**Fake Product Detection Using Blockchain**

**Abstract:**

The increasing prevalence of counterfeit products in the market poses a serious threat to consumer safety, brand trust, and economic integrity. Traditional product authentication methods are often centralized, prone to manipulation, and lack transparency. This project proposes a **Blockchain-based fake product detection system** that ensures product authenticity through a decentralized and tamper-proof ledger.

The system involves three primary modules — **Admin**, **Manufacturer**, and **User**. The **Admin** manages platform users and monitors the system, the **Manufacturer** registers products on the blockchain with unique IDs and production details, and the **User** scans product codes to verify authenticity directly from the blockchain. This ensures end-to-end traceability and prevents data tampering.

**Existing System:**

* Product verification is manual or QR code-based without backend validation.
* Centralized databases are vulnerable to hacking and unauthorized changes.
* Lack of real-time consumer access to reliable product origin information.
* No way to track product life cycle once it leaves the manufacturer.

**Proposed System:**

* Uses **blockchain technology** to record product data immutably from manufacturing to sale.
* Each product is tagged with a unique blockchain-registered ID (QR code/NFC).
* Consumers can instantly verify product authenticity through mobile/web applications.
* Admin can monitor registered manufacturers and block suspicious activity.
* Enhances trust, transparency, and accountability in the supply chain.

**✅ Module Descriptions**

**🔒 1. Admin Module**

The **Admin** oversees the entire system, handles authentication, and ensures the platform is secure and well-maintained.

**Features:**

* **Login Authentication:** Secure login to access the admin dashboard.
* **Manage Manufacturers:** View, verify, approve, or block manufacturer accounts.
* **View/Add/Remove Products:** Monitor all products in the blockchain system.
* **View Complaints & Feedback:** Review and respond to user or manufacturer feedback and complaints.
* **System Monitoring:** Audit logs, manufacturer activity tracking, and system performance overview.

**🏭 2. Manufacturer Module**

The **Manufacturer** is responsible for adding genuine products to the system. This is the source of all product data.

**Features:**

* **Login & Registration:** Register as a verified manufacturer and login securely.
* **Add Product:** Register each product with a unique ID and details (name, batch no, date, etc.) which gets stored immutably on the blockchain.
* **Manage Products:** Edit or update status of products (e.g., shipped, discontinued).
* **Feedback to Admin:** Submit system feedback or improvement suggestions.
* **Respond to Complaints:** View and respond to complaints related to their products.

**👤 3. User Module**

The **User** is the consumer who wants to verify the authenticity of a product before purchase or use.

**Features:**

* **Check Product Authenticity:** Scan QR code or enter product ID to validate its blockchain record.
* **Raise Complaints:** If a product seems fake or unlisted, users can raise complaints to the admin.
* **Submit Feedback:** Share feedback on product authenticity or system usability.
* **View Product Details:** View product history like manufacturing date, manufacturer info, and verification status.