

perspexion

Automating Agent Care and New Business at American Enterprise Group



**A Case Study On
Intelligent Document Processing Using AI/Machine Learning**

CHALLENGE

Reliably capture critical data from electronic and handwritten forms

SOLUTION

AI and machine learning, combined with strong domain expertise, delivered by a high-energy startup

BACKGROUND

American Enterprise Group, Inc. (AEG) is a mid-sized insurance organization based in Des Moines, Iowa. Through its multiple insurance companies, AEG sells both health insurance products (Medicare supplement, hospital indemnity, dental, short-term care, and cancer) and life insurance products (preneed and final expense) under the American Republic®, Medico®, and Great Western Insurance Company (GWIC®) brands.

Like every insurance organization, AEG faces sizable obstacles in handling a virtual blizzard of documents each year. Over a million pages are received annually across a variety of sources, such as mail, email, and fax. These documents are a mixture of printed and handwritten forms, including applications for various types of insurance, plus a wide variety of service forms from agents, channel partners, and customers. The company estimates it devotes a dozen staff members across multiple departments (plus seasonal temporary staff) to the task of imaging documents and capturing the data so the documents can be routed and processed.

With the help of American Enterprise (AE) Ventures, LLC, its standalone innovation arm, AEG transforms customer interactions through innovative solutions. AE Ventures looks for opportunities to drive innovation and generate customer value via capital investments, pilots, and incubation of new business ideas.

In late 2019, AE Ventures began a search for a vendor to help AEG innovate and transform its document processing. They examined a variety of vendors with document capabilities, including several with Intelligent Character Recognition (ICR) capabilities. They selected a relatively young startup, **Friendly Technologies**, based on the company's intriguing mix of experience in the challenging health insurance space and its intelligent document handling capabilities, powered by machine learning.

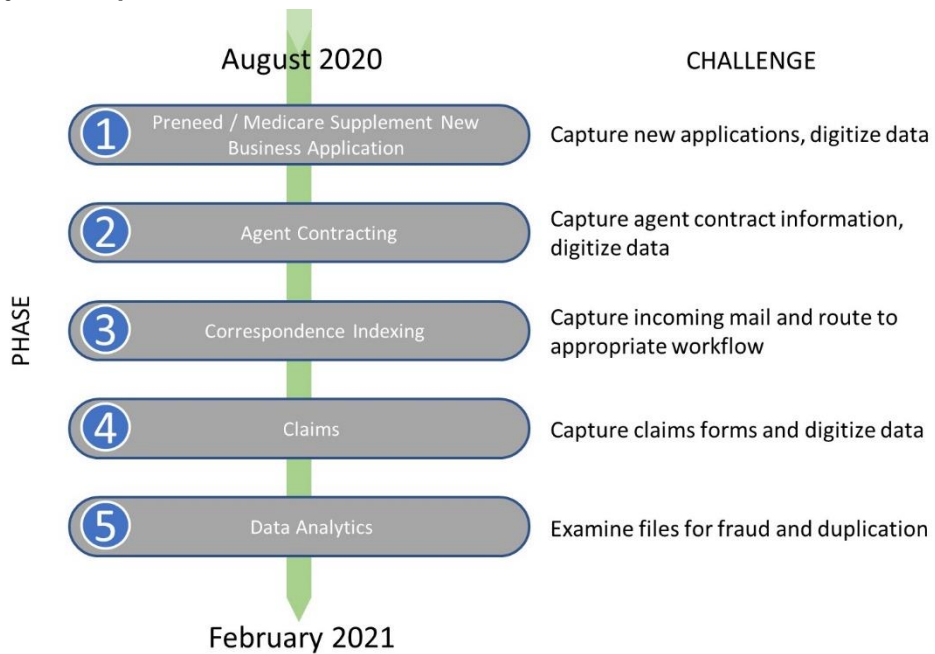
IMPLEMENTING ICR

Handling documents in an automated fashion has historically presented challenges. While document imaging has been around for decades, AEG's experience was that the quality of data captured from imaged documents was often poor. Human intervention was almost always required to convert images to a useful stream of data, and that process was extremely labor intensive.

Friendly's technology offered a solution to this problem by processing imaged documents using machine learning techniques to identify and extract key data from the forms, and then route that data for either automated processing or for human review.

