

Use case

PROCESSING MEDICAL CLAIM FORMS WITH ARTIFICIAL INTELLIGENCE

How to use deep learning to capture physicians' handwriting, enhance the operational efficiency of health insurance funds and reimburse millions of citizens faster and more accurately



Customer: **Partenamut**

Industry: **Health Insurance**



Document Manager Awards 2017
Project of the Year

CONTEXT & CHALLENGES

CONCEIVE

Healthcare and Health Insurance - Belgium's digital ecosystems

Health insurance funds in Belgium (locally known as "mutualities") are currently undergoing digital transformation... with a deadline.

The challenge is dual: on one hand, the federal government demands that most paper-based medical claim forms be electronic by 2019; on the other hand, all these (private) companies are receiving less and less government funds.

As a result, Belgian mutualities are adapting their digital strategies while looking at implementing more cost-efficient solutions.

In other words, Belgian mutualities are becoming smarter.

THE CUSTOMER

Partena Group – Mutualité libre (FR) / Onafhankelijk ziekenfonds (NL) is an independent health insurance fund and one of the largest in the country.

- 1.3 million members
- 1000+ employees
- 300 partners
- 52 agencies
- 1/3 of Brussels citizens
- 15% of Wallonia citizens
- 20.000 reimbursements every day

THE PAIN POINTS

Partena has been scanning documents for decades, outsourcing their business processes to Moonio since 2009. It soon realized that, in order to tackle the document challenges of a new era, it needed solutions that would innovate everything from technology and processes to employees and customers. Pain points to be addressed include:

- VOLUMES – Millions of documents have to be processed every month
- ACCURACY – As data becomes the most valuable resource for companies everywhere, data quality becomes vital for Business Intelligence and decision making
- MANUAL VALIDATION – As data sources multiplied, document quality decreased. Human operators manually entering data imply higher and higher operational costs
- TURNAROUND TIMES – Reimbursement speed in the age of "instant gratification"
- LESS LOYAL CUSTOMERS – Life-long membership for services is a thing of the past

CONTEXT & CHALLENGES

THE DOCUMENT

The form is not optimized for optical character recognition and contains around a dozen handwritten fields as well as:

- Barcodes and QR codes
- Printed text
- National security number
- Personal signature
- Official stamps and seals

This complexity poses a lot of problems for traditional OCR. There is a huge gap today between the reading performance and the desired level of automation.

Errors and inaccuracies make their way into the forms, resulting in wrong nomenclature codes, inconsistent data concerning payments, discrepancies about patient data, fraud.

Medical claim forms in Belgium are VERY complex documents issued by medical institutions or practitioners each time a patient interacts with the health system. The patient must send the form to his health insurance company for reimbursement.

The form is titled "HIERNA INVULLEN OF KLEEFBRIEFJE V.I. AANBRENGEN". It contains several sections with handwritten data and official stamps.

Top Section: Contains a barcode and patient information: Verzekert: KROEL SILVIANA, ARIEL NERPEELSTRAAT, 324, INSZ: 9730 WORTBOEM, 110/110 36524595167, ISEN.

GETUIGSCHRIFT VOOR VERSTREKTE HULP: IN TE VULLEN DOOR DE VERSTREKKER. Contains handwritten patient name: Krol Silvana, and other details like Datum: 18/8/16, Nomenclatuurnr.: 102535.

Table: A table with columns for Datum van de verstrekking and Nummer v. d. nomenclatuur. It is mostly empty, with a large "SAMPLE" watermark across it.

Voorgeschreven door: Contains handwritten information about the prescribing doctor, including a date and a RIZIV-identificatienummer.

Patiënt is gehospitaliseerd / ambulant (1): Contains handwritten information about the patient's status, including a date and a Dienst.

Identificatie van de verstrekker: Contains handwritten information about the provider, including a date and a Dienst.

Bottom Section: Contains a stamp for BVBA dr BERNARD INGELMANS, Algemene geneeskunde, GROENSTRAAT 78, 8320 AVELGEM. It also includes a date and a signature.

ONTVANGSTBEWIJS: Contains handwritten information about the receipt, including a date and a Dienst.

CONTEXT & CHALLENGES

Medical claim forms contain multiple handwritten fields.

