

# ONLINE SUBMISSION

TEAM NAME: HUSTLE SQUAD

COLLEGE NAME: KONGU ENGINEERING COLLEGE

PROBLEM TRACK: TRUST & PRIVACY



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# PROBLEM STATEMENT

# K! HACKS 3.0

- RAPID RISE OF DEEPFAKES AND MANIPULATED DIGITAL CONTENT THREATENS TRUST IN ONLINE MEDIA.
- FAKE VIDEOS AND FORGED DOCUMENTS CAUSE MISINFORMATION, IDENTITY THEFT, AND FINANCIAL FRAUD.
- EXISTING DETECTION SYSTEMS LACK TRANSPARENCY, EXPLAINABILITY, AND VERIFIABLE PROOF.
- NO UNIFIED PLATFORM ENSURES ACCURATE DETECTION + CLEAR EXPLANATION + TAMPER-PROOF VERIFICATION.

Cycle of Deepfake Threats



## Create Deepfake



## Deepfakes are generated using AI.



## Conduct Financial Fraud

Tampered documents lead to financial crimes.



## Damage Reputation

Manipulated content harms individuals and organizations.



## Fake videos and news circulate online.



## Forged documents are used for identity theft.

de with Napkin



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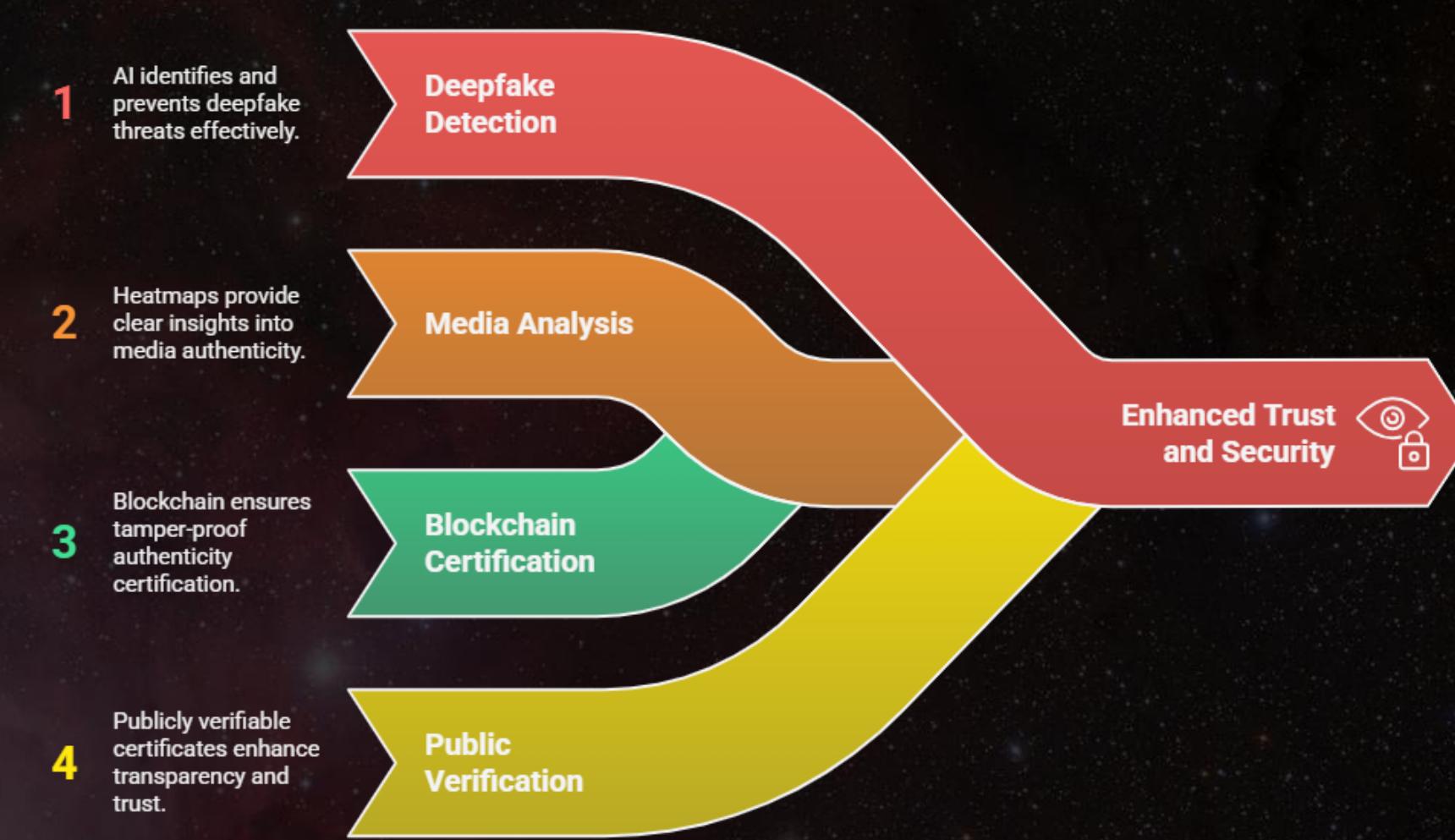
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# SOLUTION ABSTRACT

