

Face Liveness Detection



Contactless
Non-Intrusive
Real-time
Spoof Prevention

Presented By

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Problem Statement



Digitization

Biometric Authentication Systems

Accurate Spoof Detection

Literature Review

IEEE 4th International Conference on Cloud Computing and Big Data Analysis [IEEE]

- active vs passive detection
- solution : color and texture
- problem: lacked face detection and pretreatment methods

Image Analysis of Facial Blood Vessels for Anti-Spoofing of Printed Image and 3D Mask Attacks

- face spoofing detection techniques based on video frames and video sequences
- solution : blood vessel distribution analysis based on color and texture difference
- performed well on printed images and masks but not replayed video attacks

Evaluating liveness by face images and the structure tensor [IEEE]

- categories of attacks; 2D and 3D
- solution : eulerian magnification and SIFT algorithm and SVM classifier

Face Anti-Spoofing based on Color Texture analysis

- challenges include the spoofing attacks such as print attacks, replay attacks
- solution : color-texture analysis with RGB and HSV colorspace

Robust pulse rate from chrominance-based rPPG [IEEE]

- chrominance based rPPG algorithm

Market Size and Growth



*Face Recognition
By 2025*

\$8.5 Billion

*Fraud Prevention
By 2028*

\$66.6 Billion

Our Solution

Active and Passive Liveness Detection

Eye Movement

Color-texture Analysis

Bloodflow Analysis



Workflow

Research

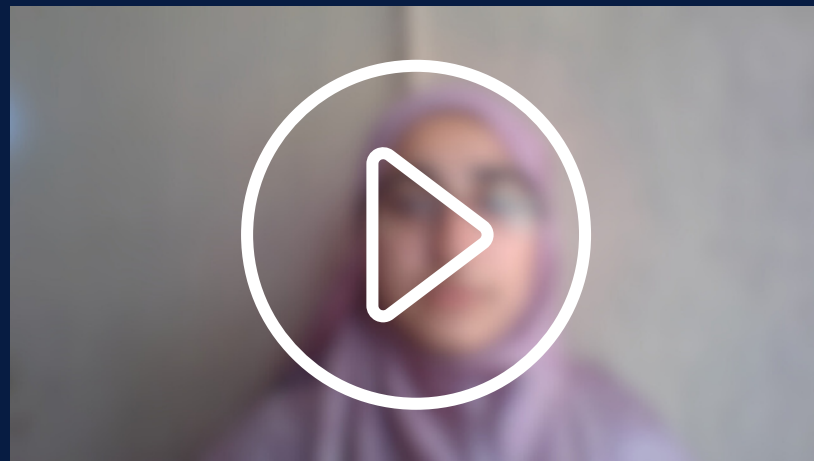
Dataset Collection - *20,000 images* [7,000 real ; 13,000 spoof]

