



DEMO DECK*

AI-assisted MRV for Smallholder Carbon Project

**Sample/illustrative assets – no proprietary data*

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Role: Technical Program Manager
Dec 2023–May 2025
4 countries · 100+ contributors

Problem

- Credits are only issued when removals are measured, reported, and verified.
- Credit calculation depends on consistent trench dimensions, feedstock mass and moisture, method, GPS and date, and methodology factors.
- Data quality was uneven across countries, standards were changing, connectivity was poor, and auditors needed reproducible evidence and a clear decision trail.

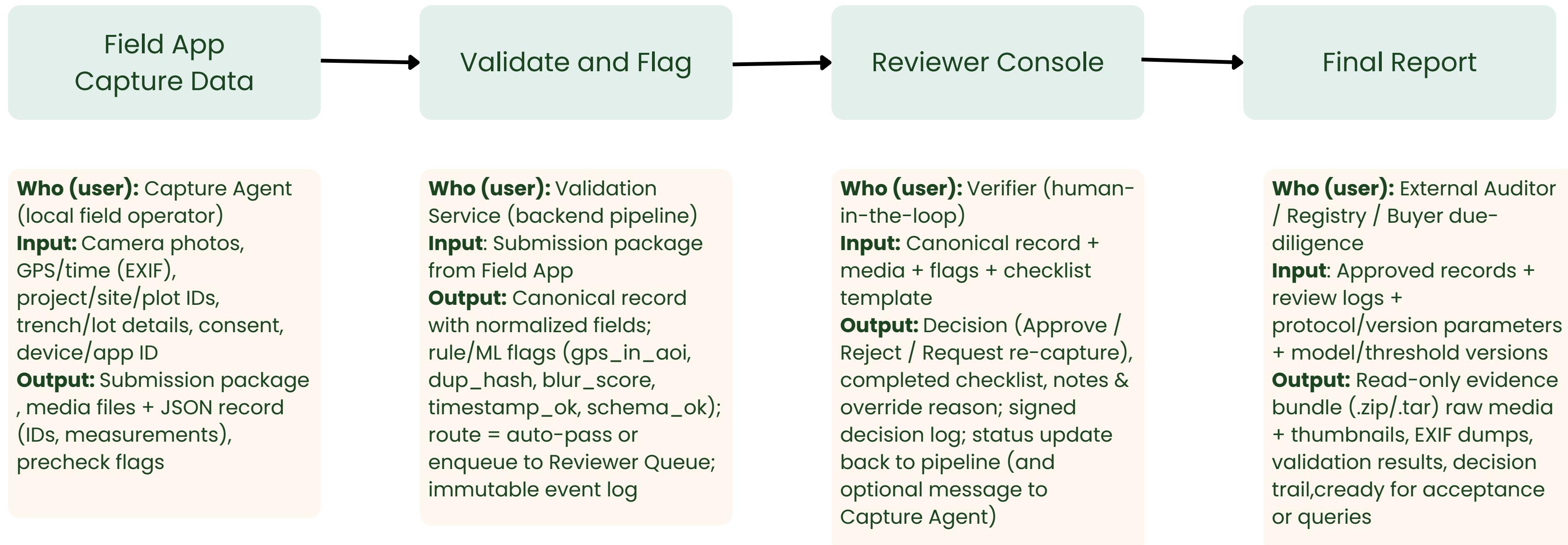
Context

- Distributed field teams in 4 countries with low or patchy connectivity and varied devices.
- Human reviewers with external auditors and evolving requirements.

Goals / Success criteria

- Auditor acceptance on the first full cycle.
- Simple and reliable capture for field operators.
- Median review time target: 3 days with a tamper-evident record of decisions.

