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Real-Time Human sensation Recognition Based On Facial Expression Detection Using Softmax Classifier

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ABSTRACT

Now-a-days with the continued development of artificial intelligence facial emotion recognition has become more popular. The emotion recognition plays a major role in interaction technology. In interaction technology the verbal components only play a one third of communication and the nonverbal components plays a two third of communication. A facial emotion recognition (FER) method is used for detecting facial expressions. Facial expression plays a major role in expressing what a person feels and it expresses inner feeling and his or her mental situation or human perspective. This paper aims to identify basic human emotions with the combination of gender classification and age estimation. The facial emotions such as happy, sad, angry, fear, surprised, neutral emotions are considered as basic emotions. Here proposes a real time facial emotion recognition system based on You Look Only Once(YOLO) version 2 architecture and a squeezenet architecture. The yolo architecture is a real time object detection system. Here it used for identify and detect faces in real time. These images are captured by using anchor boxes for accuracy. The second architecture is squeezenet and is used for gender classification

1. INTRODUCTION

A face detection includesclassifying

classes: one with faces (targets), and other containing the background (clutter) which needs to be removed.

Commonalities exist between faces, they vary differently in terms of age, skin color and facial expression, this becomes difficult due to this commonality. The further problem is complicated by differing lighting conditions, image qualities and geometries, partial occlusion and disguise is also a possibility. A face detector should be able to detect the presence of any face under different set of lighting conditions in any background condition. The face detection analysis can be broken into two tasks. The first task is a classification task that takes some random regions of image as input and outputs a binary value of yes or no, indicating if there are any faces present in the image. The other task is the face localization task which is to take an image as input and output the location of any face or faces within that image as some bounding box/boxes with (x, y, width, height). Smart robots can be built by automatic facial expression application. These bots can be used in various applications like interactive games and service center There are six universal expressions according to Ekman they are fear, disgust surprise, anger, sadness and happiness. Face variances can be observed to recognize these expressions. For example, we can say a person is happy which can be identified as a gesture of smile by tightened eyelids and raised lips corners. A person's internal states, social communication and intentions are indicated by change in facial expressions. Many applications in many areas like human emotions analysis, natural Human computer interaction, image retrieval and talking bots have a large effect on them by automatic facial expression detection. Face Recognition with Histogram of Oriented Gradients using CNN detection has been an impacting issue in the technological community as human beings find facial expressions one of the most natural and powerful means to express their intentions and emotions. The last stage of the system is facial expression detection

2. SYSTEM ANALYSIS

2.1 EXISTING SYSTEM:

Emotion recognition plays a major role in interaction technology. In interaction technology, the verbal components only play a one-third of communication and the nonverbal components play a two-third of communication. A facial emotion recognition (FER) method is used for detecting facial expressions. Facial expression plays a major role in expressing what a person feels and it expresses inner feelings and his or her mental situation or human perspective predict whether they are fraudulent or not.

2.2 PROPOSED SYSTEM:

This paper aims to identify basic human emotions with the combination of gender classification and age estimation. The facial emotions such as happy, sad, angry, fear, surprised, neutral emotions are considered as basic emotions. Here proposes a real time facial emotion recognition system based on You Look Only Once (YOLO) version 2 architecture and a squeeze net architecture. The Yolo architecture is a real-time object detection system. Here it is used to identify and detect faces in real-time. These images are captured by using anchor boxes for accuracy. The second architecture is the squeezenet which is used for gender classification and age estimation. It provides significant, accurate object detection and extracts high-level features that help to achieve tremendous performance to classify the image and detecting objects. Both architectures provide more accurate results than other methods with the large no of hidden layers and crossvalidation in the neural network.

3. SYSTEM REQUIREMENTS

3.1HARDWARE REQUIREMENTS:

- System: Pentium Dual Core.
- Hard Disk : 120 GB.
- Monitor: 15'' LED
- Input Devices: Keyboard,

Mouse • Ram: 1 GB

3.2SOFTWARE REQUIREMENTS:

- Operating system : Windows 10
- Coding Language : python
- Tool: PyCharm
- Database : MYSQL
- •Server :

Flask

1. a non-parametric classification method that assigns labels to samples based on their proximity to the k-nearesttraining examples. K-nearest neighbour can be effective in detecting fraud by considering the similarities between transactions.
2. **Imbalanced data handling:** Address the imbalanced nature of credit card transaction data by employing
3. techniques such as oversampling, undersampling, or hybrid approaches. These techniques aim to balance the representation of the minorityclass (fraudulent transactions) to avoid bias towards the majority class.
4. **Feature engineering and selection:** Perform feature engineering to extract meaningful information from the credit card transaction data. Select relevant features that have a significant impact on distinguishing between fraudulent and legitimate transactions. Feature engineering techniques can include statistical measures, transaction metadata, and behavioural patterns.
5. **Model evaluation and optimization:** Evaluate the performance of the fraud detection system using appropriate evaluation measures such as precision, recall, F1- score, and area under the ROC curve (AUC-ROC). Optimize the hyperparameters of the
6. random forest and k-nearest neighbor algorithms to achieve the best possible performance.
7. **Adaptability to new fraud patterns:** Implementmechanisms to monitor and

detect emerging fraud patterns. Update the model periodically using new data to ensure that thesystem can adapt to evolving fraud techniques and maintain its effectiveness over time.

