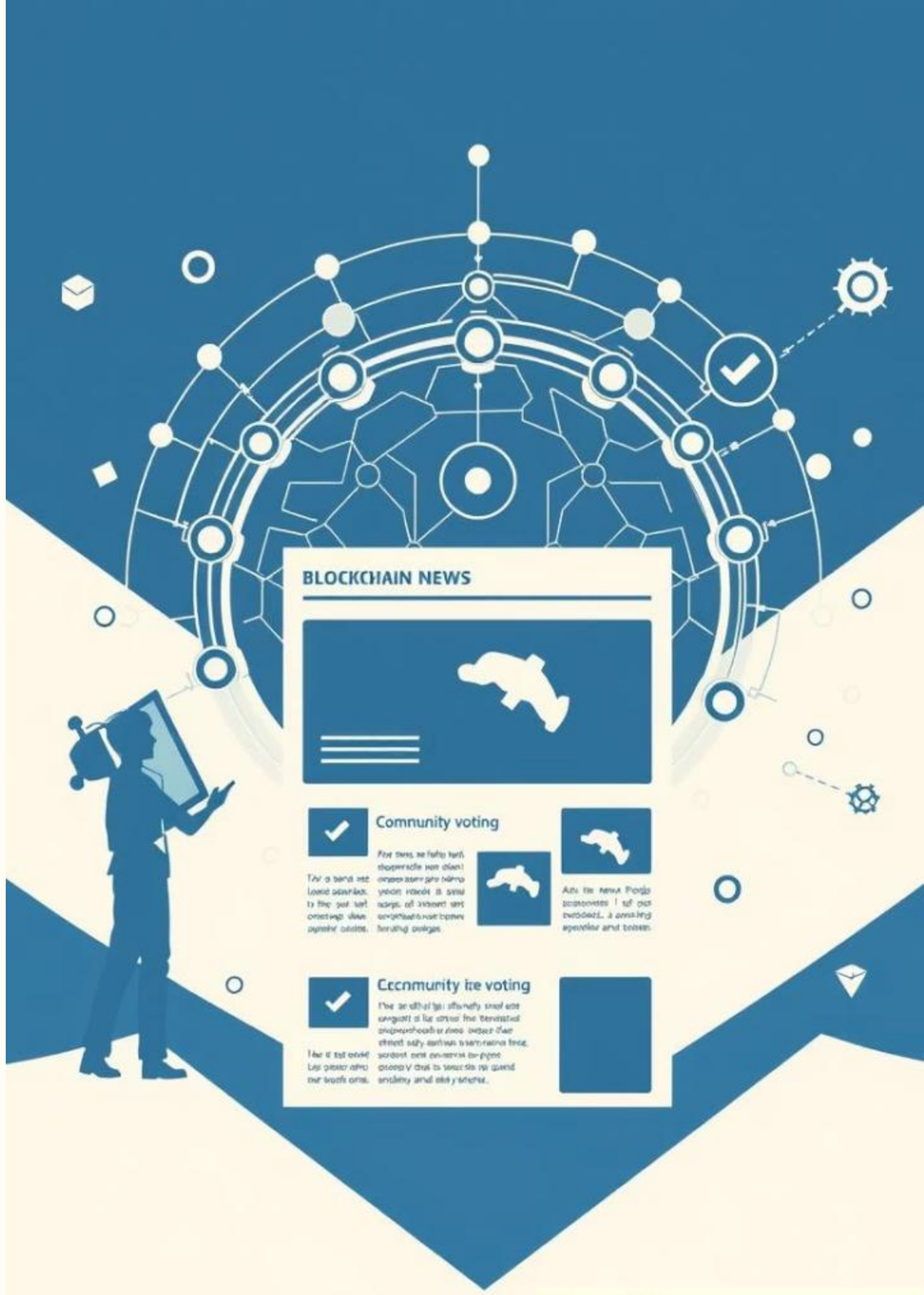
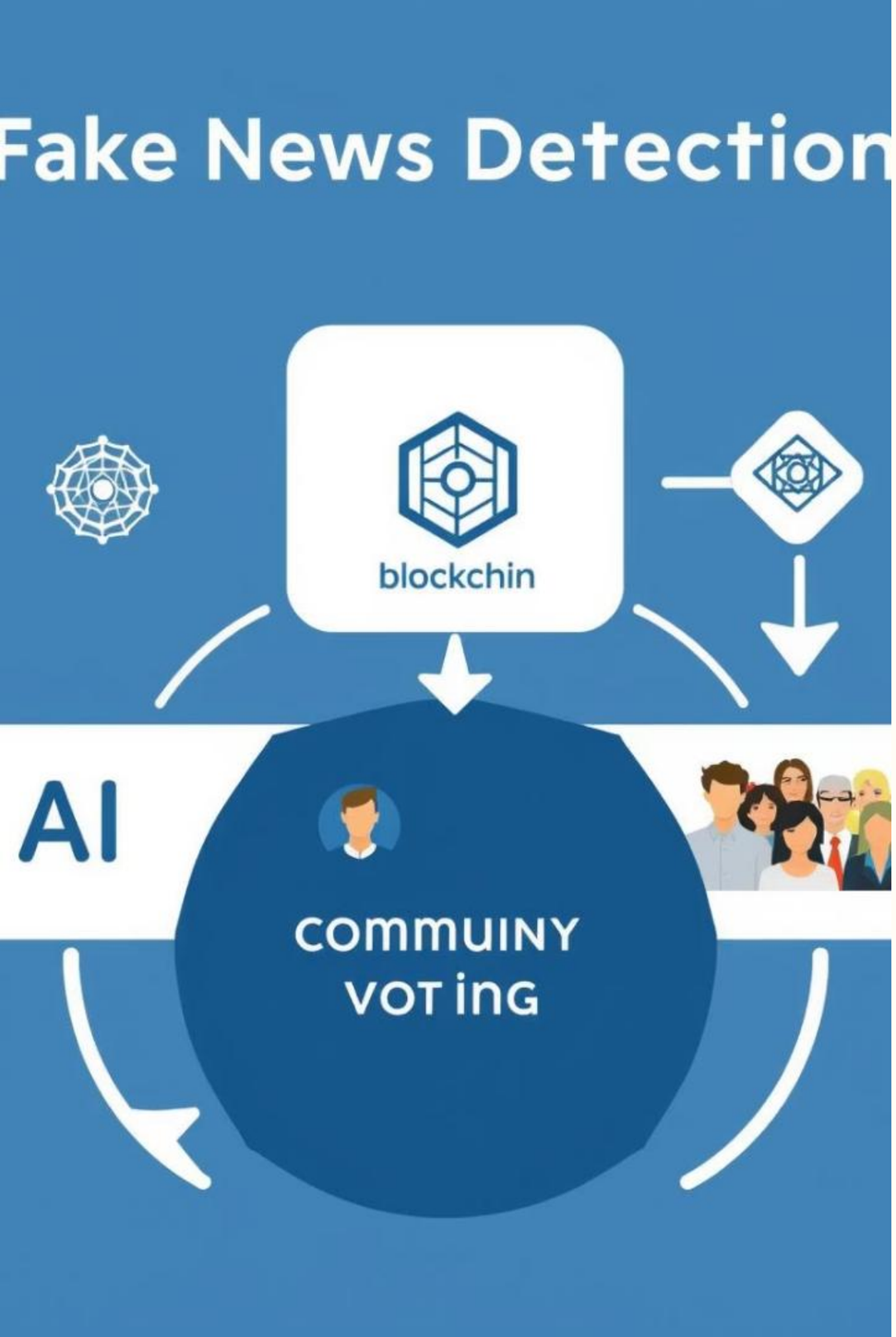
Fake News Detection using AI, Blockchain & Community Voting

