



Hack Wizards

AI-Powered TermSheet Validation for Barclays

Automating Accuracy, Compliance, and Efficiency in Post-Trade Operations





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Theme : TermSheet Validation using AI





Problem Statement



Financial institutions globally struggle with inefficient, error-prone manual term sheet validation processes that require hours per document while still maintaining 10-15% error rates, leading to costly trade discrepancies, settlement delays, and compliance risks; as trading volumes surge, current methods fail to adequately handle diverse document formats (PDFs, emails, Excel), adapt to evolving regulations, or scale efficiently without proportional cost increases, creating an urgent need for an automated solution that can process documents in minutes with near-perfect accuracy while dynamically adjusting to new requirements and transaction volumes to eliminate operational bottlenecks, reduce financial risks, and free up resources for strategic work.



Solution

1. Document Ingestion

- Handles PDFs, emails, Excel, and scanned images

2. Smart Extraction

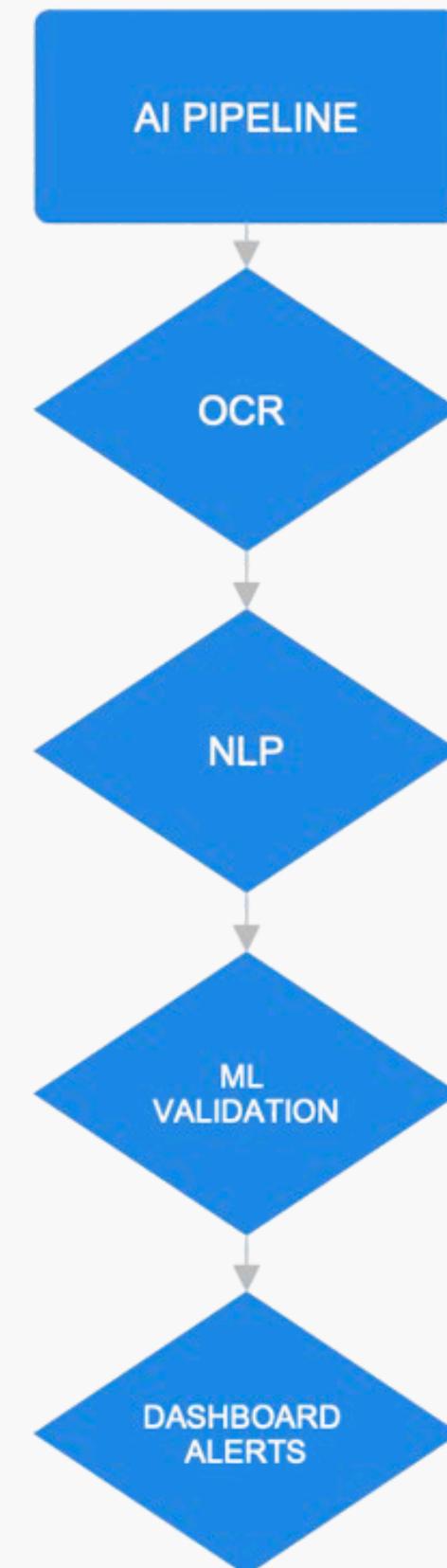
- OCR (Tesseract + AWS Textract) for text capture
- NLP (spaCy + Transformers) to identify clauses, dates, amounts

3. Intelligent Validation

- Rule-based checks (ISDA compliance, counterparty limits)
- ML anomaly detection (PyTorch) for unusual patterns

