Anybody, on the web without much stretch can access or download and print photographs



1.Haar Cascade algorithm.

Detecting the faces from the live images based on the Line feature descriptors.Harr Cascade is uses Object Detection Algorithm, to identify faces that is image or a real time video. The algorithm uses edge and line detection features for checking liveness of captured image. It is model stored in xml file and then read using open cv methodology. This algorithm includes face detection,eye detection, for head detection, edges of faces, upper and lower part of face. There are different types of detected features

1) Edge Features
2) Line Features
3) Four Rectangle Features.

Harr Cascade detect two types of images first one is positive image in that all features are detected for the identifying the liveness of the image and anther one is the negative image in that it not perfectly captured the image in that all features are not get captured.

There are 4 steps to perform Harr cascade algorithm

1) first, it calculate the harr featured from the captured images
2) then it creates the internal images it means that it not go for computing each pixel if the image instead that it go from the ares that the pixels get captured in the RGB Format.
3) According to that it classifies the picture on the basis of strong classifier and the weak classifier. Strong classifier gives the most of the harr features that they want to do prediction for the image spoofing.
4) Then according to he cascade result it dives the feature data to classifier for further work.

2.Hand crafted feature extraction –

Extracting the required features using mathematical formulas like luminance, skewness, etc.

3.GLCM(gray level cooccurance)

1) Spatial relationship of pixels is the gray-level co-occurrence matrix
2) Extracting statistical measures from this matrix.
3) Statistics inferred from the GLCM Matrix :
   - Contrast

- Correlation
- Energy
- Homogeneity

4) These features helps to identify the various properties of the image and recognize the objects within it purely.

4. Gardient Boosting Algorithm -

Gardient Boosting Algorithm is basically used for the classifies the data into different condition with the help of decision tree classifier.In this algorithm the features we are extracted from the harr cascade algorithm and the GLCM Algorithm it get classifies using decision tree modelwhich uses random forest Gradient boosting algorithm combines many weak leaner model together and create the predictive model for the machine learning. Gardient boosting is used because it effectively classifies the complex dataset. Gardient boosting is used to cover Regression, Classification and ranking of the data. It uses the predefined configuration for the regression and classification. In Face detection it first classifies the features which is available in the dataset of xml file. Then according to the train and test model it classifies the features and the ranked the features to the set values of the test data. in liveness detection it is important the threshold value that decides that the captured image is the live or fake. It matches the classifier data with the train module it the help of the decision tree classifier. It Divides the data into the trained and test dataset according to module or features that they were captured. Then it combine the individual model prediction result for prediction. Then after it combines all result for the accurate prediction.

VI. CONCLUSION

The real challenge of Object Detection in Camouflage can be overcome using the discussed techniques efficiently. Features being extracted can be used to classify the foreground and background. The use/contribution of 2DWT plays pivotal rolein object detection as it provides the foremost information about the object. Machine Learning can help to predict the accurate results about the object detection

VII. FUTURE SCOPE

Our biometric facial data can be easily stolen from social sites and other personal websites. Most common attack on face recognition system is the photograph attack i.e. placing photographs in front of camera Due to less accuracy, more and diverse liveness samples needs to be collected which can be a great challenge every time, especially for spoofs in 3D masks and wax figures Cannot portray various races, ages, and facial expressions and on developing effective features that can address a wide range of spoofing scenario.

REFERENCES

[1] Xiaoxiao Sheng, Yungang Liu, Huijun Liang, Fengzhong Li, Yongchao Man, "Robust Visual Tracking via an Improved Background Aware Correlation Filter", Access IEEE, vol. 7, pp. 24877-24888, 2019.

[2] Shilpa Gite, Himanshu Agrawal, Ketan Kotecha, "Early anticipation of driver’s maneuver in semi autonomous vehicles using deep learning", Progress in Artificial Intelligence, 2019.

[3] George Mathew, "The Challenges and Solutions for Building an Integrated Video Analytics Platform", Information Reuse and Integration (IRI) 2017 IEEE International Conference on, pp. 427-435, 2017.