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- AI-POWERED DETECTION SYSTEM IDENTIFIES DEEPFAKES AND DOCUMENT FRAUD WITH HIGH ACCURACY.
- EXPLAINABLE AI (HEATMAPS & SCORES) CLEARLY SHOWS WHY CONTENT IS MARKED SUSPICIOUS.
- BLOCKCHAIN-BASED CERTIFICATION STORES ANALYSIS RESULTS AS IMMUTABLE PROOF.
- PUBLIC VERIFICATION MECHANISM ALLOWS ANYONE TO VERIFY AUTHENTICITY SECURELY.

Building a Secure Digital Future



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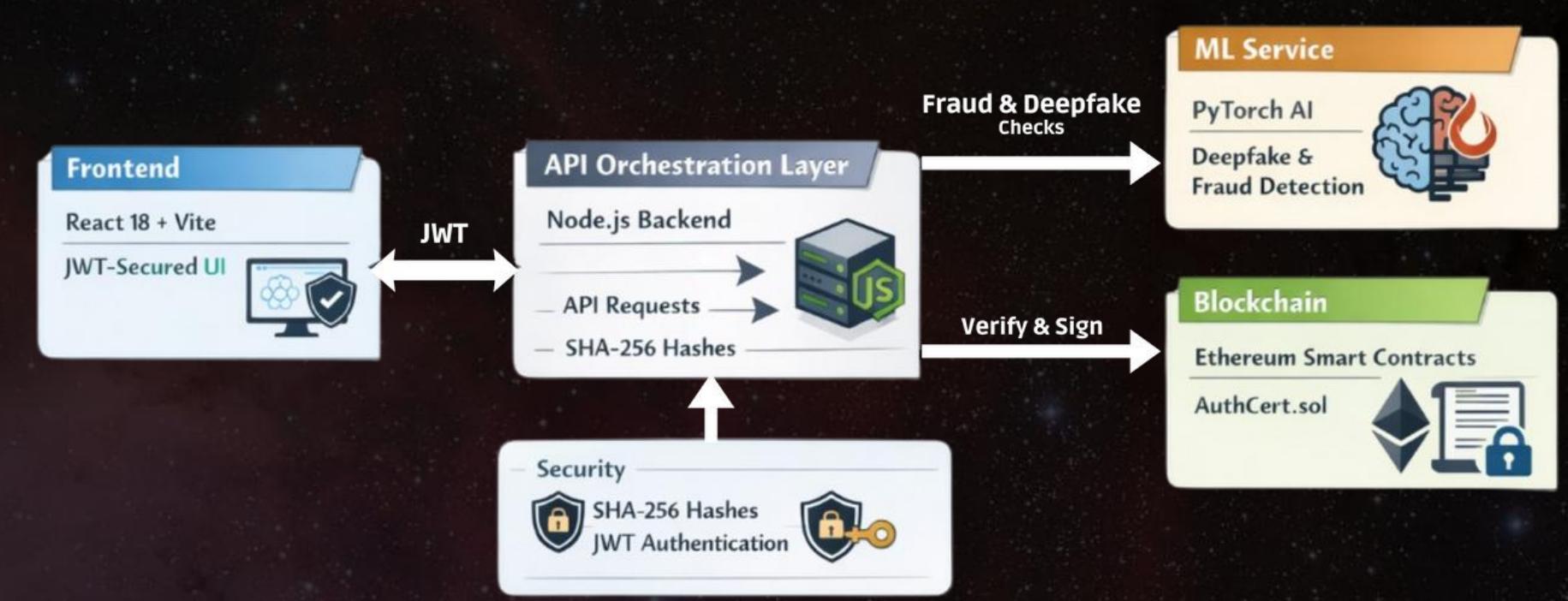


