

Custody Lens

Explainable, local anomaly analysis for specimen-handling metadata.

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Problem and intended users

Laboratory operations teams need a way to inspect unusual handling records while keeping the evidence and uncertainty visible. This prototype supports research into transit, queue and custody-scan patterns; it does not judge a patient's result or decide specimen acceptability.

What works

Import a JSON reference/candidate dataset, fit a separate three-nearest-neighbor reference model for each route, inspect scores and nearest examples, add a reviewer note, and export the review packet. The interface runs entirely in the browser. Unknown routes remain unscored.

AI method and limitations

The model uses robust feature scaling and a leave-one-out reference 95th-percentile distance threshold. It is unsupervised anomaly detection, not clinical classification. Reference selection, low sample sizes and distribution changes may produce misleading results. Example records are synthetic; there are no patient data, clinical accuracy measurements or hospital deployment claims.

New contribution and provenance

Adapted from my existing MED-BLACKBOX project. Its Splunk and hosted-model agent are prior work retained in the repository. New UnivaBio work is the local kNN model, route isolation, strict JSON import, evidence inspector, annotated export, responsive UI, tests and demonstration. OpenAI Codex assisted with code, testing and documentation; Google Chirp 3 HD generated demo narration.

Validation and next steps

Four model tests cover unusual examples, unsupported routes, constant reference data, invalid values, duplicate identifiers and unknown-field removal. Browser checks verify selection, malformed imports, export and mobile layout. Next: qualified operations review with consented, appropriately governed data, and prospective evaluation of false positives and missed patterns.

Research prototype only. No automatic clinical actions. No guarantee of specimen quality. Free-text notes and identifiers are not exhaustively de-identified; do not upload patient information.

[Live prototype](#) · [Source and reproducible tests](#)