THE DOCUMENT

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CONTEXT & CHALLENGES

Medical claim forms contain multiple handwritten fields.

THE DOCUMENT



THE SOLUTION

FROM BPO TO AI

When the idea to use “cognitive capture” for medical claim forms was first proposed, Partena was already outsourcing document processing to Moonoia (BPO services provided by Moonoia included scanning, recognition, document management, validation, archiving & hosting,

disposal, etc.), with Manufast – a company specialized in printing and outgoing mail operations - handling exceptions and manual validation.

Until 2015, nobody in the Belgian health insurance industry had ever attempted to use artificial intelligence to automate data extraction and document processing.

Moonoia saw an immense opportunity in the millions of medical claim forms passing through the systems of Partena.

Moonoia approached Partena with an intelligent, innovative and never-before seen solution, expressing the willingness to build the Proof of Concept at its own expense.

2016 provided extremely promising results: the docBrain technology developed by Moonoia was outperforming traditional OCR engines while offering – for the first time - full visibility and insight across all stages of the processes, across multiple departments and even across multiple company branches.

Partena decided to switch from traditional OCR to using deep learning neural networks for data extraction, while Moonoia committed to:

- Improve recognition rates to over 99%
- Increase automatic detection of inconsistencies, completion errors and even fraud
- Decrease overall manual work involved by more than 70%
- Ensure a smooth transition without disrupting the existing business flow

THE SOLUTION

WHY COGNITIVE CAPTURE?

Traditional optical character recognition needs machine printed text or at the very least clearly defined fields (the characters need to have spaces in between) in order to deliver acceptable results. So, there is a good reason to use deep learning technology to perform recognition on non-constrained documents containing cursive handwriting such as medical claim forms.

Moonoia trained its own in-house developed platform called docBrain on millions of medical attestations and now uses deep learning neural networks to recognize even the most difficult areas on a paper document, often illegible to human operators.

Looking at accuracy levels of 99% combined with intelligent content analysis detecting completion errors, Partena can now process medical claim forms from reception to reimbursement up to 80% fully automatically – without any human interv

DOCBRAIN – HOW DOES IT WORK?

docBrain is an in-house developed set of technologies and platform which uses deep learning neural networks (DNNs) to extract data automatically and continuously improve its own capture performance.

docBrain has an extensible architecture that shields the complexity of the underlying technology from the consuming application(s).

How it works:

First, the consuming application sends 'jobs' to docBrain using a Service Oriented Architecture interface like REST to perform certain tasks such as image optimization, document type classification or recognition.

The docBrain web service distributes the tasks according to their nature and sends them to the different recognition engines at its disposal.

The different engines process the tasks and report the results back to the docBrain web service.

Finally, the docBrain web service sends the results back to the consuming applications.

“Looking at the project in retrospective, the benefits – besides the visible cost reductions – were quality increase, stability and, most importantly, workforce flexibility. Thanks to process intelligence and predictability, we are now able to anticipate peak times, optimize traffic and workforce, and introduce training programs or non-core activities just when the time is right.”

Thierry Naniot,
HUB Manager, Partena
Group

THE OUTCOME

All the initial criteria and key metrics were (over)achieved:

- Over 70% reduction of manually-handled operations. A true step forward towards straight-through processing.
- 7.7 million documents successfully processed in the first year
- Significantly shorter turnaround times
- Unprecedented ROI (outstanding recognition and automatic classification helped reduce other costs associated with rework)
- Seamless integration with in-house Electronic Document and Content Management (EDM, ERP) systems ensured low implementation costs
- Better monitoring and reporting brought stability, predictability and process intelligence across departments and across companies
- Customer satisfaction has shown a steady, positive trend since the solution was implemented

LEARN MORE ABOUT THIS PROJECT

Watch the webinar

Copy the link below and paste it into your browser if the button above doesn't work:

<https://www.moonoia.com/watch-webinar-medical-claim-forms>



AI MADE EASY FOR END-TO-END DOCUMENT PROCESSING

docBrain is a unique AI platform built to conceive, assemble, deploy and manage end-to-end solutions based on neural network models to solve a wide range of document processing challenges - including document classification, text and image recognition, data extraction and validation.

By applying machine learning principles, docBrain succeeds where classic scanning and OCR technologies fail – at automatically extracting complex content.