4. Actionable Outputs

- Dashboard alerts for exceptions
- Audit-ready validation logs



Solution

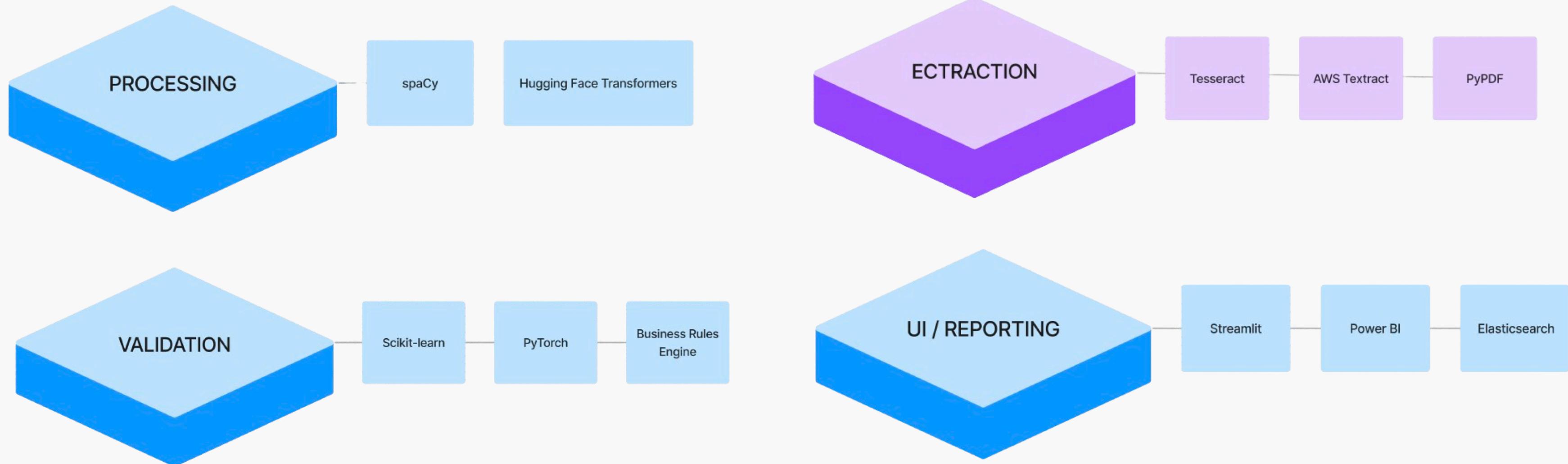


Key Advantages :

- ✓ Hybrid Approach - Combines rules (for known requirements) + ML (for anomaly detection)
- ✓ Regulatory Ready - Built-in checks for ISDA, MiFID II, EMIR
- ✓ Future-Proof - Modular design adds new document types easily

Solution

Tech stack



Solution

Differentiators

Context-Aware Parsing :

Our AI solution combines context-aware parsing with specialized NLP models trained on ISDA/EMIR documentation to accurately recognize financial entities (like distinguishing 'Notional Amount' from 'Premium Amount').

Continuous Learning:

It continuously improves through user feedback loops that automatically retrain models and adapt to new document formats/clauses.



Explainable AI :

It delivers fully explainable outputs with visual heatmaps highlighting problematic terms, plain-English justifications for every validation decision.

Methodology

Data Collection & Processing:

Term Sheet Ingestion:

- Collect term sheets from diverse sources (emails, PDFs, Excel) using OCR (Tesseract/AWS Textract).
- Cleanse data by removing duplicates, standardizing formats, and masking sensitive fields.

Market/Regulatory Data:

- Integrate ISDA/EMIR clauses and counterparty limits from Barclays' databases.
- Use APIs to fetch real-time regulatory updates (e.g., MiFID II amendments).

Tools: Python Pandas, Apache NiFi, Snowflake

AI Model Development:

