

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 DEEPPAKES 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



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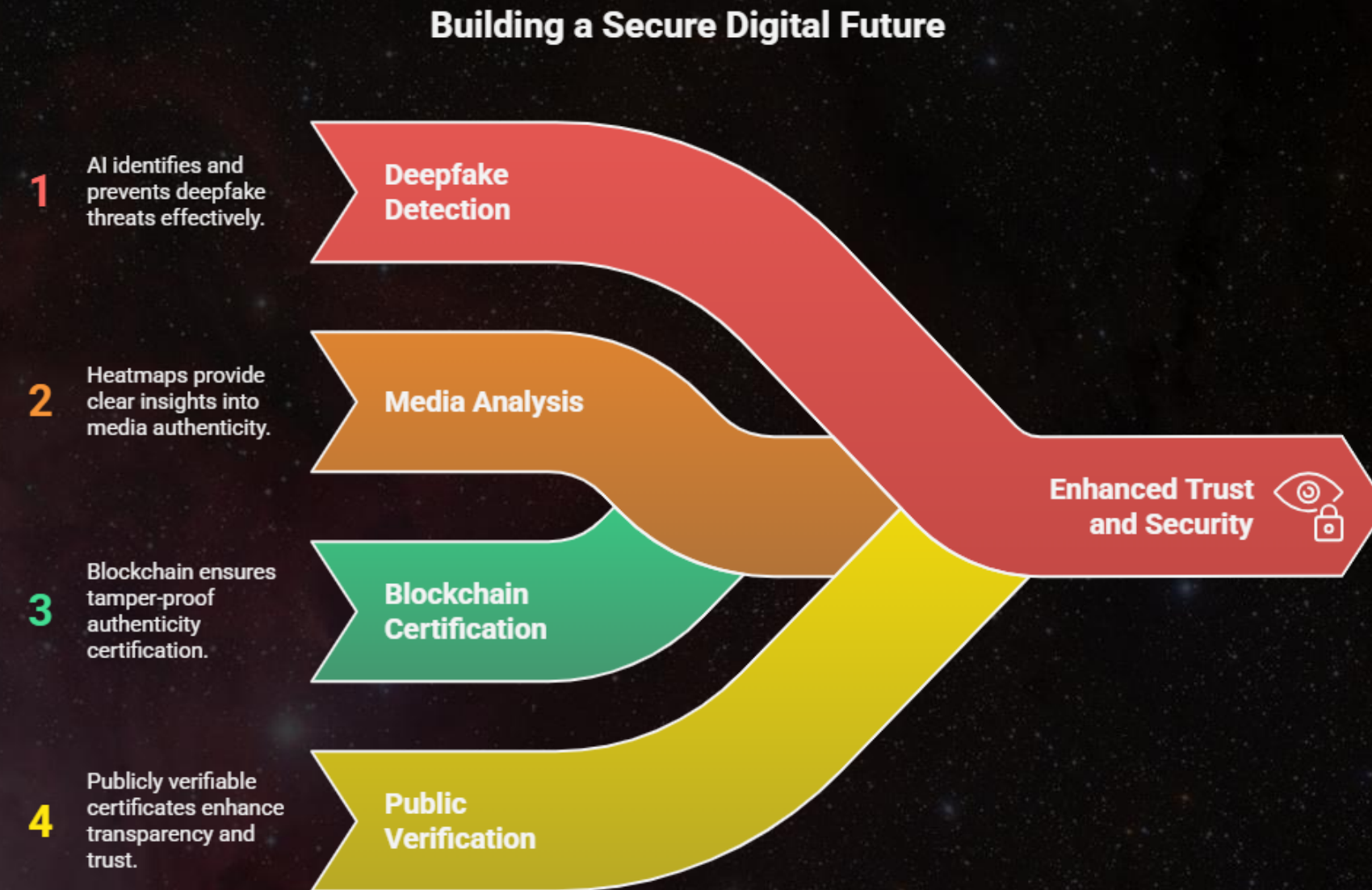


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SOLUTION ABSTRACT

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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.