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# ARCHITECTURE

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- USER UPLOADS MEDIA/DOCUMENT VIA FRONTEND.
- BACKEND VALIDATES AND HASHES THE CONTENT
- AI SERVICE ANALYZES AUTHENTICITY AND GENERATES EXPLANATIONS
- HASH IS STORED ON BLOCKCHAIN VIA SMART CONTRACT
- RESULTS AND VERIFICATION CERTIFICATE ARE RETURNED TO THE USER
- PUBLIC VERIFICATION IS ENABLED USING TRANSACTION HASH



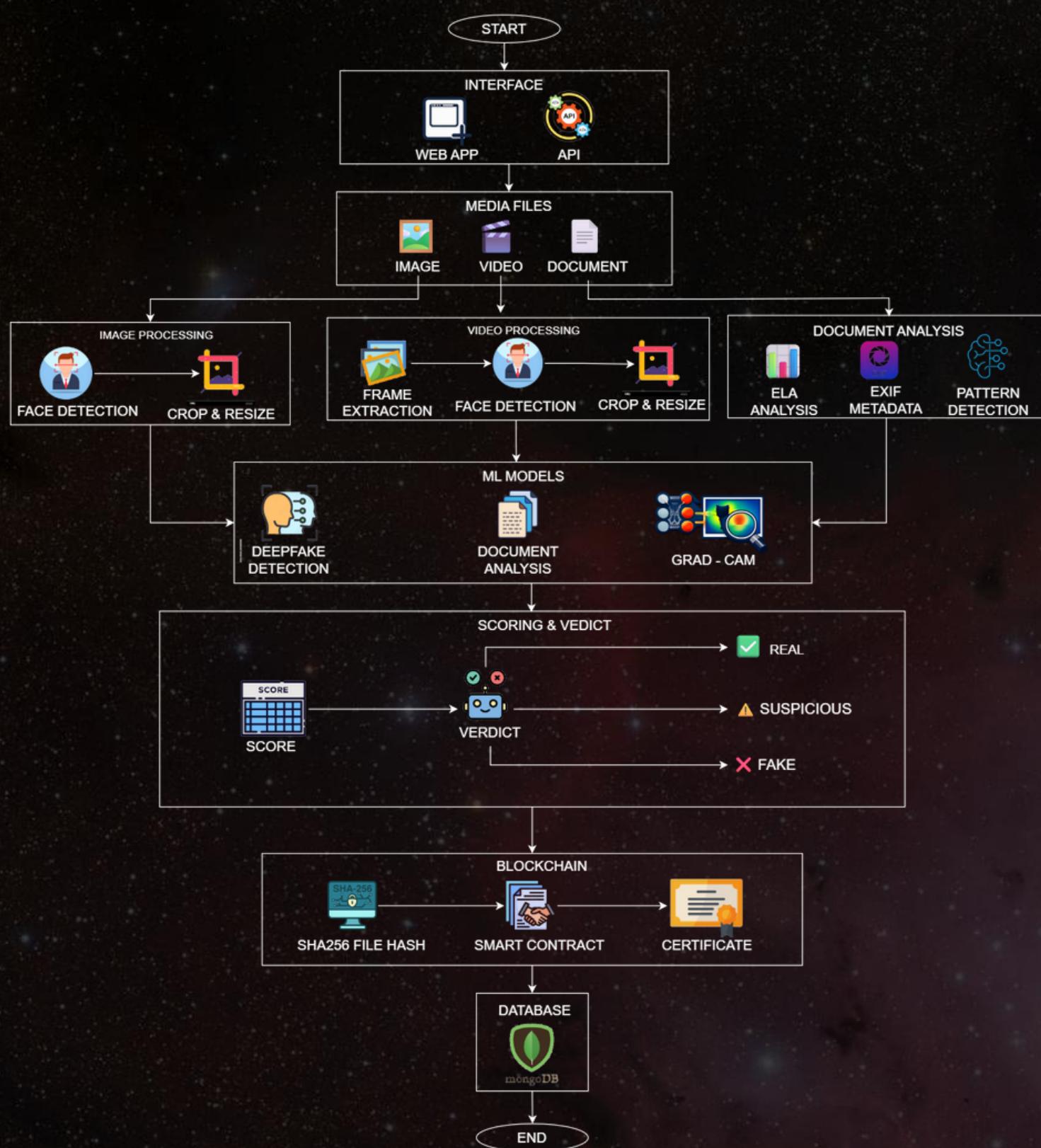
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# SYSTEM DESIGN