This presentation explores an innovative Fake News Detection system architecture that leverages artificial intelligence, blockchain technology, and community voting. It aims to ensure the validation of content with transparency, security, and collaborative verification. Software architects and engineers will gain a detailed and technical understanding of each component, their interactions, and technology choices for implementing a robust solution to combat misinformation in digital media.





Architecture Document: Overview

System Objective

To accurately identify fake news by combining advanced AI techniques with decentralized validation and social consensus.

Core Technologies

Natural language processing (NLP) for content analysis, blockchain for immutable record-keeping, and community voting for human validation.

Key Features

Content validation, transparency throughout the workflow, and real-time user alerting for suspicious or misleading information.

Architecture Components

User Interface (UI)

Mobile and web applications enabling users to submit news, view alerts, and participate in voting.

API Gateway

Acts as the centralized entry point routing requests to AI, voting, and notification services.

AI Module

Employs sophisticated NLP models to classify news content as fake or real with high accuracy.

Blockchain DB

Ensures immutability by storing verified news results on a decentralized ledger with smart contracts.

Community Voting

Engages a user base to validate AI predictions and build consensus through voting mechanisms.

Notification Service

Sends push alerts to users about suspicious news and voting results in real time.

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Flow of Information

1 2 3 4

User Submission

News content is submitted via the app interface.

Processing

API forwards content to AI module and community voting system for evaluation and consensus building.