System at a Glance



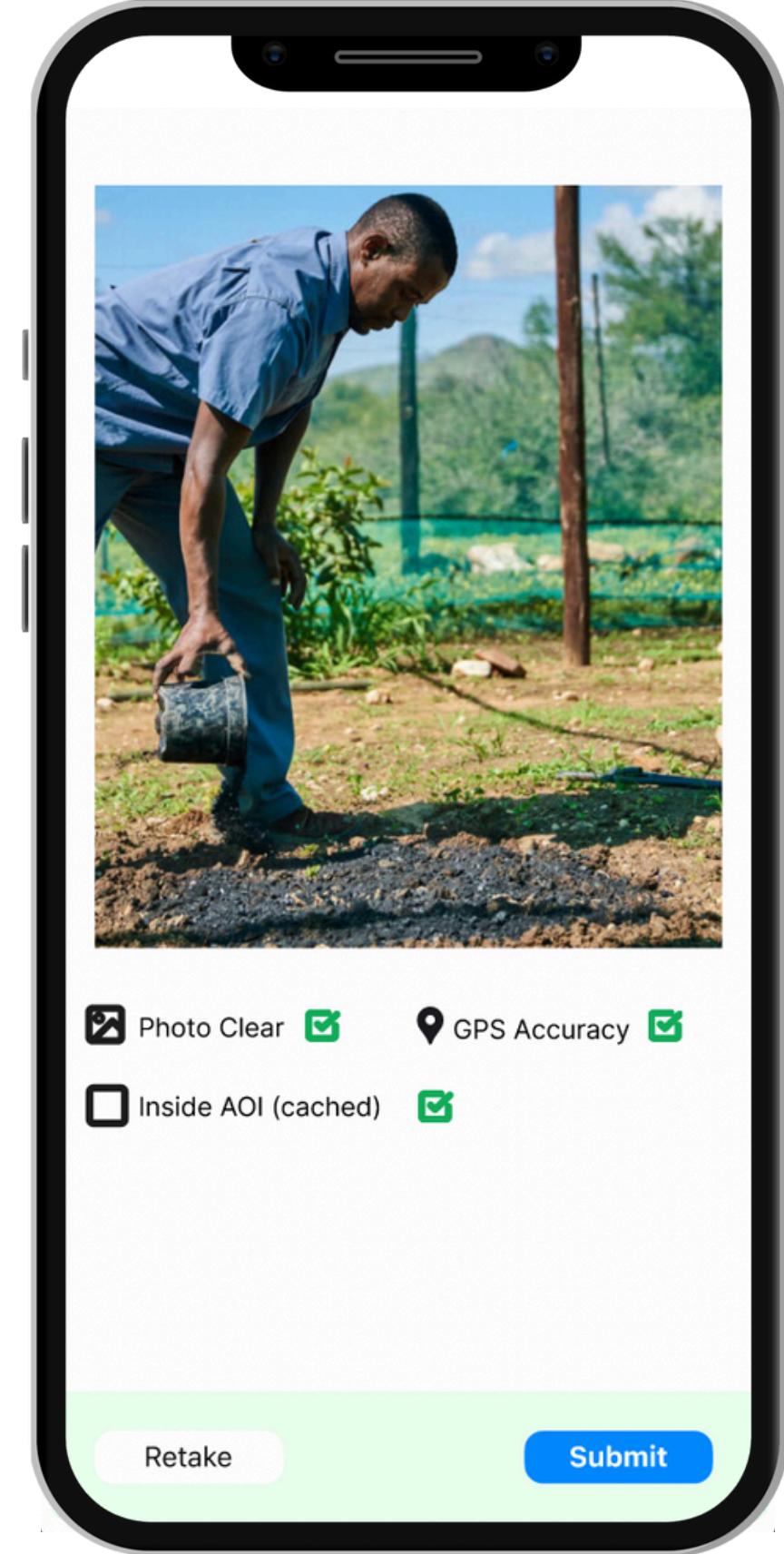
Field App - Capture Data

Who (user): Capture Agent (local field operator)

Input: Camera photos, GPS/time (EXIF), project/site/plot IDs, trench/lot details, consent, device/app ID

Output: Submission package , media files + JSON record (IDs, measurements), precheck flags

Tools: Python on AWS; pHash + rule engine; OpenAI for reviewer hints; metrics to Power BI



Demo Screen

Validate and Flag

Who (user): Validation Service (backend pipeline)

Input: Submission package from Field App

Output: Canonical record with normalized fields; rule/ML flags (gps_in_aoi, dup_hash, blur_score, timestamp_ok, schema_ok); route = auto-pass or enqueue to Reviewer Queue; immutable event log

Sample Rules Table

Rule	Threshold	Action on Fail
Blur/Sharpness	Variance-of-laplacian > 120	Send to Reviewer (Warn)
GPS Accuracy	$\geq 30m$	Send to Reviewer (Warn)
AIO Distance	Near edge	Send to Reviewer (Warn)
Duplicate Image	Duplicate Image	Send to Reviewer (Warn)
Trench Dimensions	outside allowed range e.g., Length 0.5–20 m, Width 0.2–1.5 m, Depth 0.2–2.0 m	Send to Reviewer (Warn)

Sample only

Reviewer Console

Who (user): Verifier (Compliance Coordinator)

Input: Canonical record + media + flags + checklist template

Output: Decision (Approve / Reject / Request re-capture), completed checklist, notes & override reason; signed decision log; status update back to pipeline (and optional message to Capture Agent)