Model Design, Training and Optimization - *3 Models*

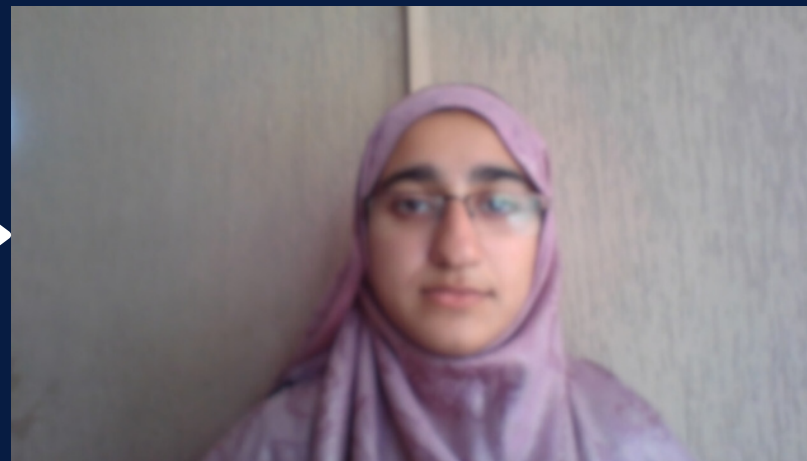
Website Integration

Dataset Processing

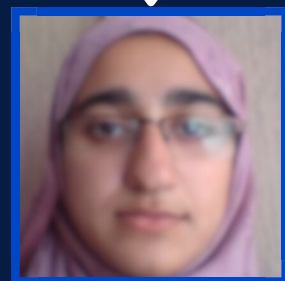
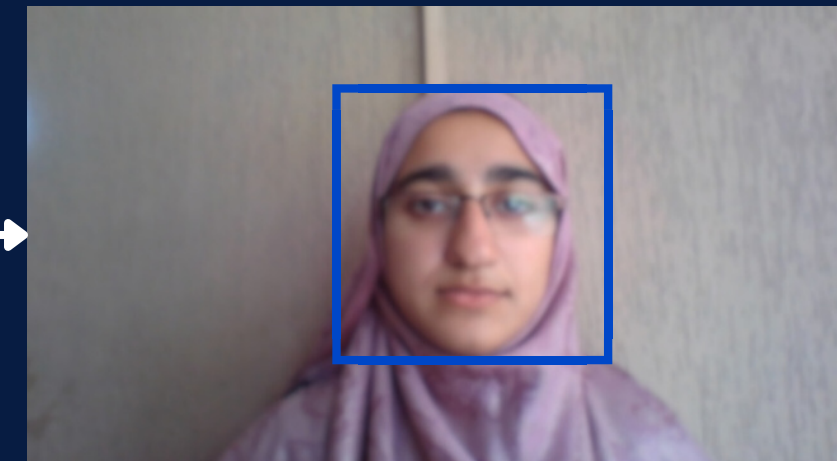
Video Collection



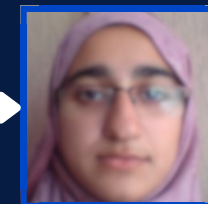
Frame Extraction



Face Detection



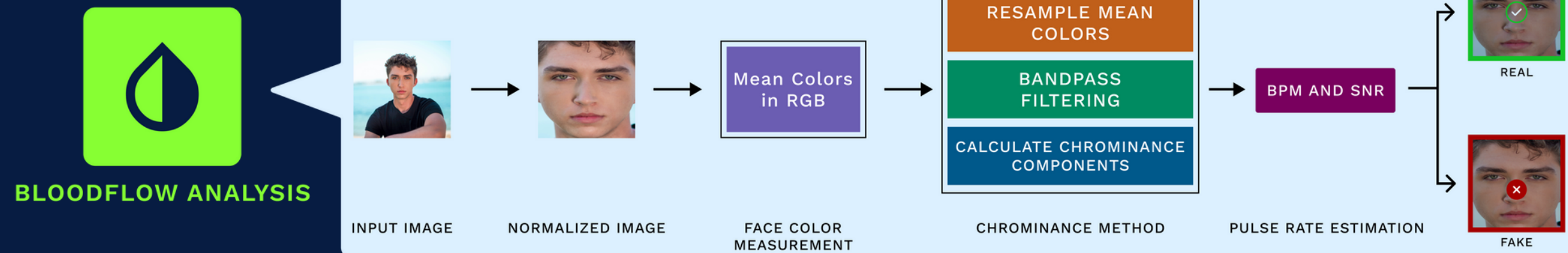
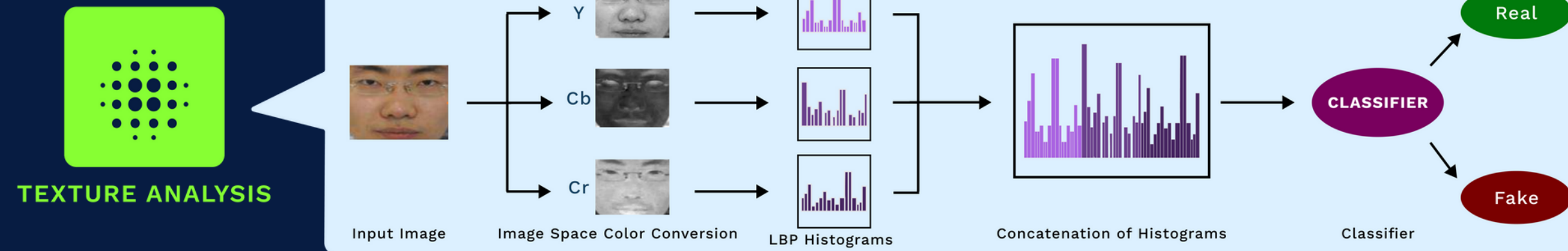
Crop and Resize



