



STGI

HACKATHON

TEAM -> NULL-VECTOR

IMAGE FORGERY DETECTION MODEL

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INTRODUCTION

- Implemented an image forgery detection system using a Convolutional Neural Network (CNN) architecture
- We utilized a pre-trained MobileNetV2 model for feature extraction.
- The system also incorporated advanced noise detection techniques and Photo-Response Non-Uniformity (PRNU) extraction to enhance accuracy and reliability in forgery detection.

APPROACH

- **Data Collection and Preparation:** We curated a dataset comprising authentic and forged images, ensuring a balanced representation for effective model training.
- **Model Development:** We implemented a Convolutional Neural Network (CNN) architecture, optimizing it for image forgery detection through various preprocessing techniques and noise analysis.
- **Deployment and Evaluation:** The trained model was integrated into a user-friendly Streamlit application, allowing real-time forgery detection and showcasing its effectiveness through performance metrics.

TECH STACK

- Programming Language: Python
- Deep Learning Framework: TensorFlow, Keras
- Computer Vision Libraries: OpenCV, scikit-image
- Data Manipulation and Numerical Computing: NumPy, SciPy
- Model Serialization: joblib, pickle
- Web Application Framework: Streamlit
- Environment Variables Management: dotenv

UI-UX

Image Forgery Detection

Choose an image...

Drag and drop file here
Limit 200MB per file • JPG, PNG, JPEG

Browse files

WhatsApp Image 2024-09-28 at 12.06.59 PM.jpeg 24.1KB

Uploaded Image.

The image is forged.

The image is forged.

Noise analysis results:

```
{  
    "visual_inspection" : true,  
    "variance" : 5447.049815277664,  
    "stddev" : 73.8041314241802,  
    "sobel_edges" : -21.521805824829027,  
    "canny_edges" : 11.13183629119884,  
    "snr" : 1.6600493918085921,  
    "fft_noise_level" : 132.61390389840986,  
    "jpeg_artifacts" : "False",  
    "prnu" : "array([[-0.00470669, -0.00470669, -0.00470669, ..., -0.00470669,  
        -0.00466248, -0.0047509 ],  
        [-0.00470669, -0.00470669, -0.00470669, ..., -0.00466248,  
        -0.00483931, -0.00483931],  
        [-0.00470669, -0.00470669, -0.00470669, ..., -0.0047951 ,  
        -0.00452987, -0.00452987],  
        ...,  
        [-0.00015348, -0.00046292, -0.00077236, ..., -0.00245219,  
        -0.00461828, -0.0047951 ],  
        [-0.00019769, -0.00024189, -0.00046292, ..., -0.00302686,  
        -0.00483931, -0.00466248],  
        [-0.00041872, -0.00019769, -0.00024189, ..., -0.00271742,  
        -0.00457407, -0.00457407]])"}
```

DATASET

- CASIA 2
- Authentic and Forged

DEPLOYED LINK

[Click Here](#)

CONCLUSION

- **Effective Forgery Detection:** The CNN model demonstrated high accuracy in distinguishing between authentic and forged images, proving its effectiveness in real-world applications.
- **User-Friendly Interface:** The integration of the model into a Streamlit application provides an accessible platform for users to upload images and receive immediate feedback on forgery status.
- **Future Improvements:** Ongoing enhancements can include expanding the dataset, refining the model architecture, and incorporating additional features for more robust analysis.

```
if any_question :  
    answer = my_sol(your_question)  
    return answer  
  
else:  
    return ThankYou
```

