Law as Code 2025/2026

D-Check: Edge-Converged Legal Navigation

Secure and Compliant Mobile Anti-Discrimination Solution

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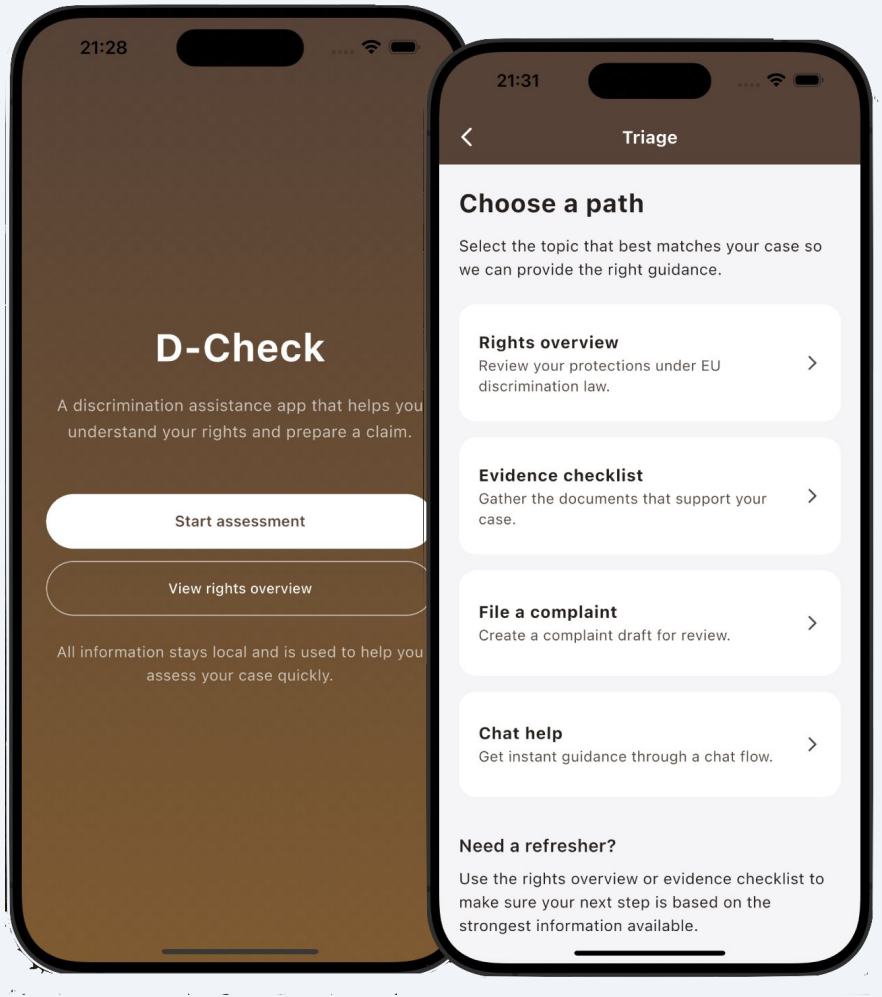
Accessible EU Anti-Discrimination Law App

Secure and Compliant Mobile Anti-Discrimination Solution



The Privacy Crisis in AI Legal Tech

Cloud RAG Vulnerability

Security Vulnerabilities

Traditional platforms transfer unencrypted, sensitive personal disclosures to centralized cloud databases or third-party repositories.

Procedural Complexity

Navigating fragmented EU Member State laws and language barriers is structurally difficult for everyday citizens.

Loss of Data Sovereignty

Victims lose control over their data when translating lived experiences into the technical language required for legal filings.

D-Check Core Capabilities.

Rights Overview

Localized access to EU Directives and Member State anti-discrimination laws, translated into plain language.

Evidence Checklist

Deterministic guides for capturing critical incident details, ensuring reports meet legal evidentiary standards.

