Retina Vault

Redefining Secure Access

AI Challenge 2025

Advanced Biometric Security Through Retina Recognition

Our Vision

Who We Are

Retina Vault – pioneers in optical biometric technology

Our Goal

Reshape secure data access platforms - faster, more secure, and accessible

How we do it

Leverage cutting-edge AI for Retina Extraction to provide Role-Based Access Control

Key Problems We're Solving

Stronger Security

Eliminating passwords removes a primary target for cyberattacks. Unique retina patterns significantly enhance identity verification, making unauthorized access virtually impossible.

Dynamic Control (RBAC)

Beyond authentication, RetinaVault implements granular access control, determining what specific data users can access and what actions they can perform.

Privacy & Compliance

Ensures GDPR and HIPAA compliance by restricting sensitive data access to authorized personnel only, with comprehensive audit logs and consent features.

How It Works

1. Retina Scan

Optical capture of the unique blood vessel patterns in the user's retina using specialized scanning hardware.

2. AI Verification

Advanced AI model analyzes the scan and verifies the user's identity by matching against stored biometric templates.

3. Access Control

RBAC (Role-Based Access Control) engine grants specific access permissions based on the user's verified identity and assigned role.

4. Secure Logging

All access events are encrypted and securely stored for compliance, auditing, and security monitoring purposes.

MobileNetV3 Embeddings

Technical Architecture

Retina Vault's architecture integrates advanced biometric processing with secure role-based access control systems.

Biometric Layer

Specialized hardware and software for capturing and processing retina patterns

AI Processing

Using MobileNetV3 Embeddings enable fast and accurate retina extraction by providing lightweight yet powerful feature representations.

Security Core

Role-based access control logic and security policy enforcement

Encrypted Storage

Secure storage for biometric templates and access logs

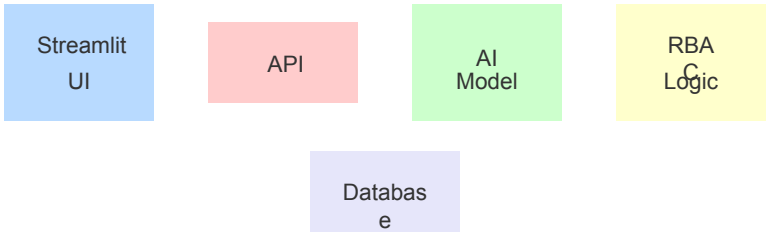
Technical Implementation

Front-End Streamlit UI for retina and admin dashboards

Back-End API + Database + RBAC logic

AI Layer Retinal Scanning, preprocessing, feature matching

Security Layer Encrypted retinal data, compliance with standards



Retina Vault System Architecture

Live Demo

Watch as we demonstrate Retina Vault's cutting-edge biometric authentication system in action.

- Complete retina scanning and authentication process
- Role-based access control implementation

Duration: 3 minutes

Impact & Market Potential

Market Growth

The biometric security market is projected to grow at a CAGR of 15% through 2030, with retina scanning technology emerging as a premium segment for high-security applications.

Target Industries

Healthcare (patient data), Financial Services (transaction security), Government (classified access), and Enterprise IT (secure network access) represent our primary market segments.

Competitive Advantage

Our proprietary AI algorithms achieve 99.9% accuracy with processing speeds 3x faster than competitors, while our RBAC integration provides unmatched security granularity.

Team & Project Validation

Key Achievements

- Successfully completed proof-of-concept with 99.7% accuracy in controlled testing
- Developed proprietary AI algorithm for retina pattern recognition

Validation Metrics

- Authentication speed improved by 65% compared to traditional methods
- Security breach simulation tests showed zero vulnerabilities

Expert Recognition

- Technical partnership with leading cybersecurity research institute

Values and strives for achievement, but focuses on their **version** of success

Finds **balance** in their thinking, effort, and energy devoted to security

Views challenges as **opportunities** to grow and learn

Offers empathy, **validation** , and grace to users

Future Roadmap

AI Enhanced RBAC

Implementing distributed ledger technology to enhance Risk based assessment.

Mobile and IoT Device Access

Extending biometric authentication to mobile platforms and IoT devices with specialized scanning hardware.

Quantum-Proof Cryptography

Developing encryption methods resistant to quantum computing attacks to future-proof security infrastructure.

Advanced Mobile Lens Scanners

Creating next-generation portable scanning devices with enhanced accuracy and reduced form factor.

Meet the Team

AI & Performance Team

Niveditha T - AI/ML Engineer

Rakesh Srivatsav V - Data Analysis

Security & Architecture Team

Ross Macdonald - CTO, Security Lead

Harshika Pareek - Data Strategy Lead

Testing & Reliability Team

Thapelo Khantsi - Tech/QA Lead

Pratiksha Chaudhari - Data Analyst

Business & Strategy Team

Saurabveer Singh - Business Analyst

Michael J. Loftus - Team Lead