The initial area of focus at AEG was claims processing, which was viewed as a resource-intensive process. Based on a preliminary review of Friendly's capabilities and technology, AE Ventures realized it had the potential to apply across several other areas. In April 2020, AE Ventures piloted Friendly's document processing capabilities using actual new business application forms and data. For approximately four weeks, a multidisciplinary team processed various documents using the Friendly toolset. By audit, AE Ventures determined Friendly could extract data from processed documents at close to 60 percent accuracy, even in its high-level test environment with limited tuning and machine learning training. Since then, through AI machine learning, accuracy has improved to 91 percent. Given the success of the pilot, AE Ventures made a pitch for full integration into AEG's infrastructure. In a matter of weeks, the team developed a plan to engage Friendly in a multi-phased project, which kicked off in August 2020. (see Figure 1)

Figure 1: Project Setup and Rollout



AEG implemented Friendly in a series of sprints, aimed at successively adding more complex tasks. The first phase included Medicare supplement and preneed applications, which have filed templates with each state insurance regulatory body. Each application varies in structure complexity based on the product. The initial project team was made up of approximately 15 people, with a mix of AE Ventures staff, AEG business and technology team members, and a strong contingent from Friendly. For subsequent phases, the team size was reduced by half because the phase one development work was reusable and familiarity with the Friendly toolset and process improved with each sprint.

The project was managed with Microsoft Azure DevOps tools and methodologies, and weekly meetings between the Friendly staff and AEG project team were critical to the development of new capabilities. AE Ventures' technology architect says one of the key benefits of working with an entrepreneurial startup like Friendly is its ability to generate product enhancements in near-real-time as they emerge in project discussions.

ACCURACY AND CONFIDENCE PRIMER

To put the results of any machine learning application in context, it is important to understand the concepts of accuracy and confidence.

Accuracy is a measure of the system's ability to correctly determine the value of a scanned item. It is typically calculated via an audit of a test dataset. It is expressed as a percentage: the number of items correctly identified by the system, divided by the total number of items processed. For AEG, the accuracy target is 80 percent. AEG is currently seeing average accuracy levels of 91 percent.

Confidence is a system-generated measure that represents the likelihood that the system is "understanding" the input being processed. For example, if a particular data field is known to be a single digit, the system is tasked with determining which of ten digits (0 through 9) are represented. After analyzing a handwritten entry, the system might decide that the entry is a "3," at 70 percent confidence. That means there is a 30 percent chance that the entry is something else, perhaps an "8."

This confidence level is typically used to configure the post-recognition workflow. AEG needed a confidence level of 80 percent or higher for processed items to be potentially "auto-approved" by the system without human intervention.

An ICR Example

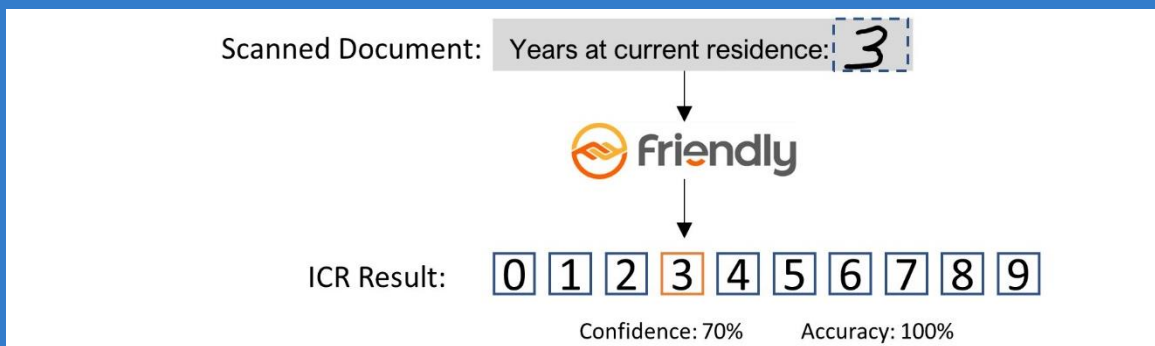


Figure 2: The Friendly Implementation at AEG



SOLUTION OVERVIEW

The core Friendly process for each project phase is quite similar (see Figure 2 for details). Forms are received in multiple formats and converted to images, then Friendly performs a series of processing steps to extract required data. The results are pushed to queues, where reviewers can see the results of every processed image.

