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Case Study

AI-Based Medical Card Data Extraction for Appointment Scheduling

Industry: Healthcare

Key Data Points

500K+ medical cards processed with 95%+ accuracy.

Introduction

This case study describes how an AI-driven medical card extraction system was designed and implemented to reduce patient and/or practice effort during appointment scheduling while improving data accuracy for healthcare providers. It answers how AI can reliably identify and extract information from diverse medical cards and evaluates success based on accuracy, reduction in manual data entry, and patient adoption.

Key questions answered

01

Can AI reliably identify whether an uploaded image is a valid medical card?

02

Can relevant patient and insurance details be extracted with high accuracy?

03

Does this reduce patient friction and operational errors during appointment booking?

Evaluation criteria



Medical card detection accuracy



Data extraction accuracy and completeness



Reduction in manual data entry by patients



Adoption rate and user experience improvements

Sources used



Appointment scheduling analytics



Patient upload and validation logs



QA test results across card types



User feedback from pilot practices

The Situation

Patients booking appointments were required to manually enter insurance and medical card details such as policy number, member ID, payer name, and personal information. This process was time-consuming, error-prone, and often resulted in incomplete or incorrect data. The system supported a wide variety of insurance providers, leading to inconsistencies in data formats.

The problem



High friction during appointment scheduling led to drop-offs



Manual entry resulted in frequent data errors



Staff had to re-verify or correct patient-submitted information



Patients often uploaded incorrect documents (photos, IDs, prescriptions) instead of medical cards

This directly impacted patient experience, operational efficiency, and downstream insurance workflows.



What had been tried

- Mandatory form validations and field constraints
- Instructional text and sample images for uploads
- Manual back-office verification

These approaches increased effort but did not significantly reduce errors or abandonment.

Constraints

- Must work with hundreds of different medical card layouts
- Variable image quality (mobile photos, lighting, orientation)
- No additional steps or complexity for patients
- Strict data privacy and security requirements

Stakeholders

- Patients booking appointments
- Operations staff at Practice
- Practice administrators
- Product and engineering teams



Scope and Approach

What had been tried

- AI-based validation to confirm whether an uploaded image is a medical card
- Automated extraction of key patient and insurance fields
- Integration with the existing appointment scheduling workflow
- Support for hundreds of medical card formats

What was out of scope

- OCR for non-medical documents (e.g., prescriptions, ID cards)
- Manual correction workflows for staff
- Downstream claim processing

✓ Inputs

- Uploaded medical card images
- Real patient uploads during pilot phase
- Error logs and exception cases

✓ Validation

- Multi-round QA testing across different card types
- Accuracy checks against manually verified data
- Pilot rollout with selected practices
- Continuous monitoring of false positives and extraction errors

Findings and Insights



What the data showed

- A large percentage of patients attempted to upload incorrect documents
- Medical card layouts varied significantly across providers
- Key data fields appeared in inconsistent positions and formats



Root causes

- Manual data entry fatigue led to shortcuts and errors
- Lack of real-time validation allowed incorrect uploads
- Traditional OCR alone was insufficient for reliable extraction



Critical insights

- Document classification was as important as text extraction
- Context-aware AI performed significantly better than template-based approaches
- Automating the process reduced both patient effort and operational overhead

Solution

What was recommended

An AI-first approach that combines document classification with intelligent data extraction, embedded directly into the appointment scheduling flow. This approach minimized patient effort while improving accuracy and scalability across card types.

What was built

- AI model to validate whether the uploaded image is a medical card
- Automated extraction of patient and insurance details from valid cards
- Seamless population of extracted data into appointment forms

The system supports hundreds of medical card designs without requiring provider-specific templates.