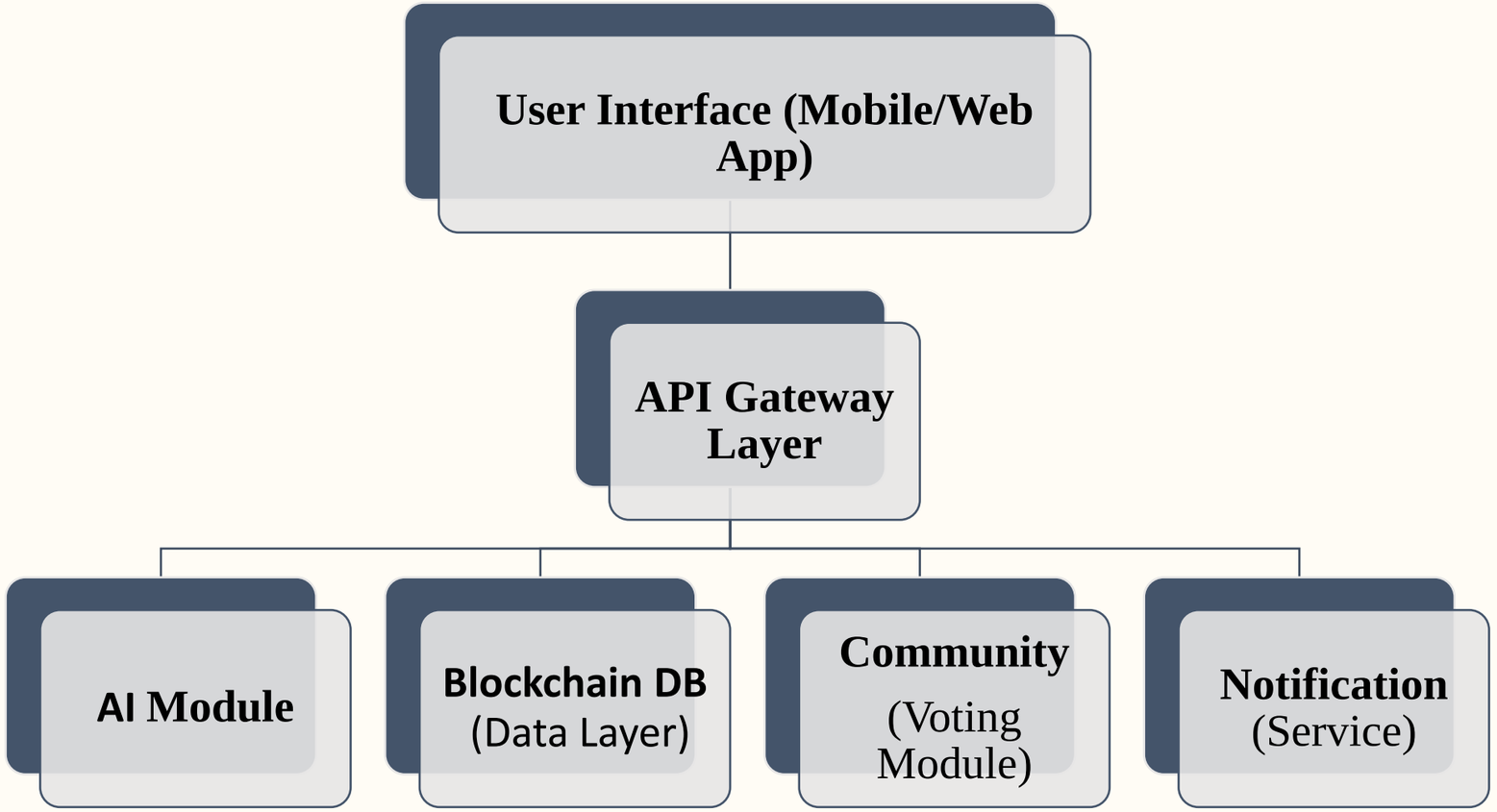
Consensus & Storage

Voting results combined with AI prediction finalize the classification and store it on blockchain.

Notification

Users receive alerts about verified or suspicious content to raise awareness.

Architecture Diagram / Block Diagram



Design Document: Technology Design

Frontend Development

Uses React.js combined with Tailwind CSS for responsive, performant, and user-friendly interfaces.

Backend Services

Powered by Flask (Python) to handle API requests, AI model invocation, and communication with blockchain nodes.

Model Integration

Leveraging pretrained NLP models like BERT and T5 accessed through Hugging Face for robust classification accuracy.