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- USER UPLOADS MEDIA VIA WEB APP OR API
- FILES ARE PREPROCESSED FACES, FRAMES, METADATA
- ML MODELS ANALYZE AUTHENTICITY
- GRAD-CAM EXPLAINS PREDICTIONS
- SYSTEM GENERATES TRUST SCORE
- VERDICT: REAL, SUSPICIOUS, OR FAKE
- RESULT STORED ON BLOCKCHAIN AND DATABASE



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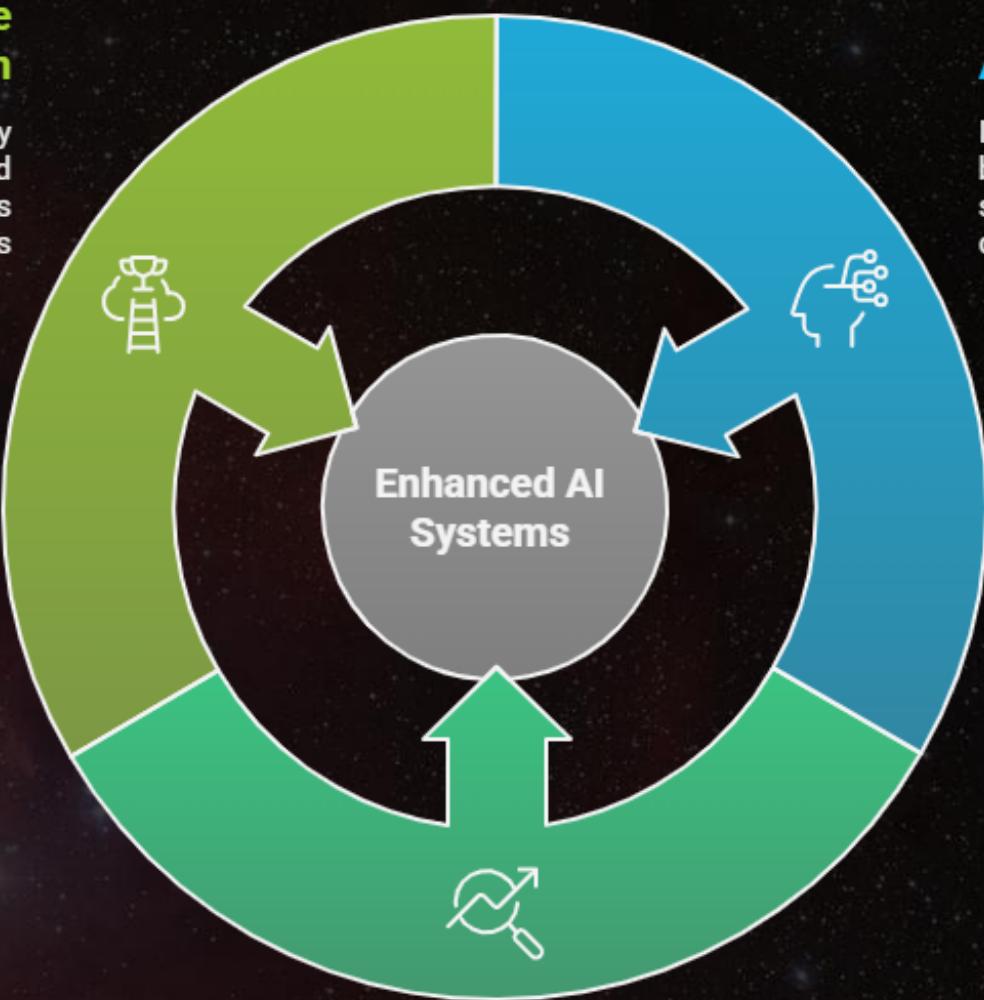
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# FEASIBILITY AND UNIQUE SELLING POINTS

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- TECHNICALLY FEASIBLE USING PROVEN TECHNOLOGIES LIKE AI MODELS, REST APIs, AND BLOCKCHAIN NETWORKS.
- AI + BLOCKCHAIN INTEGRATION ENSURES ACCURATE DETECTION WITH TAMPER-PROOF CERTIFICATION.
- EXPLAINABLE AI OUTPUT (SCORES & HEATMAPS) BUILDS USER TRUST AND TRANSPARENCY.
- SCALABLE & MODULAR DESIGN ALLOWS EASY UPGRADES AND MULTI-PLATFORM DEPLOYMENT.