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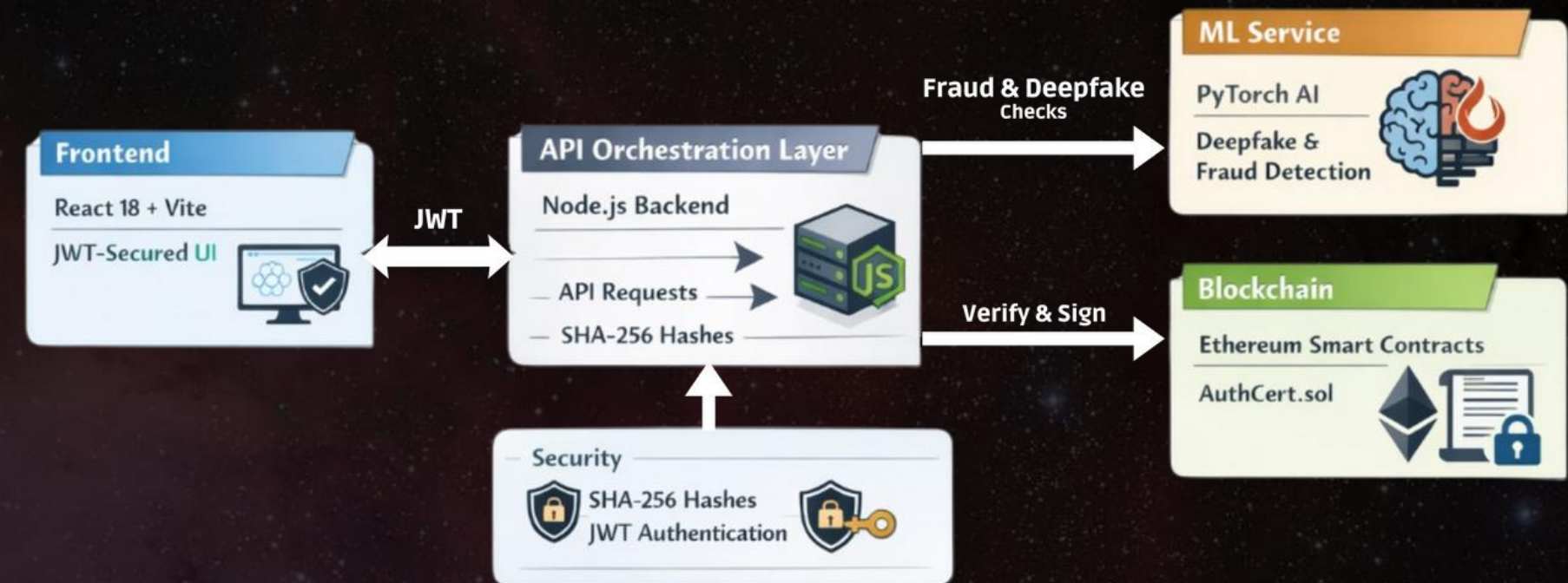


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ARCHITECTURE

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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



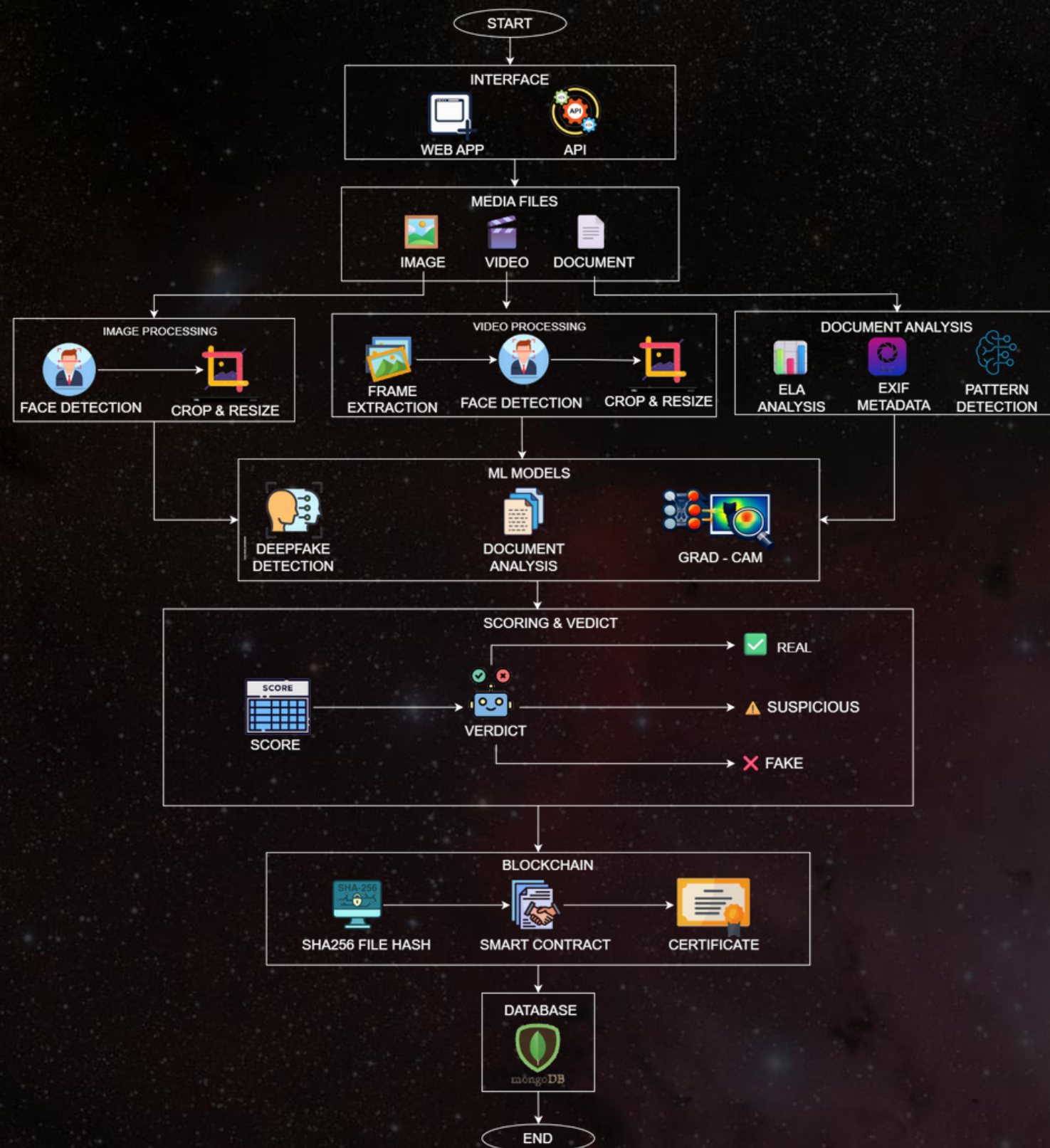
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SYSTEM DESIGN