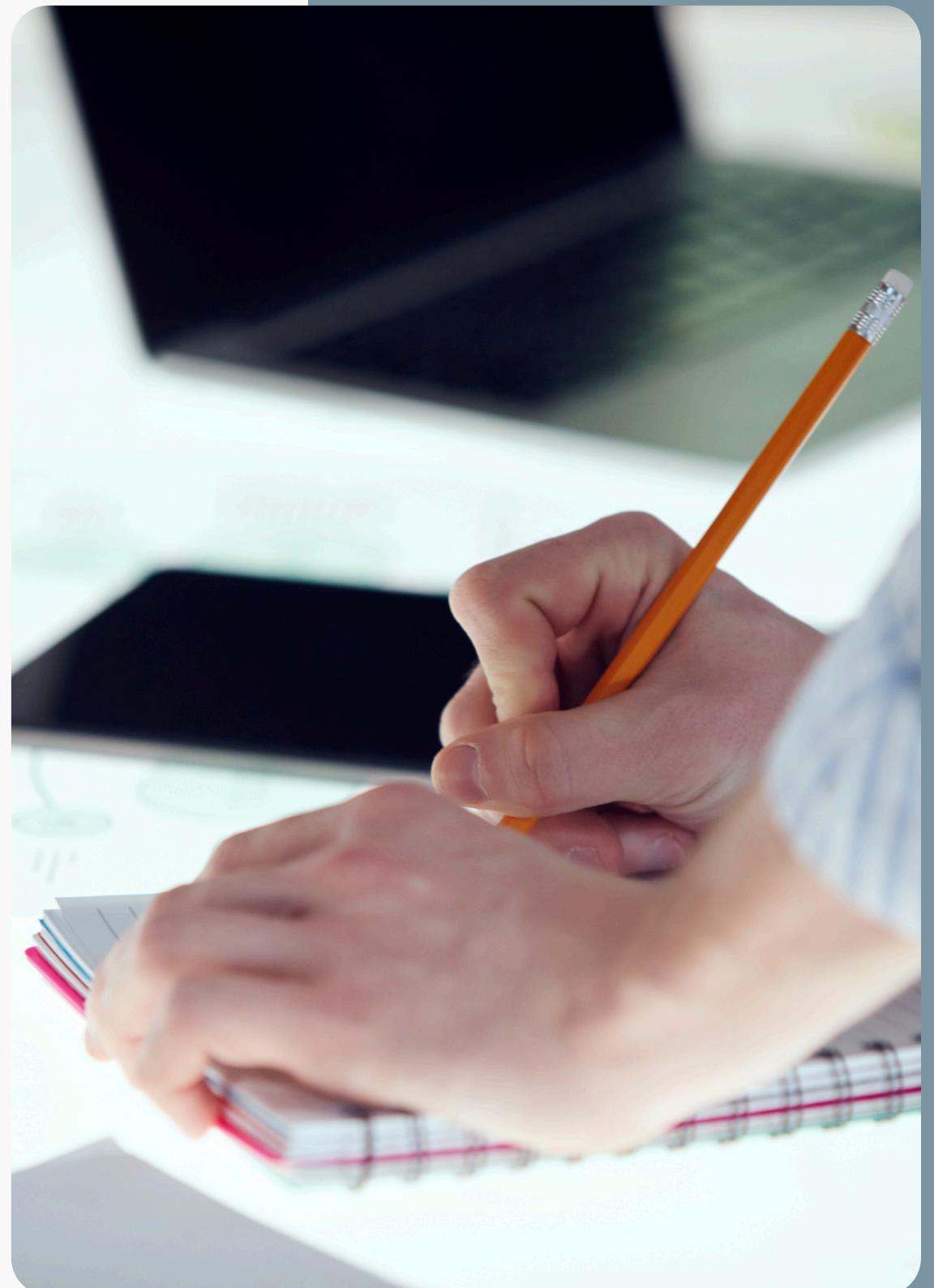
Context-Aware NLP:

- Train spaCy/Hugging Face models on financial jargon (e.g., "Notional" vs. "Principal").
- Use BERT for clause classification (e.g., "Termination Events").

Validation Engine:

- Rule-based checks (e.g., "Trade date ≤ Settlement date").
- ML anomaly detection (Isolation Forest) for unusual patterns.

Output: JSON with validated fields + confidence scores.



Methodology

Testing & Iteration:

Pilot Phase:

- Validate 1,000 historical term sheets to benchmark accuracy (target: <1% errors).
- A/B test manual vs. AI processing times.

Feedback Loop:

- Log user corrections to retrain models weekly.
- Heatmap error analysis to prioritize fixes (e.g., "Section 4.3 = 60% of misses").