As an alternative, the system may be configured to auto-approve those results. On human or automated approval, the data is then mapped into the core systems downstream such as the underwriting platform, policy admin, e-contracting, and claims systems.

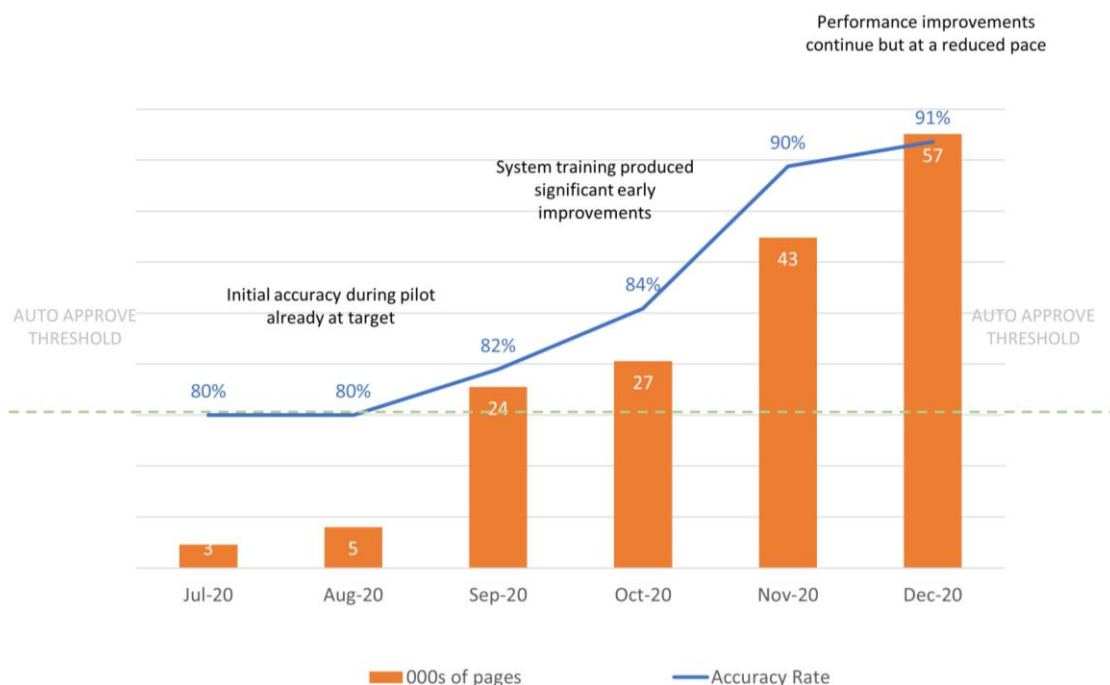
The Friendly platform is completely cloud-based, which is important for two reasons. First, it greatly eases the implementation burden with no formal installation into AEG's infrastructure. All integrations are handled through APIs. Second, having access to sufficient computing power is essential to the application of machine learning techniques at scale.

RESULTS

Ultimately, success of the Friendly implementation at AEG is measured by the number of documents that can be processed with the highest levels of accuracy and confidence. Early results have been encouraging. Within one month of the first phase implementation, system accuracy had already reached 82 percent. Historically with OCR, the number could have been 50 percent or lower, depending on the type of document processed.

The accuracy numbers continued to improve each month thereafter, and currently are well above AEG's threshold for potential auto-approvals. These results came from manual tuning of the system and the "training" characteristics that are inherent in machine learning. In essence, the Friendly solution recognizes whenever results are adjusted by human reviewers to refine its algorithms for better accuracy.

Figure 3: The Result of System Tuning Over Time



BUSINESS CASE

AEG did a thorough business case review before kicking off the project. While it has not been even a year since kickoff, the company is already confident that the project will hit its targets. **Project leaders expect to achieve a \$3.5 million net cost savings over an eight-year observation period and an 89 percent IRR.**

While the specifics of the business case vary by project phase and line of business, in general, the manual effort involved in processing new documents has been cut dramatically by Friendly technology. For example, Medicare supplement applications for new business that previously took 20 minutes of manual effort now require only two minutes. Results like these have completely eliminated the need to hire temporary data entry staff during the annual open enrollment period.