File a Complaint

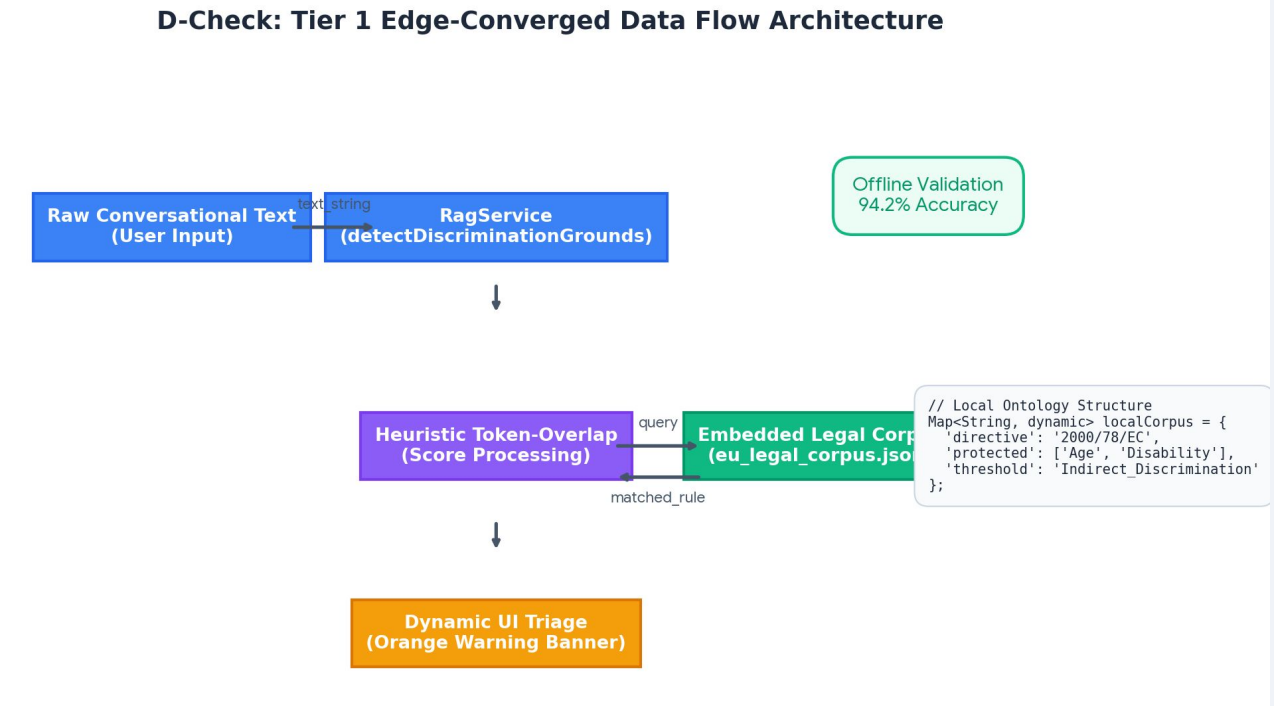
Streamlined generation of formal legal documents based on user input, ready for submission to local authorities.

Chat Help

Privacy-first conversational interface powered by ephemeral compute tunneling for secure legal navigation.

Tech Architecture

On-Device Trust Boundary



Flutter & Dart Engineering

Built specifically for rapid hackathon deployment and real-world compliance without a network layer.

Open-Source Integrity

A transparent framework demonstrating that mobile applications can successfully orchestrate RAG workflows entirely on-device.

Edge Convergence

Moving processing logic directly onto the smartphone ensures data remains secure and isolated.