Technology Components

Blockchain & Storage

- Ethereum blockchain using smart contracts for immutable news records
- IPFS for decentralized file storage of content metadata

Community Voting & Notifications

- Node.js backend with MongoDB for handling votes and user data
- Firebase Cloud Messaging to deliver real-time alerts to frontends

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Technology Components

Block	Technology / Tool	Function
Frontend UI	React.js, Tailwind CSS	User interaction, form input, result display
Backend API	Flask, REST APIs	Route requests, invoke ML/Blockchain services
NLP Models	BERT, T5 (via Hugging Face)	Analyze news content
Model Training	Python (sklearn, TensorFlow)	Preprocessing, training classifier
Blockchain Layer	Ethereum (Smart Contracts), IPFS	Store validated news securely
Community Voting	Node.js, MongoDB	Record votes, reputation-based updates
Notification System	Firebase Cloud Messaging (FCM)	Alert users in real-time

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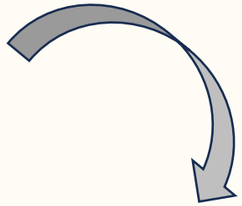
Flow of Information: Technology Level

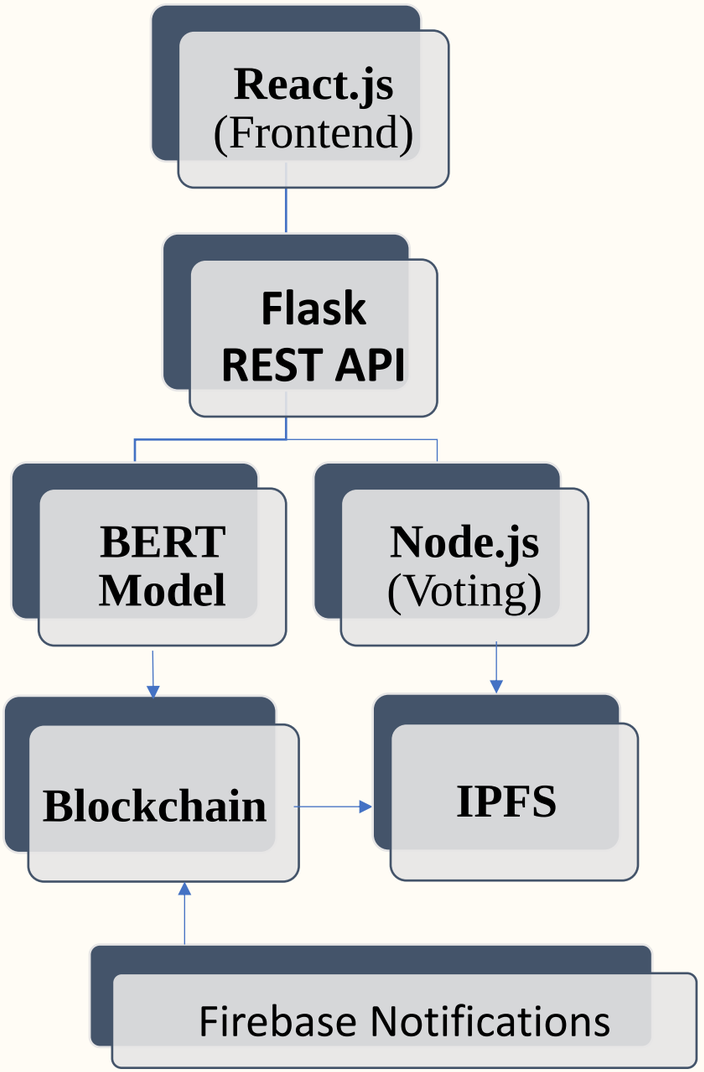
1. User submits news via React frontend interface.
2. Flask backend receives and processes the request.
3. AI models classify the news and trigger community voting.



1. Consensus and AI verdicts are stored securely on Ethereum blockchain.
2. Notification service sends updates via Firebase Cloud Messaging.

- News is submitted via **React UI**.
- Sent to **Flask API** for processing.
- API calls **BERT/T5 model** to classify the news.
- If flagged as suspicious:
  - ❑ Community voting is enabled.
  - ❑ News is verified through votes and AI result fusion.
  - ❑ Upon validation, news is stored on **Ethereum** via **smart contracts** and metadata on **IPFS**.
- Users get real-time alerts through **Firebase**.

Technology Design Diagram



Detailed Explanation

- **React.js Frontend:** Handles content submission, voting interface, and result dashboard.
- **Flask Backend:** Connects frontend with AI services, blockchain, and database.
- **AI Detection:** Uses pre-trained BERT/T5 to flag potential fake news.
- **Blockchain Layer:** Ethereum smart contracts ensure news integrity. IPFS stores content off-chain for scalability.
- **Voting Module:** Registered users vote on news articles. Reputation system ensures credibility.

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Summary & Next Steps

Robust Detection

Combining AI and community voting improves accuracy and resilience against misinformation.

Transparent Validation

Blockchain guarantees immutable and tamper-proof storage of verified news data.

Future Enhancements

Integrate advanced models, expand community participation, and enhance alert customization.