clarity

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HOW TO MOVE FROM UNSTRUCTURED TO STRUCTURED DOCUMENTS

to Create Meaningful Data

Fax From: +13101658498
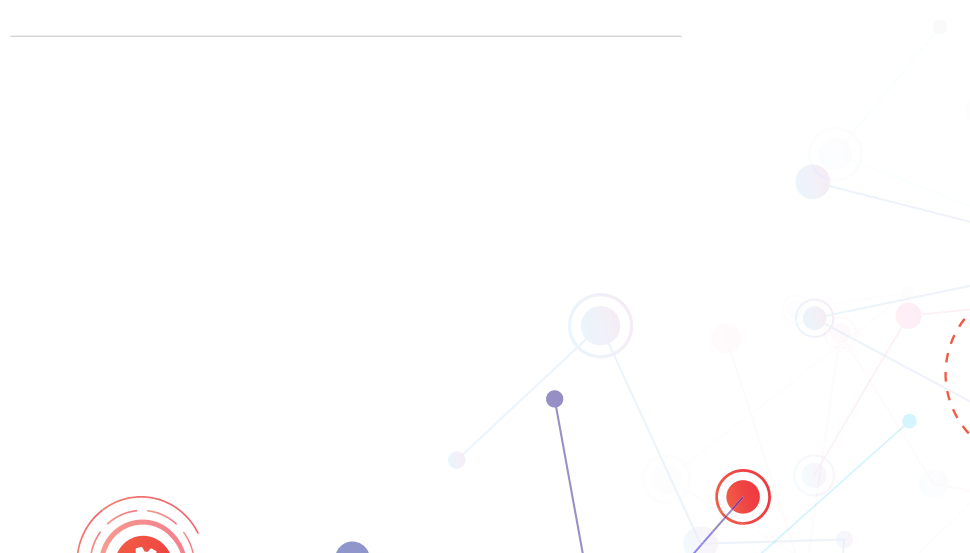
Provider: Ken McEwen, MD

Patient: James Doe

CTRL Num: XA7832

Status: Discharged

PATIENT DATA

TABLE
OF CONTENTS

Ready for some positive news about your fax workflows?

In 2020, as America's hospitals became overrun by patients presenting with COVID-19 symptoms, providers and labs began sending notifications of positive cases to their local health departments (LHDs). The notices provided these government agencies valuable information on where to mobilize resources to slow potential outbreaks.

But in addition to the sheer number of COVID-positive notices they were receiving, LHDs faced another challenge. Many providers were transmitting their notifications by fax. Hardcopy records piled up on LHDs' fax machines. Public health officials needed to manually sift through and read each fax document to triage the most serious cases.

Dr. Umair Shah, executive director of Houston's Harris County Public Health Department, put it this way: *"Picture the image of hundreds of faxes coming through, and the machine just shooting out paper."*[1]

This is a familiar story in healthcare: fax pages everywhere, containing unstructured data that needs to be reviewed and manually re-entered into another system before the care team can take their next steps to help the patient. But fortunately for several health departments dealing with COVID faxes in 2020, there was a positive twist to the story.

Adding artificial intelligence to cloud fax technology

Now for the good news. Researchers at the Stanford University School of Medicine created an artificial intelligence (AI) program to help public health officials respond to potential COVID outbreaks more quickly and reliably. How? By enabling technology to identify and flag the acute notifications embedded among the thousands of fax pages scattered all over their office floors.

Here's how it worked. The researchers created a series of AI-powered algorithms to review the standard COVID-positive forms (called confidential morbidity reports, or CMRs) that providers were faxing to their local health departments.

First, the program converted each incoming fax to digital format, as a PDF. From there, the AI algorithms were able to perform several key steps automatically, including:

- Read the fax and translate it into words and digits.

- Detect and segregate all fax pages pertaining to COVID reporting.

- Review the details of these faxes for key elements indicating the level of acuteness.

- Prioritize faxes containing references to emergencies and urgent issues.

- Send a priority notification to health officials for the most serious cases.

Stanford's test shows AI can improve healthcare faxing efficiency and outcomes

The test was a success. In 2021, Stanford Medicine published a report summarizing how their AI algorithms helped several local health departments more quickly identify and act on the most urgent COVID faxes. Here are a couple of the report's key findings:

- **In one test pilot, the AI program was able to successfully identify and prioritize 49 of the 59 high-urgency faxes that it reviewed.**
  The Stanford's AI code helped to save public health officials significant time and effort sifting through those fax reports manually.

- **One participating health department estimated the AI tool helped them respond to acute cases 20 hours sooner than if they had to review each fax manually.**

  In their pilot program with one LHD, the Stanford researchers activated the fax AI program just before a long holiday weekend. When those public health officials returned to their offices, they found more than 400 COVID-related CMRs on their fax machine.