Dual-Tier Execution Pipeline

Orchestrated Compliance

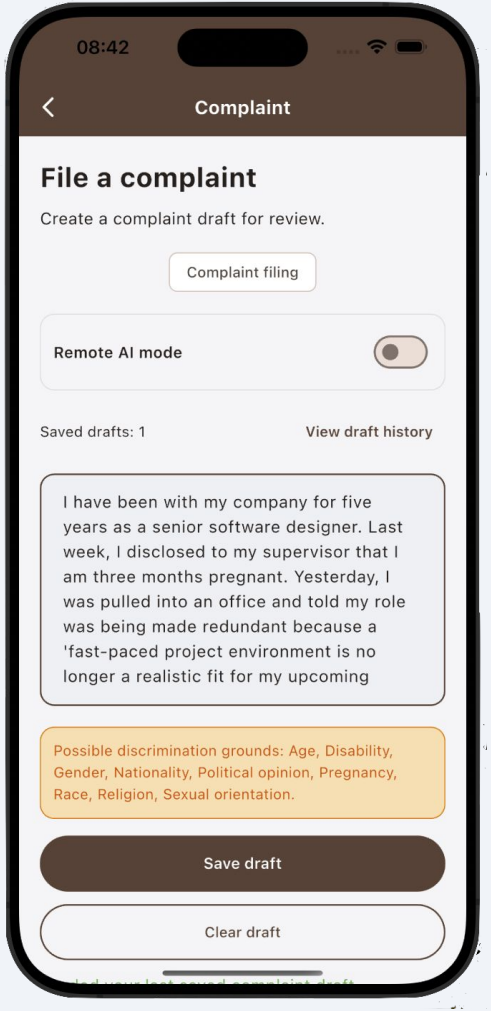
Tier 1: On-Device Triage (Deterministic)

Runs entirely offline. Processes natural language locally using token-frequency heuristics to flag protected legal grounds as the user types.

Tier 2: Ephemeral Tunneling (Stateless)

Enhances queries with on-device statutory text before routing through encrypted tunnels to a stateless Mistral-7B instance.

Achieves zero-latency onboarding and built-in GDPR Article 17 compliance.



Deterministic Local Classification

RagService Engine

Strips punctuation, normalizes casing, and tokenizes input entirely inside local device memory for immediate processing.

Zero Hallucinations

Protects the initial categorization layer by cross-referencing against a localized dictionary of terms derived from EU Directives.

Real-Time Badging

The interface dynamically displays legal category badges as the user types, without making external network calls.

Technical Implementation: RagService

Deterministic Local Engine

Active Listener & Tokenization

Feeds raw text into `detectDiscriminationGrounds()`, stripping punctuation and normalizing casing entirely in local memory.

Multi-Tiered Dictionary Mapping

Matches tokens across embedded arrays of core EU protected classes (age, disability, gender, etc.) for real-time analysis.

Local Corpus Retrieval

Scans `eu_legal_corpus.json` for exact matching legal text and directive abstracts without external network calls.

Individual Case

Scenario: Visa-Sensitive Rights

A foreign worker in Vienna facing eviction by a landlord refusing non-EU citizens.
The worker fears cloud-based tools could flag their visa status with authorities.

D-Check Action: Local Trust

User documents the incident and lease details entirely on-device. D-Check's **RagService** flags "Nationality Discrimination" without any external network calls.

Outcome: Secure Navigation

The worker receives a structured legal report for local advocacy, ensuring their sensitive data never touches a public cloud or immigration database.

D-Check Mobile Interface

Ephemeral Compute Tunneling

Stateless Inference

RemoteAiService

Compiles prompts on-device with securely fetched statutory text before routing through encrypted tunnels to Hugging Face.

Mistral-7B-Instruct-v0.3

Utilizes open-weight models for predictable and verifiable legal output with a locked-down temperature of 0.1.

Volatile RAM Processing

Remote AI processes inputs in volatile memory and instantly wipes the prompt, ensuring no data persistence or hosting.

Technical Implementation: RemoteAiService

Secure Tunnel Execution

Authorization Security

Connection wrapper passes prompts directly to the Hugging Face ecosystem using tokens secured via flutter_dotenv .