Reviewer Console

The screenshot shows a review interface for a sample record. At the top, there are dropdown menus for Region (Kenya), Type (Production), From (Aug 1, 2024, 9:41 AM), To (Nov 30, 2024, 9:41 AM), and Status (Received). Below these are search and filter fields. A list of sample records is displayed, with SAMPLE 104 highlighted in green. To the right of the list is a photograph of a person working in a field. Further right are sections for 'Name' (John Doe), 'Production Date' (Aug 3 2024 10:00 AM), 'LC' (Mary Joe), 'Collection Date' (Aug 3 2024 10:30 AM), 'Total' (3T), 'Co2' (6.588 T), and coordinates (1.2921° S, 36.8219° E). On the far right are two sections: 'Auto Flags' (No Duplicate, Trench Ok, GPS Present checked) and 'Manual Flags' (Photo Clear, TimeStamp Valid, Production OK unchecked).

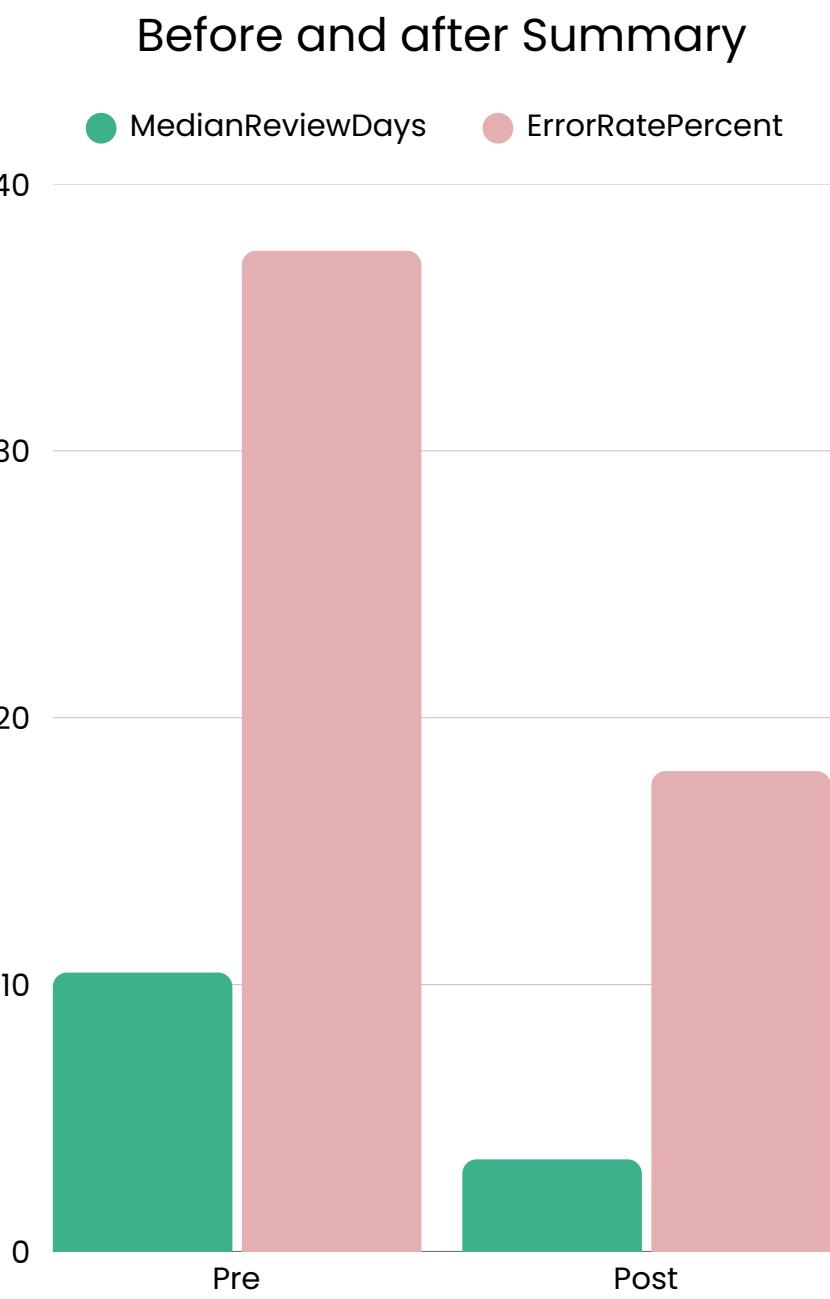
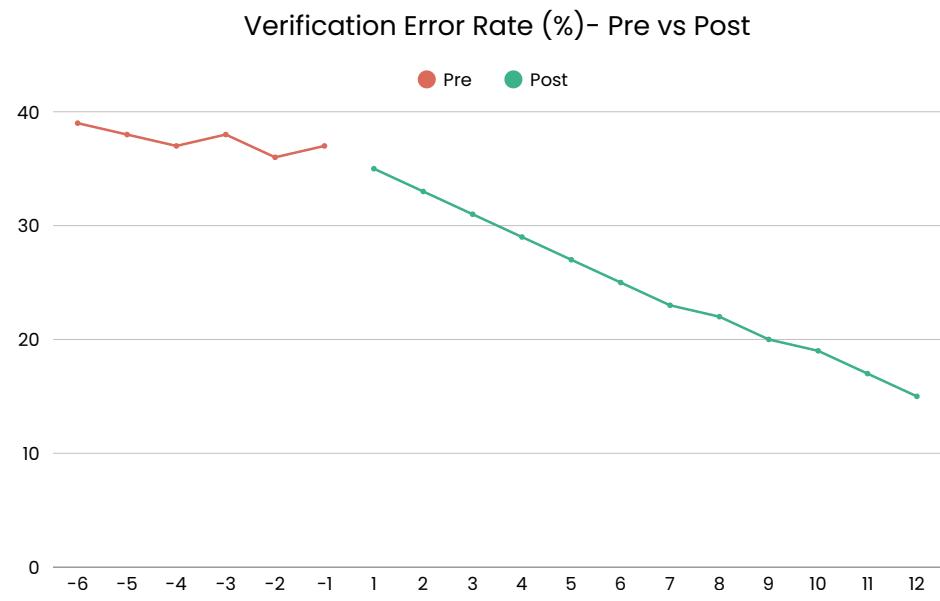
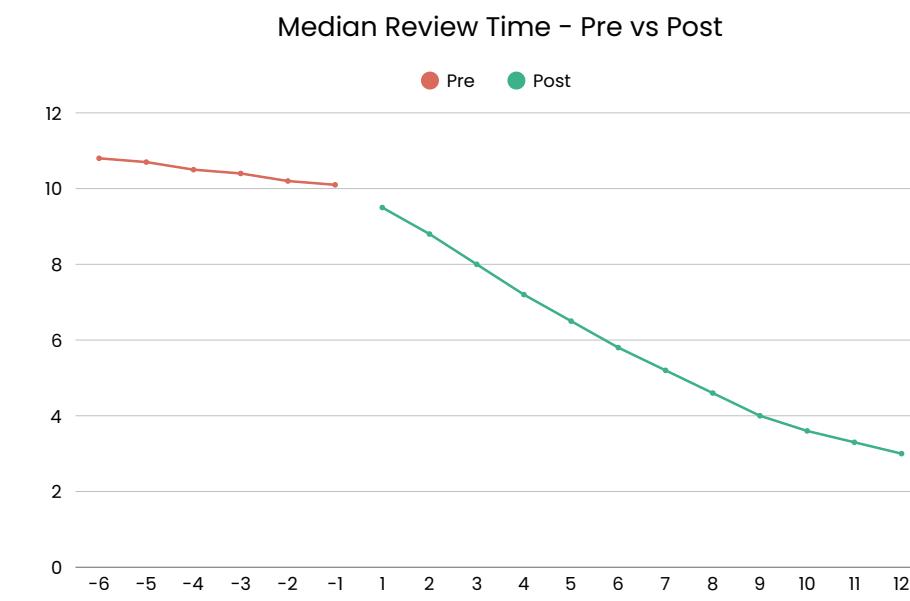
Sample only

Outcome - Final Report

Impact:

- 10,000+ verified credits
- Median review time: ~10d to 3d
- Verification errors: down ~15%

Compared to the 6-week baseline, release cut median review time from ~10.5d to ~3.5d and error rate from ~37.5% to ~18% at steady state (last 4 weeks), while meeting our 3-day SLA."



