🔍 Problem Statement

Traditional biometrics like fingerprints and passwords are vulnerable to copying, hygiene issues, and failure when skin is wet, dirty, or injured. Current payment methods also struggle with secure family controls and fast, contactless authentication without PINs or OTPs. This leaves users exposed to fraud, inconvenience, and health risks.

💡 Solution – VeinPay

VeinPay is a biometric payment system using near-infrared finger vein scanning. Since vein patterns are internal and unique, they're impossible to copy or fake. The system is contactless, hygienic, and works even with wet or damaged skin. AI-powered security adds behavior checks and anomaly detection, while family-linked spending limits and emergency freeze features offer control and safety.

🔧 What It Does

- Scans finger veins using IR light and a custom acrylic-top scanner box

- Authenticates users via AI that checks vein patterns and behavior

- Enables family-linked payments with spending limits and owner approval

- Provides "Vein Tap" for temporary child spending approval

- Supports instant account freeze using PIN or backup finger

- Replaces OTPs with AI-generated story puzzles for high-value security

🛠️ Form Factor

- Solid, light-blocking box with transparent acrylic finger rest

- IR LEDs and infrared-sensitive camera underneath

- Portable and easy to integrate with mobile apps

🎯 Target Users

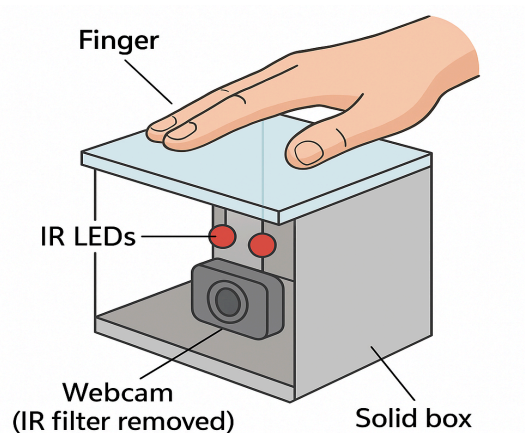- Families needing controlled, secure spending for kids/elderly

- Health-conscious users avoiding surface contact during payments

- Anyone wanting fast, foolproof biometric payment without PINs/OTPs

- Future adopters of wearable biometric payments (smartwatches, rings)

⚙️ Hardware & Design

- 3–4 mm acrylic finger placement surface

- 850/940 nm IR LEDs for vein illumination

- 1080p IR-sensitive USB camera for vein pattern capture

- AI-based image processing for vein template extraction

📱 App Features

- Manage family accounts and spending limits

- AI behavior and location anomaly detection

- Puzzle-based authentication for suspicious or high-value transactions

- Emergency freeze activation via app or backup finger scan

Finger
IR LEDs
Webcam
(IR filter removed)
Solid box

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