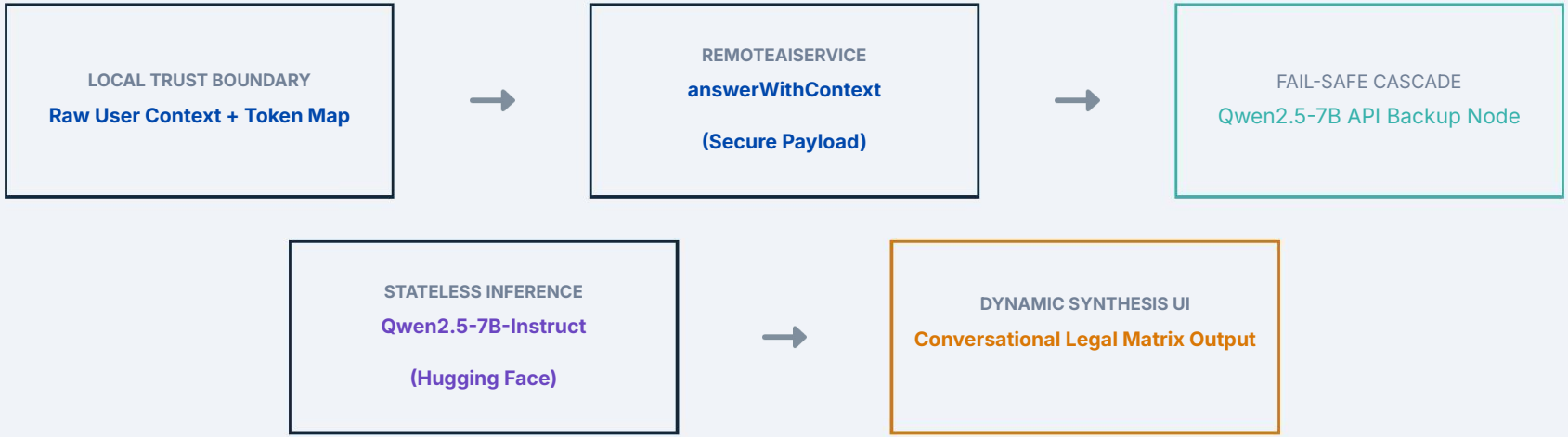
Predictable Output Synthesis

Model parameters are locked to a temperature of 0.1, ensuring the AI functions strictly as an unbiased legal text synthesizer.

Stateless Connection Pipeline

Functions as a volatile compute tunnel rather than a data store, guaranteeing complete data sovereignty for the citizen.

Tier 2: Ephemeral Compute Data Flow




```
// Stateless Compute Configuration
Map<String, dynamic> remoteConfig = {
'model': 'Qwen/Qwen2.5-7B-Instruct',
'temperature': 0.1,
'data_persistance': false
};
```

Enterprise Scenario

Scenario: AI Hiring Audit

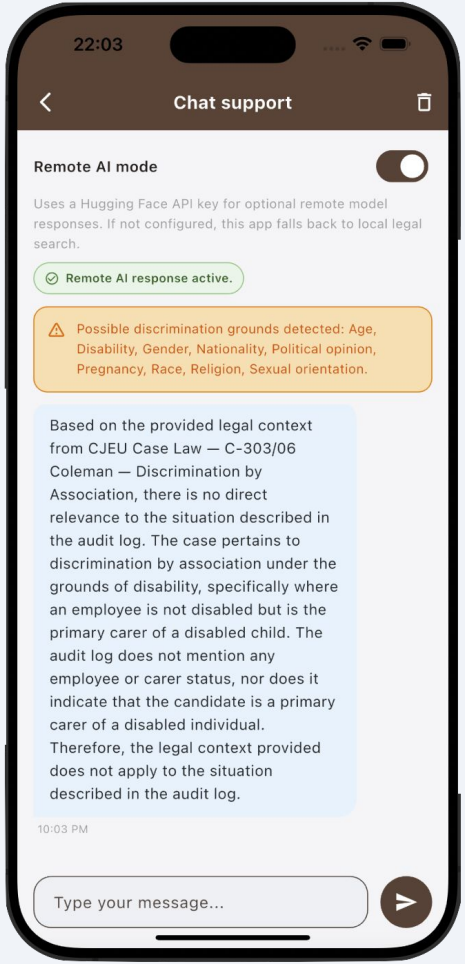
A multinational consulting firm audits a client's AI hiring vendor. They suspect systemic rejection of applicants with gaps due to parental, disability leave, or career changes.