System Architecture and Tools Used

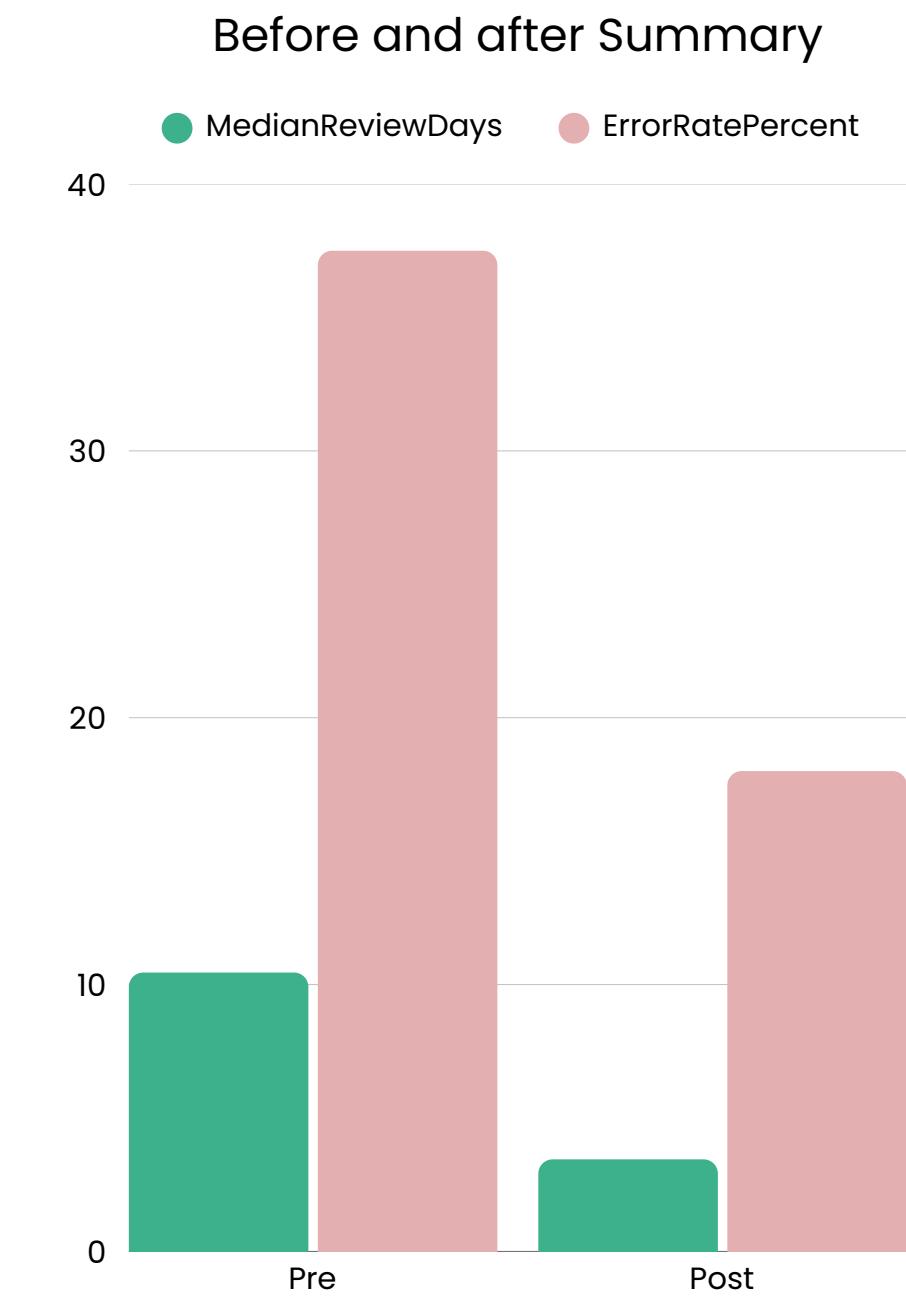
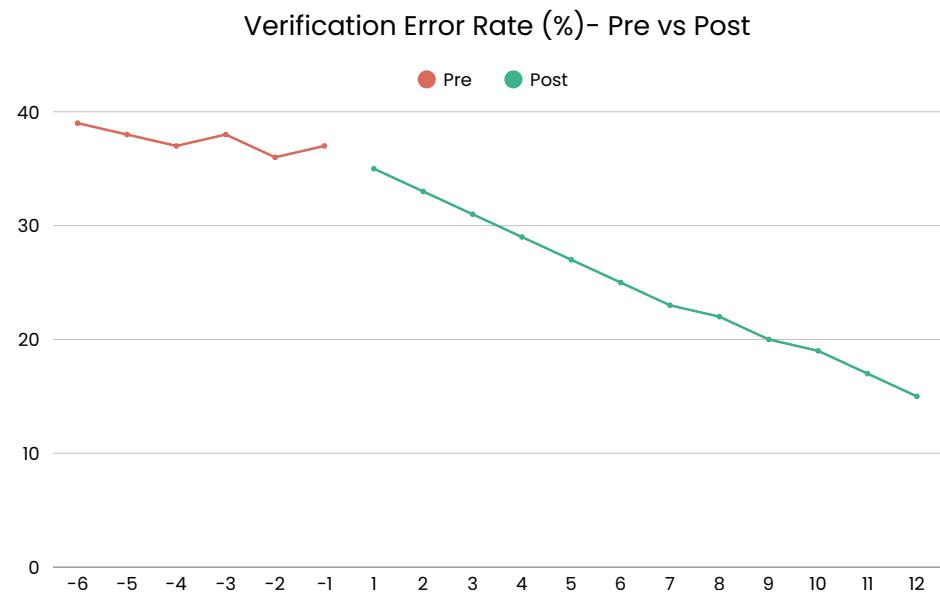
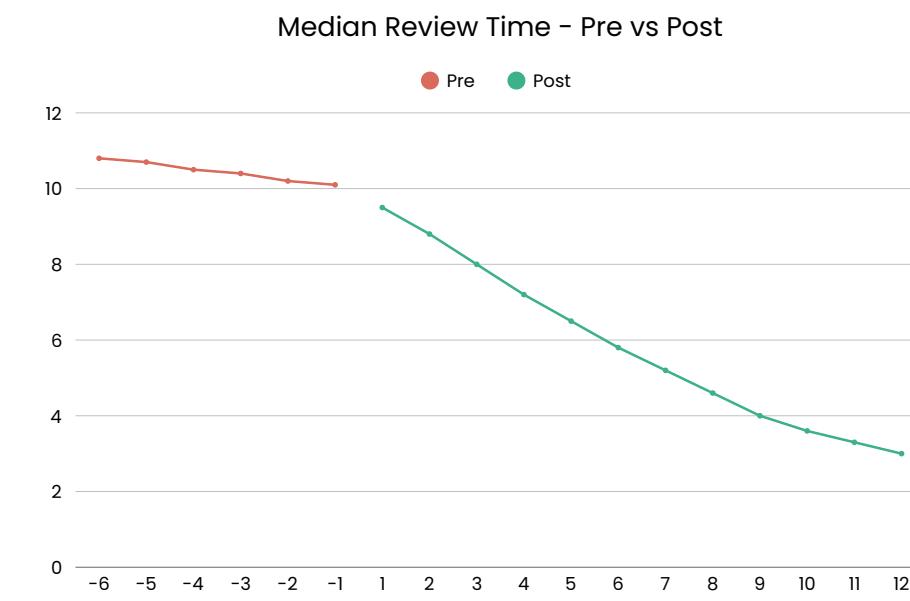
Module	Tech	Why this choice	Notes
Capture app	React (PWA)	Fast to ship, works on any phone, offline capable	Offline outbox; prechecks for blur, min resolution, GPS accuracy, cached AOI; sends JSON + image to API
Ingest and validation	Python API on AWS (FastAPI or Lambda), S3	Simple and reliable services with strong libraries	Store media in S3; record ETag and size; EXIF sanity; pHash duplicate check; GPS and AOI checks; route to auto-pass, reviewer, or quarantine; append-only event log
Source of truth	PostgreSQL (optional PostGIS)	Strong relational plus geospatial and audit trail	Tables: submissions, media, AOI, reviews, events; idempotent upserts by submission_id
Reviewer console	Airtable Interface	Approve and Reject quickly without building a custom UI	Buttons with required rationale; Automation posts decision to API; API updates Postgres and event log; only minimal data in Airtable
Analytics	Power BI (reads Postgres)	Clear KPI cards and weekly trends	Use read-only views; export PNG or PDF for the deck
Backups and integrity	S3 versioning, RDS snapshots, small Python jobs	Simple safety and restore path	ETag and size for basic integrity; append-only event history; plan SHA-256 and manifest later if needed
Ops and change tracking	Jira	Track actions, releases, and rule changes	Link tickets to Decision Log and Thresholds list
Optional AI assists	OpenAI (server side)	Reviewer hints and FAQ drafting	Keep outputs as suggestions, not decisions
Hosting and security	AWS (S3, Lambda or ECS, RDS)	Scales as needed with managed services	IAM roles, least-privilege access; VPC for RDS; region near users