## Enhancing AI Systems



### Scalable Design

Allows easy upgrades and deployment across platforms

### AI + Blockchain

Integrates AI with blockchain for secure and accurate detection

### Explainable AI

Provides transparent AI outputs to build user trust



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# MARKET STUDY AND BUSINESS MODEL

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- HIGH MARKET DEMAND DUE TO RISING DEEPFAKE THREATS, DIGITAL FRAUD, AND ONLINE IDENTITY MISUSE.
- TARGET CUSTOMERS INCLUDE ENTERPRISES, MEDIA HOUSES, BANKS, GOVERNMENT AGENCIES, AND LEGAL FIRMS.
- SUBSCRIPTION-BASED MODEL OFFERING TIERED PLANS ( BASIC, PRO, ENTERPRISE ).
- REVENUE STREAMS FROM API ACCESS, ENTERPRISE LICENSING, AND BLOCKCHAIN VERIFICATION SERVICES.



## Comprehensive Business Overview

### Market Demand

Driven by rising deepfake threats and digital fraud

### Target Customers

Includes enterprises, media houses, banks, government agencies, and legal firms

### Subscription-Based Model

Offers tiered plans (Basic, Pro, Enterprise)

### Revenue Streams

Generated from API access, enterprise licensing, and blockchain verification services



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# IMPLEMENTATION

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## DEEPCODE ANALYSIS

The figure displays three side-by-side screenshots of a Deepfake Analysis tool interface, likely from a mobile application. Each screenshot shows a different analysis result:

- Likely Authentic:** The verdict is "LIKELY AUTHENTIC" with a confidence level of "MEDIUM". The manipulation score is 31.8%. The analysis breakdown shows Neural Network at 0.0%, Artifact Detection at 0.0%, Max Frame Score at 49.1%, and Consistency at 88.1%.
- Suspicious:** The verdict is "SUSPICIOUS" with a confidence level of "MEDIUM". The manipulation score is 55.0%. The analysis breakdown shows Neural Network at 0.0%, Artifact Detection at 0.0%, Max Frame Score at 61.0%, and Consistency at 93.8%.
- Likely Deepfake:** The verdict is "LIKELY DEEPFAKE" with a confidence level of "LOW". The manipulation score is 78.0%. The analysis breakdown shows Neural Network at 0.0%, Artifact Detection at 0.0%, Max Frame Score at 92.0%, and Consistency at 73.0%.

Each screenshot also includes a section titled "Analyzed Frames (30)" showing thumbnail images of frames with their respective scores.



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# IMPLEMENTATION

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## DOCUMENT ANALYSIS & SHA-256 HASH

Document Analysis  
ELA-based tamper detection for images and PDFs.

DOCUMENT VERDICT  
**LOW RISK**  
Confidence: MEDIUM

**27.5**  
Tampering Score

Analysis Explanation  
LOW RISK: Minor variations detected, typically within normal range for unedited photos.

Error Level Analysis (ELA)  
Original ELA Compare

Original Image



Analysis Result  
**SUSPICIOUS**  
Moderate signs of potential document tampering detected. Some indicators suggest manipulation. Manual verification is recommended before accepting this document.