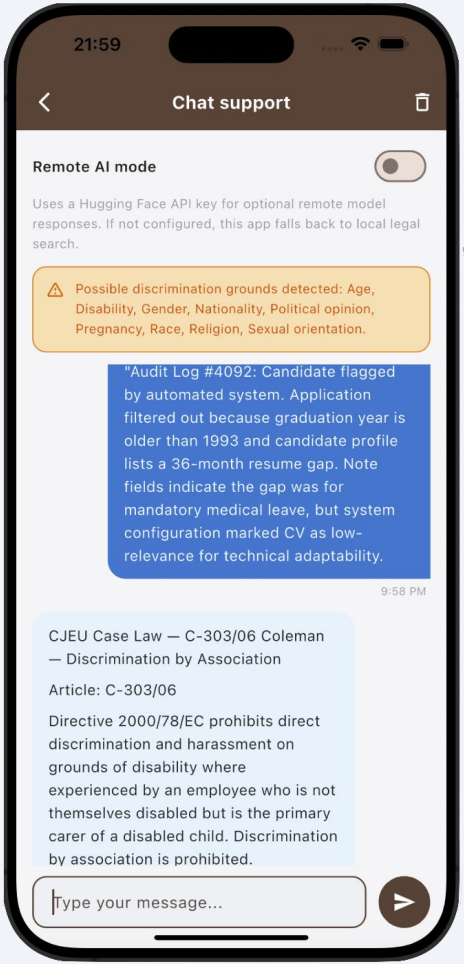
D-Check Solution: Secure Audit

Legal counsel uses D-Check as a secure mobile gateway to test vendor responses. **Ephemeral Tunneling** ensures sensitive audit data never touches the vendor's cloud.

Impact: Scalable Compliance

The firm achieves zero-infrastructure hosting costs and automatic compliance with the **EU AI Act**, identifying bias without compromising data sovereignty.

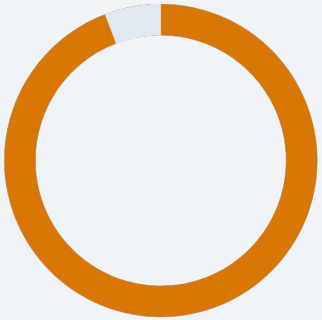




Algorithmic Validation Results

94.2%

Mapping Accuracy Rate



Validation Suite Testing

The Deterministic Token-Frequency Scoring engine was tested against a suite of simulated discrimination reports, achieving high precision in mapping informal inputs to EU legal categories.

User Trust & Sovereignty

Focus group feedback confirms that vulnerable individuals are significantly more likely to document incidents when data is stored securely on their own device.

Real-Time Educational Feedback

The As-You-Type Ground Detection feature provides immediate feedback, helping users understand their rights as they document their experiences.

Compliance & Data Minimization

Regulatory Integrity

GDPR Article 5(1)(c)

Adheres to Data Minimization by processing only the minimum data necessary through ephemeral, stateless compute tunneling.

Encrypted Local Sandbox

Sensitive personal disclosures are stored exclusively in an encrypted environment on the user's device, never in the cloud.

EU AI Act Transparency

Reduces systemic risk by employing open-weight models (Mistral-7B, Qwen2.5-7B API Backup Node) with verifiable prompts and temperature parameters.

Future Roadmap: Scaling the Edge

Phase 1
P2P Synchronization

Building a **peer-to-peer mechanism** using cryptographically signed updates for local legal reference files without central servers.

Phase 2
Hardware Acceleration

Utilizing **TensorFlow Lite** or ONNX Runtime to run compact embedding models directly on the smartphone hardware.

Vision
Local Trust Boundary

Bringing **advanced semantic vector search** entirely within the local trust boundary for ultimate privacy and speed.

Thank you!

D-Check: Secure, Private, Compliant

https://github.com/mycodetalks/D-check

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