Tools: MLflow, Tableau, Jira

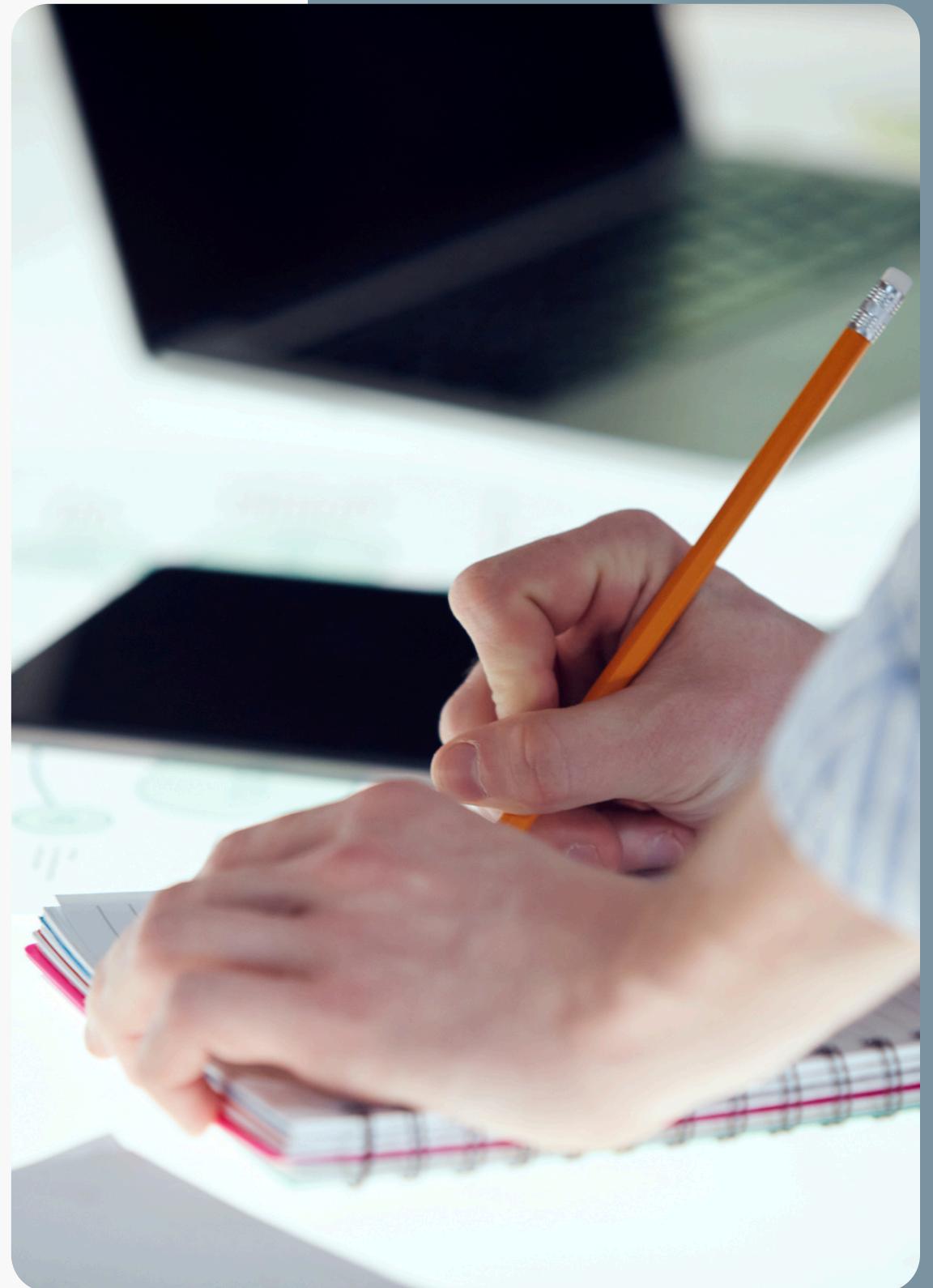
Deployment & Scaling:

Dashboard Integration:

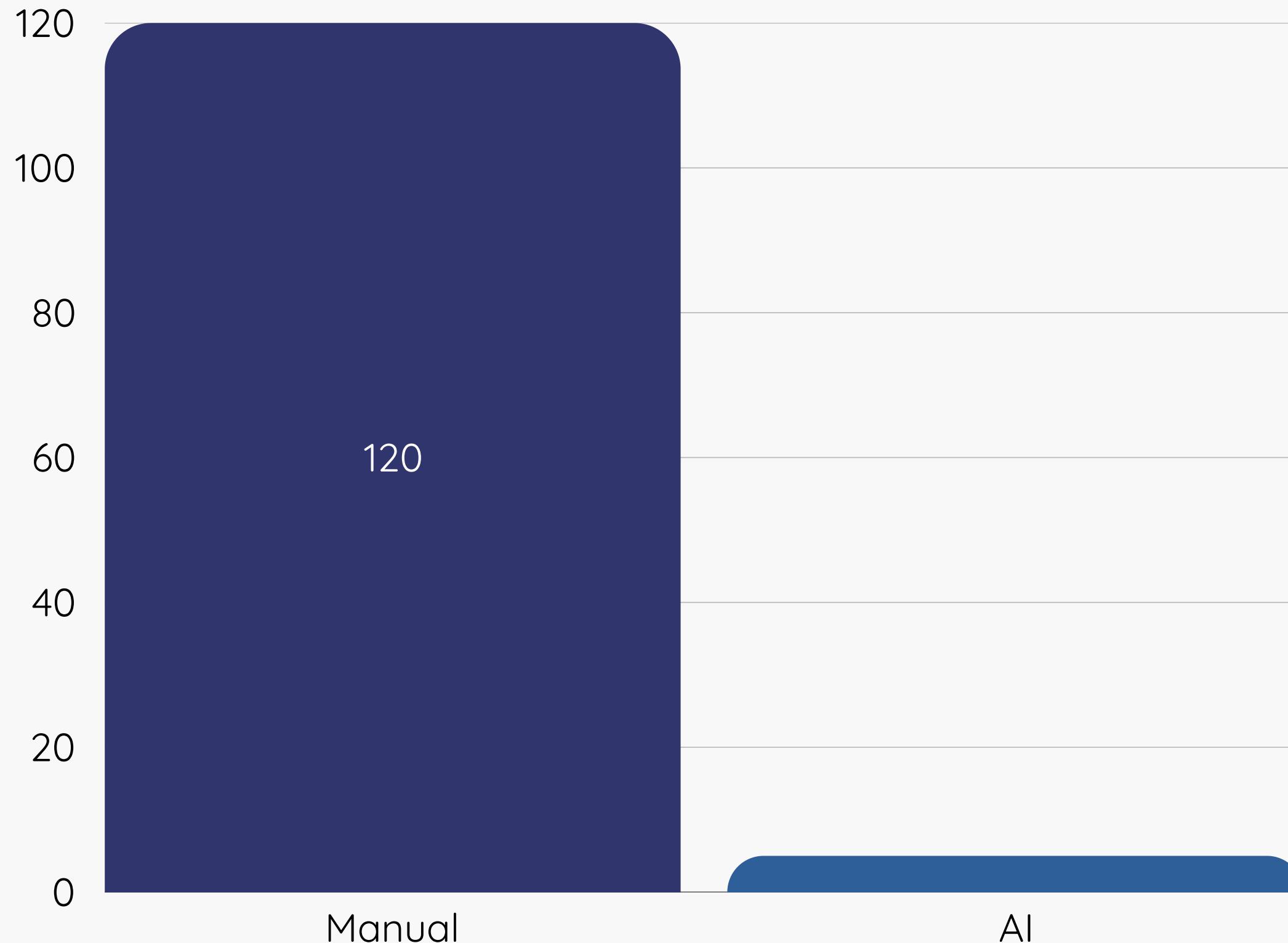
- Streamlit/Power BI UI for ops teams (Green/Red flags).
- Audit logs exported to Barclays' compliance systems.

Cloud Scaling:

- AWS Lambda for serverless document processing.
- Auto-scaling Kubernetes pods for peak volumes.



Data Analysis



Our AI validation cuts processing time from 2 hours to 5 minutes per document – achieving 96% faster throughput while reducing annual labor costs by \$958K per 10K term sheets. These efficiencies enable teams to reallocate 19,167 hours/year to high-value tasks like risk analysis and client service.