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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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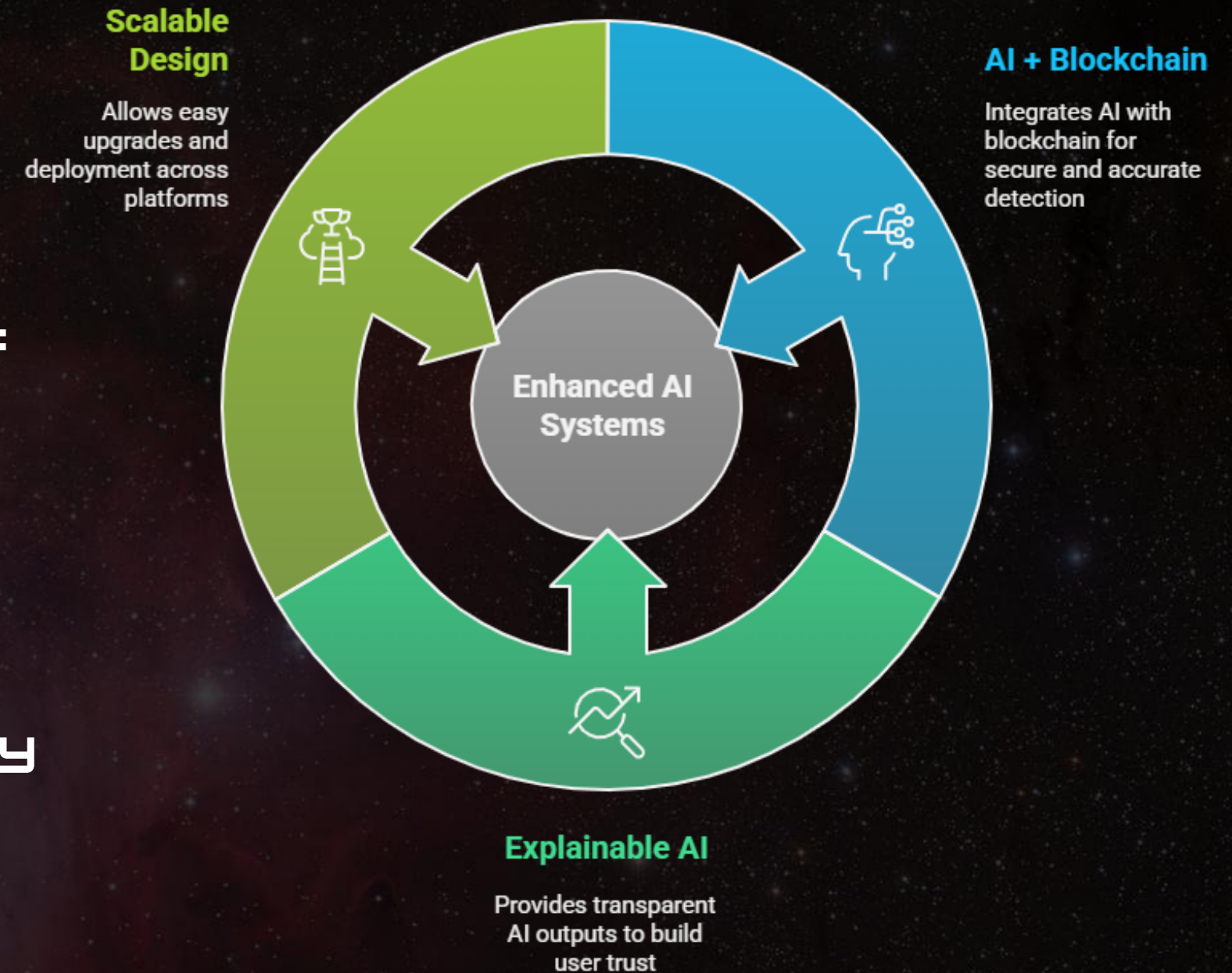
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FEASIBILITY AND UNIQUE SELLING POINTS