LESSONS LEARNED

AEG remains enthusiastic about the partnership with Friendly, as early results have been on target and the project will likely exceed expectations. Several lessons have been learned based on work completed to date:

Working closely with a vendor in an innovative model creates value in multiple ways.

Getting access to Friendly’s technology was the first layer of value that AEG generated in this project. After successful completion of the project’s first sprint, AEG management realized that having IT, business, and Friendly staff working closely together enhanced the team’s creativity and ability to adapt quickly. “We needed to communicate, communicate, communicate to make the model work,” said Julie Larson, chief technology and innovation officer at AEG. “At times, it was hard to keep the project flowing at the vendor’s level of responsiveness. Once the team found its rhythm, we collaborated to deliver value that would have been difficult to produce without Friendly in the mix.”

Protecting project resources is critical. By design, the project team was richly staffed for the first sprint. Unfortunately, AEG had an unrelated situation that temporarily affected some resources after a “minimum viable product” had been established. This slowed down subsequent phases until the full team was reestablished.

Discomfort may signal healthy disruption. Early on, the team established goals for accuracy and confidence levels, with the plan being that once those levels were achieved, auto-adjudication and downstream automation would be enabled. As the program hit its goals, it became clear that auto-adjudication and automation require a leap of faith that can be uncomfortable. To push through the discomfort, the team adopted a quote from Tom Swank, the CEO at AEG, as inspiration: “We’re getting people comfortable with being uncomfortable.”

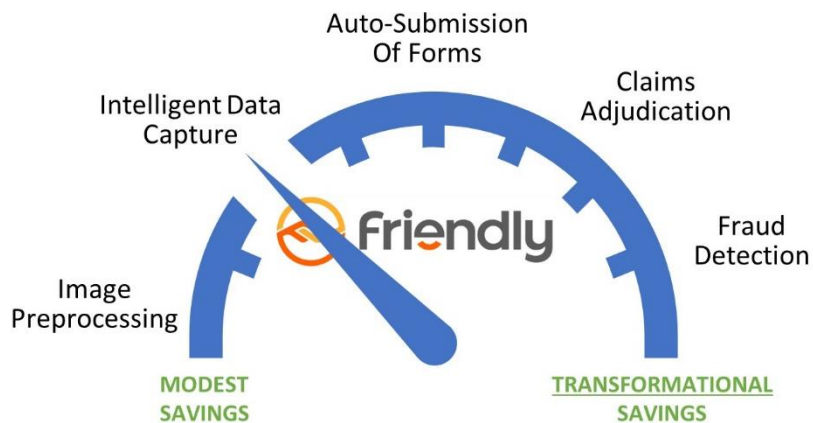
Following the ball where it bounces produces continuous innovations and ratchets up service levels. The AEG team started the project with a thoughtful plan. They also recognized the value of on-the-fly adjustments, and the Friendly team has been willing to respond with valuable platform enhancements. “Leveraging Friendly as a strategic partner adds value to AEG’s speed-to-market and customer satisfaction ethos,” said Julie Pearce, AVP of AE Ventures.

LOOKING FORWARD

While the project has been a resounding success so far, the team believes the best may be yet to come. The initial Friendly application—intelligent image processing and data capture, supported by machine learning, with the results feeding queues for human review—has been aimed primarily at reducing data capture costs. A logical extension of this approach is applying business rules within Friendly to analyze documents as a whole and *auto-submit them without human intervention*.

Claims adjudication is another application the team has in its sights. By extracting key information out of both structured and unstructured data, the team expects that certain classes of claims could become “no-touch.” AEG is beginning a project phase for claims in its dental line of business, and, if successful, other lines of business will be considered for the same approach.

Figure 4: Roadmap to Deliver Increased Value



Another important roadmap item for both Friendly and AEG is fraud analysis. Friendly's extensive experience with image processing suggests that AEG could examine cases in a facilitated or automated fashion to determine where medical evidence may have been modified with photo editing tools like Photoshop, or where diagnoses do not appear to correlate to images submitted with the claim.

The combination of fit-for-purpose technology, an agile project approach, and excellent collaboration between AEG and Friendly puts truly transformational savings within reach.

ABOUT US

Perspexion is a strategic advisory firm, focused on financial services technology. The opinions expressed in this case study are based on interviews with key insurer staff.

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