Methodology

Links to Diagrams:

Flowchart :

<https://drive.google.com/file/d/1B2u0tyDxbKUMzXRM-NYxYvLFONbsRhyL/view?usp=sharing>

Architecture Diagram :

<https://drive.google.com/file/d/1nawf2epJrf9laRP5GrzgwdjjelHuSrKz/view?usp=sharing>





Working Prototype

Link to Video:

Video:

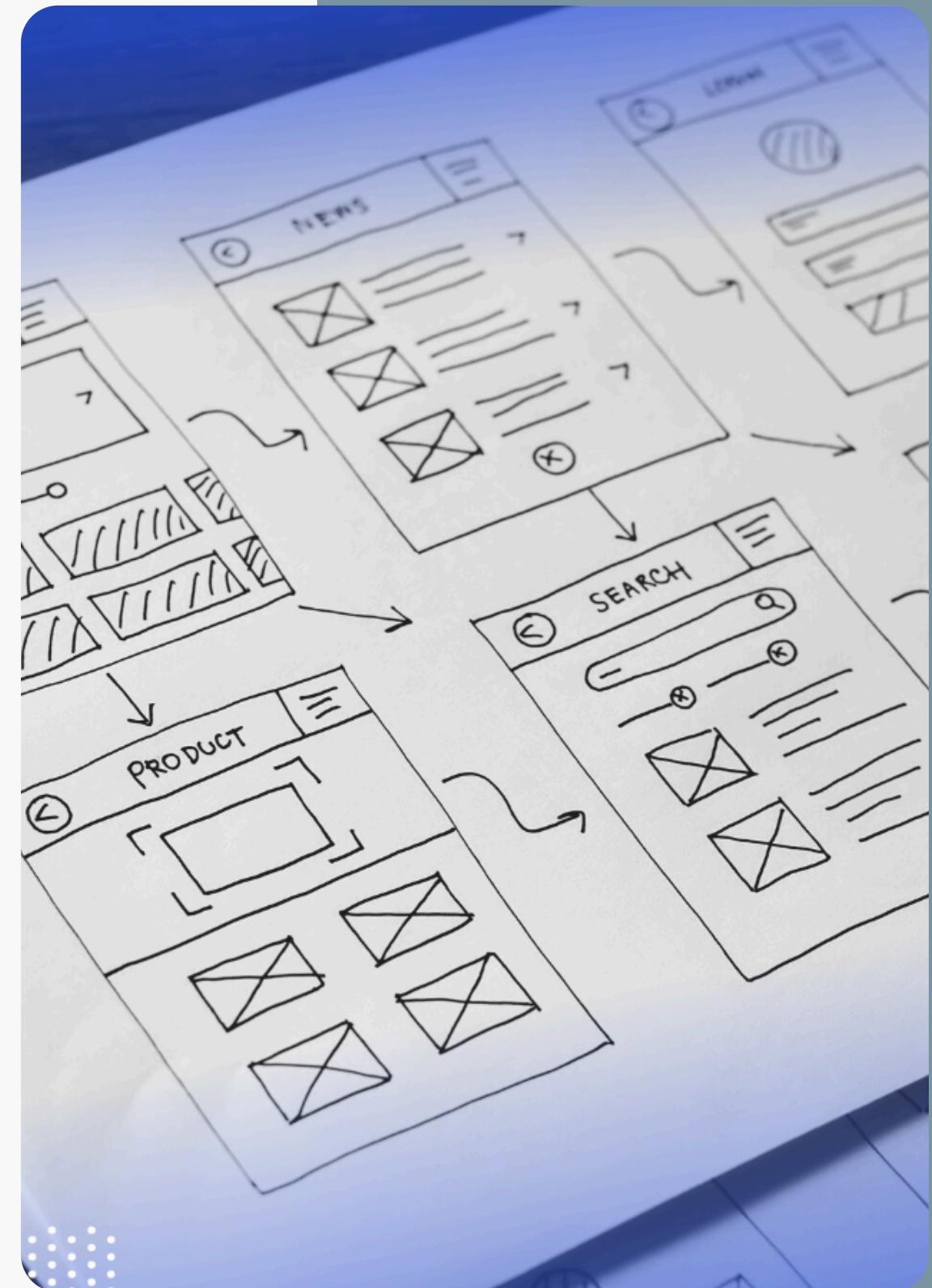




Wireframe

Link to Wireframe:

Wireframe/Screenshots:





Thank you