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Program Ops & Governance

When

- Pre-launch: short team sync to check readiness
- Post-launch: weekly rhythm to track results and improve

Weekly rhythm

- Metrics (30 min): how many finished, typical and slowest review times, percent meeting 3-day goal, percent auto-pass, percent hard fails → pick 2–4 fixes with owner and date
- Decision log (15 min): write what changed, why, who owns it, start date, rollback plan
- Team sync (45 min): Field, Data, Eng, Verifiers review risks, issues, field feedback, auditor asks

Key docs

- Decision log: Date | Change | Why | Owner | Start | Rollback
- Rules list: one place for current numbers like min blur, max GPS error, AOI buffer, duplicate cutoff, model versions
- Reviewer guide: checklists and when overrides are allowed with a short note

Roles

- TPM: runs the rhythm and change control
- Eng lead: keeps pipelines reliable and safe to retry
- Data lead: owns metrics and sampling
- Field ops: advises on usability and rollout
- Verifiers and auditors: advise on rule clarity and evidence

Thank you

TLDR

Problem: uneven data, changing rules, slow reviews

Approach: offline capture with device checks, clear backend validation, reviewer console, and audit logs

Impact:

- 10,000+ verified credits,
- Median review time reduced from 10 days to 3 days,
- Errors down about 15%

My role: TPM and product lead across field, data, and engineering

Stack: Python, React, PostgreSQL, AWS (S3, Lambda), Power BI, Airtable, OpenAI (server-side assists), Jira