Analyze Another Document

ELA SCORE: 1.6% EXIF AUTHENTICITY: 46.7% HEURISTIC SCORE: 60% PAGES ANALYZED: 1 Image

Original Image Original ELA



```
PS D:\Trust-privacy-main\blockchain> npm run deploy:local
Deploying with account: 0xf39Fd6e51aad88F6f4ce6aB8827279cffBb92266
Account balance: 10000.0 ETH/MATIC

✓ AuthCert deployed to: 0x5fbdb2315678afecb367f032d93f642f64180aa3
Network: localhost (Chain ID: 31337)

Deployment info saved to: D:\Trust-privacy-main\blockchain\deployments\localhost.json
ABI saved to: D:\Trust-privacy-main\blockchain\deployments\AuthCert.abi.json
Contract config copied to backend

Deployment complete!
PS D:\Trust-privacy-main\blockchain>

PS D:\Trust-privacy-main\blockchain> npx hardhat node
WARNING: These accounts, and their private keys, are publicly known.
Any funds sent to them on Mainnet or any other live network WILL BE LOST.

eth_accounts
hardhat_metadata (20)
eth_getBalance
eth_accounts
hardhat_metadata (20)
eth_blockNumber
eth_getBlockByNumber
eth_feeHistory
eth_maxPriorityFeePerGas
eth_sendTransaction
  Contract deployment: AuthCert
  Contract address: 0x5fbdb2315678afecb367f032d93f642f64180aa3
  Transaction: 0x5433e1e5075f6d9596a6088d8ad869048bded0dc0f1f32843dd0f5b68fd6a4a
  From: 0xf39Fd6e51aad88F6f4ce6aB8827279cffBb92266
  Value: 0 ETH
  Gas used: 1682488 of 30000000
  Block #1: 0x5e9e256e5b72451552eb850e360adb5736a20af8d43c6fd96c88bfcaf81b112f

eth_getTransactionByHash
eth_getTransactionReceipt
eth_chainId
eth_blockNumber
```



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# RESEARCH

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DEEPCODE DETECTION RESEARCH USING CNNS AND  
EFFICIENTNET TRAINED ON FACEFORENSICS++  
DATASET.

EXPLAINABLE AI TECHNIQUES SUCH AS GRAD-CAM  
REFERENCED FROM RECENT AI INTERPRETABILITY  
STUDIES.

DOCUMENT FORENSICS METHODS INCLUDING ERROR  
LEVEL ANALYSIS (ELA) AND EXIF METADATA  
RESEARCH.

BLOCKCHAIN SECURITY MODELS BASED ON ETHEREUM  
SMART CONTRACTS FOR IMMUTABLE DATA  
VERIFICATION.



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# REFERENCE

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- FACEFORENSICS++ - RÖSSLER ET AL., ICCV 2019  
[HTTPS://GITHUB.COM/ONDYARI/FACEFORENSICS](https://github.com/ondyari/FaceForensics)  
(DEEPMASK DETECTION BENCHMARK DATASET)
- EFFICIENTNET - TAN & LE, ICML 2019  
[HTTPS://ARXIV.ORG/ABS/1905.11946](https://arxiv.org/abs/1905.11946)  
(EFFICIENT CNN ARCHITECTURE)
- GRAD-CAM - SELVARAJU ET AL., ICCV 2017  
[HTTPS://ARXIV.ORG/ABS/1610.02391](https://arxiv.org/abs/1610.02391)  
(EXPLAINABLE AI VISUALIZATION)
- DIGITAL IMAGE FORENSICS - HANY FARID, MIT PRESS  
[HTTPS://FARID.BERKELEY.EDU/DOWNLOADS/PUBLICATIONS/BOOK/DIGITALIMAGEFORENSICS.PDF](https://farid.berkeley.edu/downloads/publications/book/DIGITALIMAGEFORENSICS.PDF)  
(ELA & METADATA-BASED FORGERY DETECTION)
- ETHEREUM SMART CONTRACTS DOCUMENTATION - ETHEREUM FOUNDATION  
[HTTPS://ETHEREUM.ORG/EN/DEVELOPERS/DOCS/SMART-CONTRACTS/](https://ethereum.org/en/developers/docs/smart-contracts/)  
(BLOCKCHAIN-BASED IMMUTABLE VERIFICATION)



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# TEAM DETAILS

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ROLE	NAME	STREAM/ DEPT	YEAR	COLLEGE
TEAM LEAD	PRABHU CHENNIMALAI K D	AIML	3rd YEAR	Kongu Engineering College
TEAM MEMBER	SARAVANA M	AIML	3rd YEAR	Kongu Engineering College
TEAM MEMBER	SHANMUGA PATEL KANI C	AIML	3rd YEAR	Kongu Engineering College
TEAM MEMBER	SUDHARSAN V	AIML	3rd YEAR	Kongu Engineering College



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## THANK YOU



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