How It Was Delivered

Key milestones

Discovery and data analysis



Model training and validation



Integration with appointment scheduling platform



Pilot rollout and refinements



Full production deployment



Who did what



Product team
Requirements and workflow design



Engineering team
AI integration and platform changes



QA team
Validation across card formats



Operations team
Pilot feedback and rollout support

Dependencies and integrations



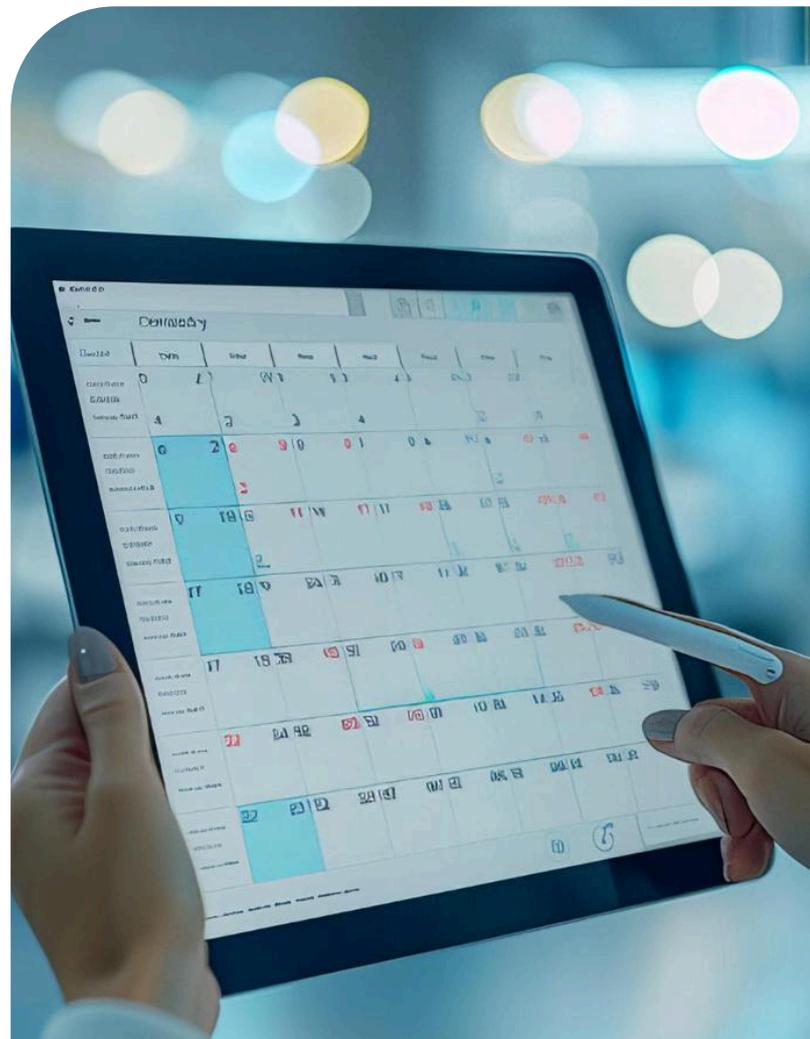
Appointment scheduling platform



Secure file upload and storage services



AI inference and processing services



Results

Quantitative outcomes



Significant reduction in manual data entry during booking



High medical card detection accuracy across supported formats



Meaningful decrease in data errors submitted by patients



Faster appointment completion times



500K+ medical cards processed with **95%+** accuracy

Qualitative outcomes



Improved patient experience and ease of use



Reduced front-desk rework and verification effort



Higher confidence in insurance data quality

Adoption



Strong patient usage due to zero additional effort



Positive feedback from practices during and after pilot

Reflection

What worked

- Combining document validation with extraction
- Designing the solution to be invisible to the patient
- Supporting scale without provider-specific customization

What did not work

- Early reliance on basic OCR without contextual understanding

What is reusable

- AI document classification framework
- Extraction pipeline for semi-structured documents
- Integration pattern for patient-facing workflows

Limits and adaptation

- Extremely poor image quality may still require re-upload
- Continuous learning needed as new card formats appear

Takeaway

Manual entry of medical card information created friction, errors, and operational inefficiencies. By embedding AI-based medical card validation and extraction directly into the appointment scheduling process, the solution eliminated unnecessary patient effort while improving data quality at scale. The key lesson was that intelligent automation, when designed to be seamless, can significantly enhance both user experience and operational efficiency.