

VoxProof: Voice-Authenticated Text Generation for Academic Integrity

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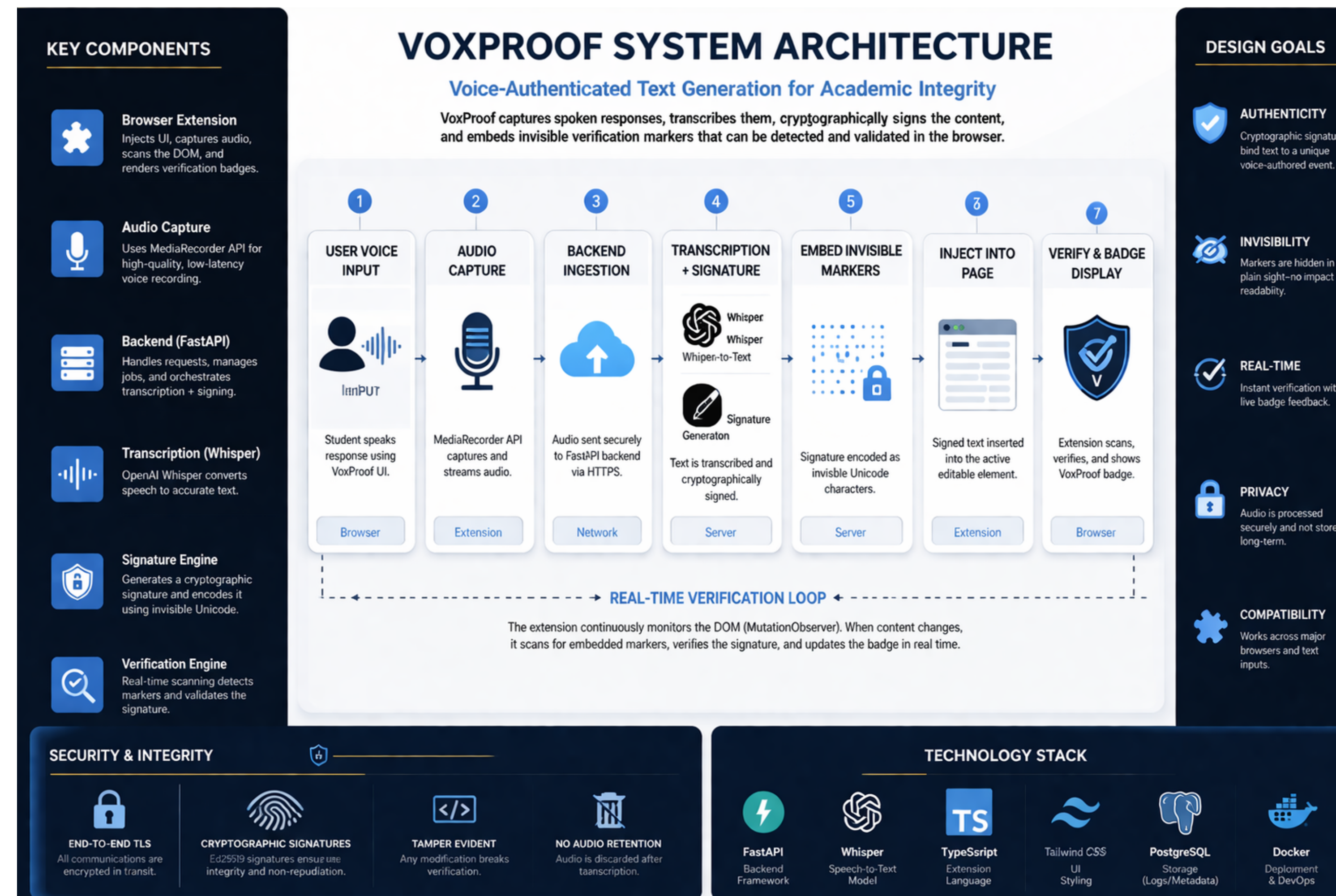
Research question: How can student authorship be verified in academic writing when large language models can generate high-quality text indistinguishable from human work?

Motivation

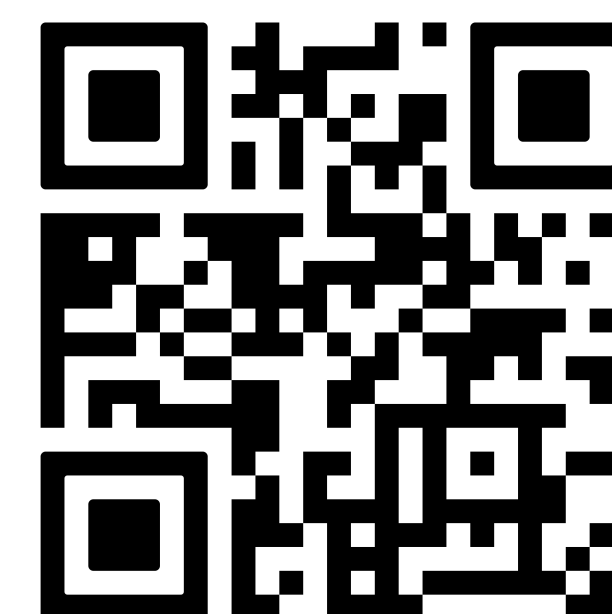
- Large language models can generate high-quality written responses indistinguishable from human work
- Typed assignments are no longer reliable indicators of students' academic understanding
- Current approaches rely on detecting AI-generated text, which is inconsistent and unreliable
- **This motivates a shift from detecting AI-generated content to verifying authentic human authorship**

Research Method

1. User records a spoken response using the browser extension
2. Audio is captured via the MediaRecorder API
3. Audio is transmitted to a FastAPI backend via HTTPS
4. Backend performs speech-to-text and generates a cryptographic signature
5. Signature is encoded into invisible Unicode characters
6. Transcribed text and embedded signature are injected into the DOM
7. Extension scans the page and detects embedded signatures
8. Verified content is labeled with a VoxProof badge



Scan Me For Live Demo



Challenges

- Limited prior experience with JavaScript required rapid learning of browser APIs and async event handling
- Chrome extension instability during development (permissions, content scripts, and DOM access issues)
- Ensuring compatibility across dynamic web pages using MutationObserver without breaking page behavior
- Researching and validating invisible Unicode characters that preserve rendering while encoding signatures
- Evaluating different Whisper models to balance transcription accuracy, latency, and compute constraints
- Designing a reliable pipeline for stopping/starting audio capture and preventing duplicate or partial inputs
- Maintaining end-to-end consistency between transcription, signature generation, and DOM injection

Progress & Future Work

- Implemented cryptographic signature generation and encoding into invisible Unicode markers
- Demonstrated real-time verification of authored text through browser-based scanning
- Initial testing shows the system can distinguish VoxProof-authenticated text from unverified content
- Evaluate robustness of embedded signatures against adversarial edits and real-world text modifications
- Compare VoxProof against existing AI-detection methods to assess reliability in academic settings