Contact



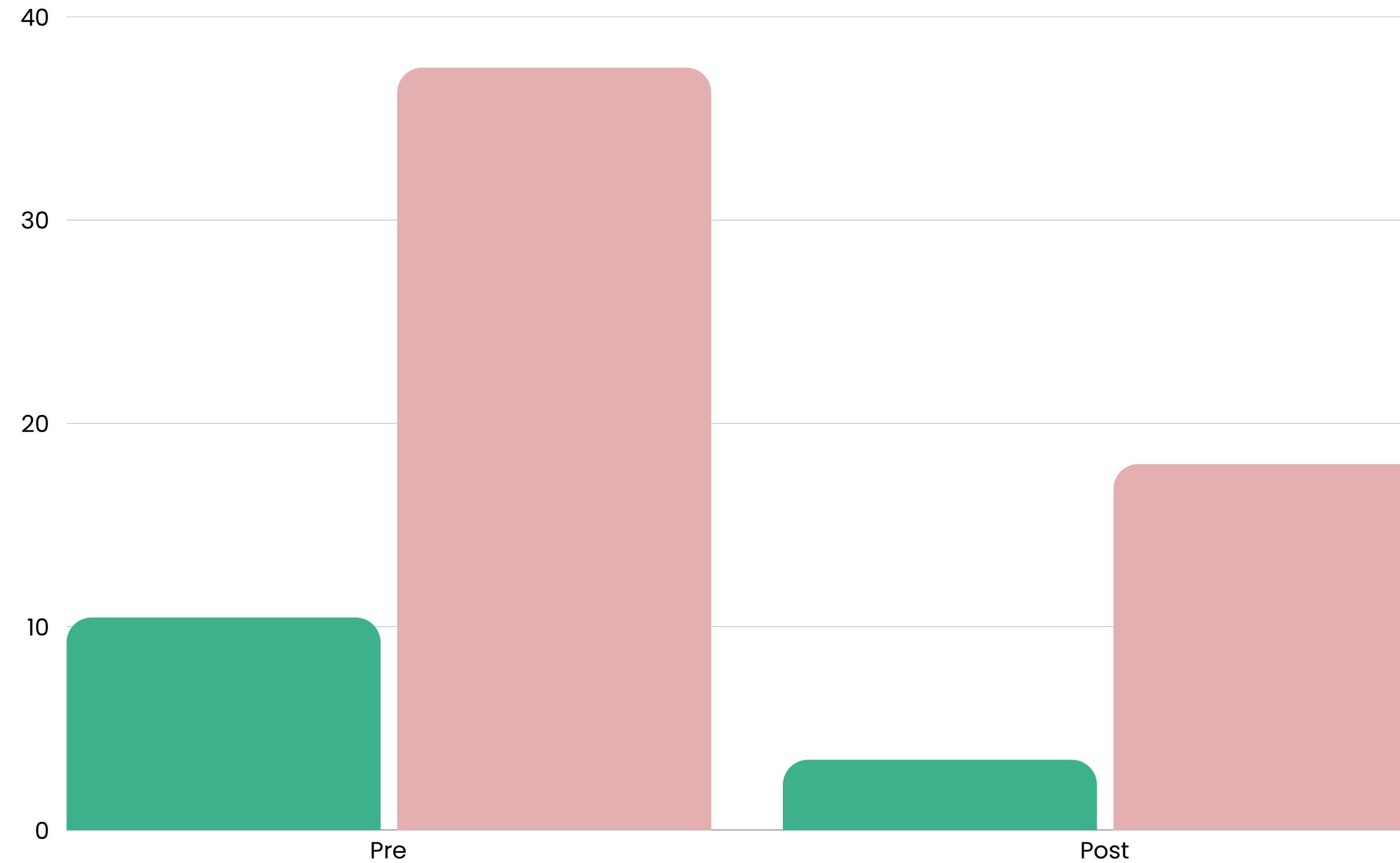
Email: mona.singh08@gmail.com

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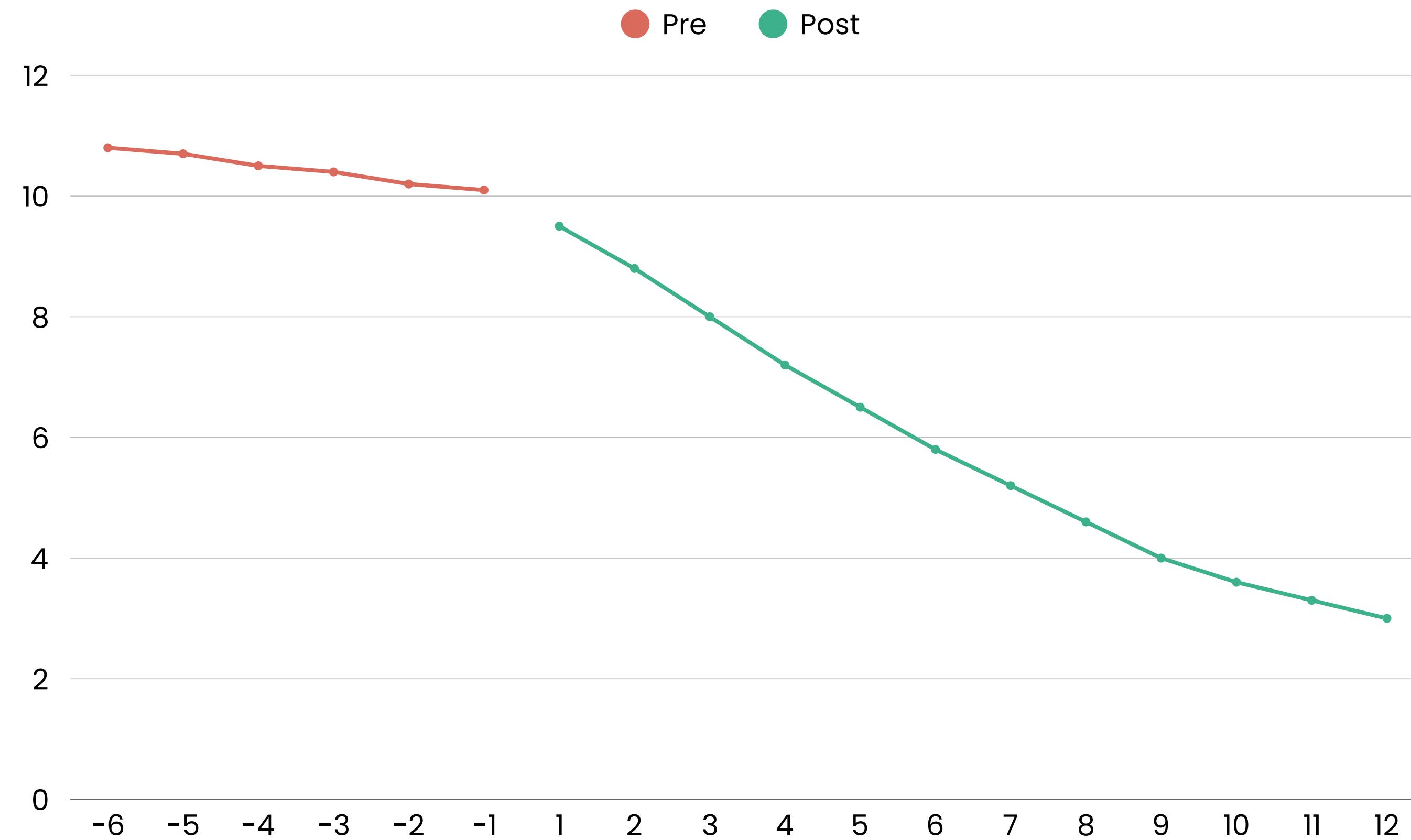
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Before and after Summary

● MedianReviewDays ● ErrorRatePercent



Median Review Time – Pre vs Post



Verification Error Rate (%) - Pre vs Post