8. **Real-time or near-real-time processing:** Design the system to process credit card transactions in real-time or near- real-time to enable timely detection and prevention of fraudulent transactions. This
9. involves optimizing the computational efficiency of the algorithms and ensuring efficient data processingpipelines.
10. **Visualization and reporting:** Provide visualizations and reports to present the results of the fraud detection system. This includes visualizing the classification outcomes, highlighting suspicious transactions, and generating comprehensive reports for stakeholders.
11. **Integration with existing systems:** Design the project to integrate seamlessly withexisting card payment systems or fraud detection systems, ensuring smooth deploymentand operation within theexisting infrastructure.

3. PROTOTYPE EVALUATION:

In credit card fraud detection, we frequently deals with highly imbalanced datasets. For the chosen dataset from Kaggle, we shows that our proposed algorithms are able to detect fraud transactions with very high accuracy and low false positive rate. Hence for better performance, our result shows that classification of algorithms done by preprocessing data rather than raw data. Because of applying preprocessing technique and K-Means algorithm on the dataset, output of algorithms is with high accuracy and give best results. Hence comparison was done and it was concluded that K-Nearest Neighbour gives the best results. This was established using accuracy, precision and recall. Balancing of dataset and feature selection is important in achieving significant results. In future, to enhance the system, other machine learning algorithms or artificial neural networks approaches can be used to detect frauds in credit card.

In this study, we created a unique

fraud detection technique that groups clients according to their transactions. and analyse behaviour to create a profile for each cardholder. Following the application of various classifiers to three distinct groups, rating scores are produced for each type of classifier. The system adapts as a result of these dynamic changes in the parameters. Prompt response to new cardholder's transactional behaviours. A feedback system is then used to address the issue of notion drift. We The Matthews Correlation Coefficient was shown to be the superior metric for handling imbalance datasets. It wasn't only MCC. solution. We attempted to balance the dataset by using SMOTE and discovered that the classifiers were performing better than before. The use of oneclass classifiers, such as one-class SVM, is an alternative method for addressing imbalance datasets. Finally, we found that the algorithms that produced the best outcomes were random forest, decision tree, and logistic regression.

4. CONCLUSION:

Payment card fraud is a massive problem for the Banking sector.

Hence, an effective fraud detection system for card payments is needed by any bank or financial institution to reduce the damages caused by fraudulent activities. In this research, we assumed that deviation from the normal behaviour of the cardholder could serve as the basis for fraud detection. Our experiments showed that the calculation of the similarity between existing transactions in a cardholder's profile and test transactions could be used for the efficient detection of payment card frauds. Moreover, our results showed that recent transactions exert considerable influence on evaluations of transactions as fraudulent or legal. We also realized that external causes such as a change in income and lifestyle of a cardholder might change cardholders' spending habits over time. Tree ensembles (such as dynamic random forests, random forests, gradient boosted trees, etc.)

5. FUTURE SCOPE:

Future enhancements for a

costsensitive card fraud detection system based on Random Forest and k-nearest neighbour (KNN) algorithms can focus on improving various aspects of the system's performance, functionality, and adaptability. Here are some potential areas for future enhancement:

Featu reEngineering:

Explore advanced feature engineering techniques to enhance the representation of transaction learn signals from both classes due to their hierarchical structure and have become very popular in solving problems with imbalanced data such as payment card fraud detection. Also, the use of DRF algorithm is appropriate when thereare many input features, and it is known as an accurate and fast learning algorithm that runs efficiently on large datasets. We used DRF to reexamine suspicious transactions and to prevent the occurrence of false positives. Our research results confirmed the effectiveness of DRF in payment card fraud detection.

data, including temporal features, aggregated features, and behavioural patterns.

Incorporate external data sources, such as customer information, geographical data, or device information, to augment the fraud detection capabilities.

Ensemble Methods:

Investigate the use of ensemble methods, such as stacking or boosting, to combine the predictions of multiple Random Forest and KNN models. Ensemble methods can potentially improve the overall performance by leveraging the strengths of different models and reducing individual model biases.

Deep Learning Approaches:

Explore the use of deep learning models, such as deep neural networks or recurrent neural networks, to capture complex patterns and dependencies in transaction data. Deep learning models have shown promising results in various domains and may provide additional insights and accuracy for fraud detection.

Online Learning and Adaptive Systems:

Develop an online learning framework that can continuously update and adapt the fraud detection models as new data arrives. Implement adaptive systems that can dynamically adjust the model's parameters and thresholds based on evolving fraud patterns and changing business requirements.

Explainability and Interpretability:

Enhance the system's explainability and interpretability by incorporating techniques such as feature importance analysis, model interpretability algorithms, or generating human-readable explanations for the system's decisions.

This can help build trust and understanding in the system's frauddetection capabilities.

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