Label

**Processed
Dataset**

Models



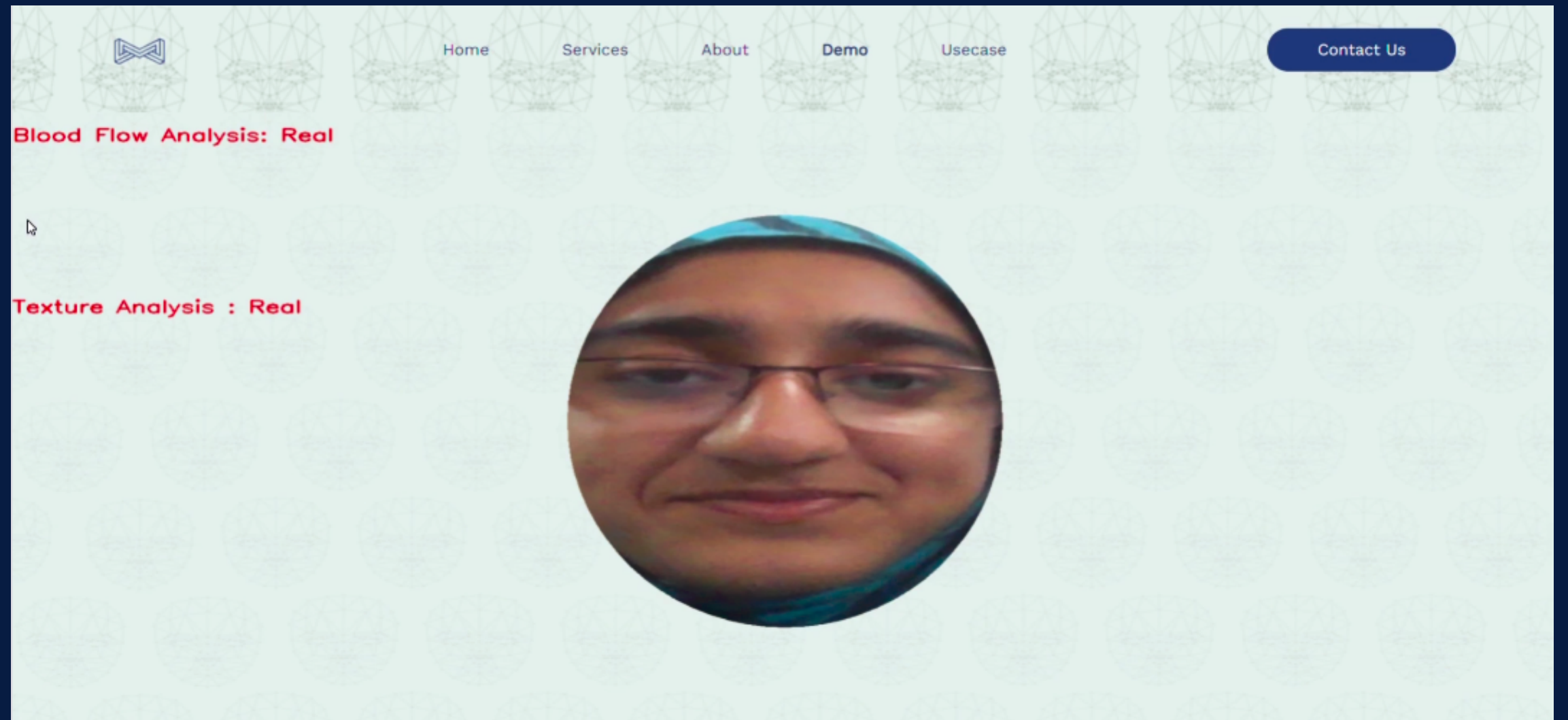
Testing

Real-time Testing

200 spoof

200 real

96% accuracy



Use Cases

Apps with User Liability



JazzCash

easypaisa

ezbike

Use Cases

Digital KYC



Use Cases

Secure Access Control
in Facilities



Use Cases

Travel and Border Control



Tools and Technologies

UI-Design



Version Control



Website



Project Management



Models



Data Collection



Sustainable Development Goals



- industries, such as finance, healthcare, and transportation
- *enhance* security measures
- *protect* user data
- foster *trust* in digital transactions



- prevent *identity theft* and fraud
- promote *fair* and transparent institutions
- accurate identification in voting, accessing government services, or law enforcement

Life Long Learnings

User Consent during data collection
Private data is not uploaded anywhere
only trained models are available online



Our Team

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Color Texture & ML

Emaan Bashir

Web Integration & Eye Movement

Rimsha Mirza

Dataset Processing & rPPG

Thank You.



FACIAL LIVENESS DETECTION SYSTEM DEMONSTRATION