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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



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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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DEEPFAKE ANALYSIS

TrustLock

Dashboard

Deepfake Scan

Document Analysis

Certificates

prabhuchennimalakd.23aim@kongu.edu

Logout

AI-powered analysis to detect manipulated media

Production Mode

VERDICT

LIKELY AUTHENTIC

Confidence: MEDIUM

31.8%
Manipulation Score

Analysis Breakdown

Neural Network

0.0%

Artifact Detection

0.0%

Max Frame Score


49.1%

Consistency

88.1%


Analyzed Frames (30)

#1




Score 35.9%

#2




Score 32.3%

#3




Score 26.4%

#4




Score 44.5%

#5



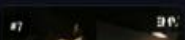
Score 54.7%

#6



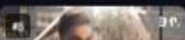
Score 35.9%

#7



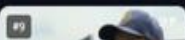
Score 32.3%

#8




Score 26.4%

#9



Score 44.5%

#10



Score 54.7%

TrustLock

Dashboard

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Certificates

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Deepfake Detection

AI-powered analysis to detect manipulated media

Production Mode

VERDICT

SUSPICIOUS

Confidence: MEDIUM

55.0%
Manipulation Score

Analysis Breakdown

Neural Network

0.0%

Artifact Detection

0.0%

Max Frame Score


61.0%

Consistency

93.8%


Analyzed Frames (30)

#1




Score 47.1%

#2




Score 52.1%

#3




Score 51.5%

#4




Score 40.9%

#5




Score 59.1%

#6




Score 47.1%

#7




Score 52.1%

#8



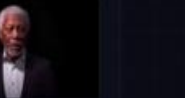
Score 51.5%

#9



Score 40.9%

#10



Score 59.1%

TrustLock

Dashboard

Deepfake Scan

Document Analysis

Certificates

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Logout

Deepfake Detection

AI-powered analysis to detect manipulated media

Production Mode

VERDICT

LIKELY DEEPFAKE

Confidence: LOW

78.0%
Manipulation Score

Analysis Breakdown

Neural Network

0.0%

Artifact Detection

0.0%

Max Frame Score


92.0%

Consistency

73.0%


Analyzed Frames (30)

#1




Score 92.0%

#2




Score 92.0%

#3




Score 92.0%

#4




Score 92.0%

#5




Score 34.1%

#6




Score 92.0%

#7




Score 92.0%

#8




Score 92.0%

#9



Score 92.0%

#10



Score 34.1%



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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

ELA Analysis (Bright areas = potential edits)

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

60%

Tampering Score

MEDIUM Confidence

ELA SCORE

1.6%

EXIF AUTHENTICITY

46.7%

HEURISTIC SCORE

60%

PAGES ANALYZED

1

Image

Original Image

Original

ELA

MISSISSIPPI DRIVER LICENSE

1 SAMPLE

2 CONNOR M. JR

3 123 MAIN ST

4 JACKSON, MS 39216-1234

5a ISS 01/10/2013

6a CLASS R

7a END ILPST

8a SEX M

9a HGT 5'-08"

10a EYES BLU

11a DOB 01/12/1967

12a REST BENQ

13a DO 0123456789012345678901234

Error Level Analysis

Mean Difference

0.88

Max Difference

15.00

Std Deviation

1.17

High Diff %

0.00%

EXIF Metadata

No EXIF metadata found

PS D:\Trust-privacy-main\blockchain> npm run deploy:local

Deploying with account: 0xf39Fd6e51aad88F6F4ce6aB8827279cFfFb92266

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: 0x5fbd2315678afecb367f032d93f642f64180aa3

Transaction: 0x5433e1e5075f6d9596a6088d8ad869048bde0dc0f1f32843dd0f5b68fd6a4a

From: 0xf39fd6e51aad88f6f4ce6ab8827279cfff92266

Value: 0 ETH

Gas used: 1682488 of 3000000

Block #1: 0x5e9e256e5b72451552eb850e360adb5736a20af8d43c6fd96c88bfc81b112f

eth_getTransactionByHash

eth_getTransactionReceipt

eth_chainId

eth_blockNumber

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RESEARCH

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DEEPFAKE 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)
(DEEPPFAKE 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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