  But those officials noted that the AI program had already identified several highly serious cases among those faxes. They also concluded that if they had been using their standard legacy process—"The machine just shooting out paper," as Dr. Shah put it—the team would have been delayed in responding to those urgent cases by roughly 20 hours.[2]

But the Stanford artificial-intelligence algorithm was limited by design

Stanford Medicine's real-world test run of a fax AI tool provides an illuminating example of what artificial intelligence can do to make healthcare faxing more efficient and effective. But it's important to keep in mind that this was a limited solution—designed only to teach a computer
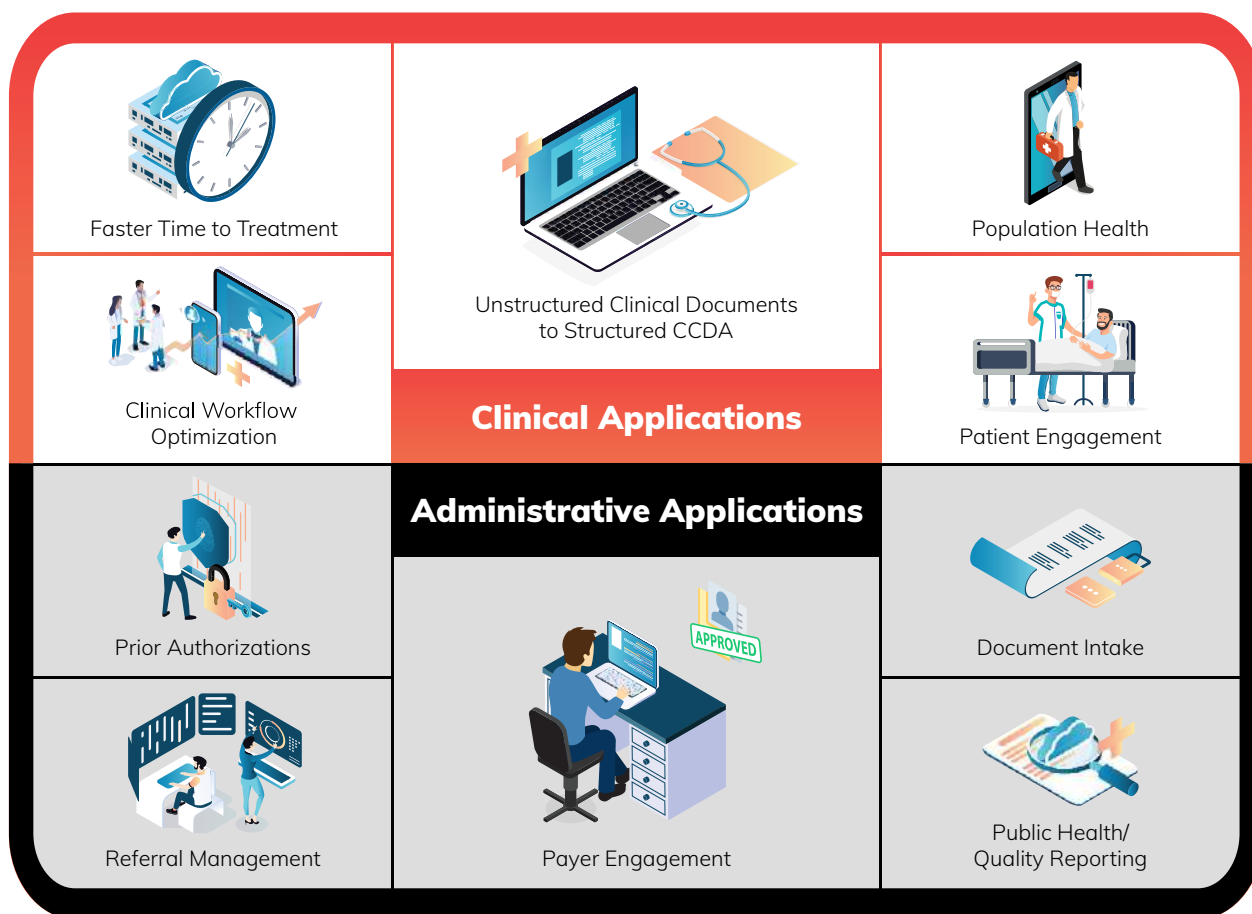
to scan for indications that a specific fax report might contain urgent information.

In fact, Stanford's researchers themselves noted that there were several limitations inherent in the test case. Here's one major example noted in their report:

*"Our system benefits from the fortunate fact that, for the forms used, the information used to determine the acuity of a case is contained in structured fields (checkboxes). Forms that captured this same information in free-text fields instead of structured fields would pose a much more challenging problem. **The ability to extract free-text information on these forms could enable further efficiency, especially related to saving time for data entry, and is a potential avenue for future work.**"* [3]

That last statement above, which we bolded here for emphasis, gets to the broad theme of this paper. Stanford's COVID test case demonstrates that moving unstructured documents to structured documents can add efficiencies—and even lead to better outcomes—in one specific workflow. But clearly, artificial intelligence doesn't need to be limited to scanning checkboxes in a specific type of fax report.

The right OCR/NLP and AI solution could be applied far more broadly to streamline and improve other faxing workflows that healthcare professionals use every day.

Faster Time to Treatment	Unstructured Clinical Documents to Structured CCDA	Population Health
Clinical Workflow Optimization	**Clinical Applications**	Patient Engagement
Prior Authorizations	**Administrative Applications**	Document Intake
Referral Management	Payer Engagement	Public Health/ Quality Reporting

A comprehensive AI fax solution can enhance a range of healthcare workflows

Artificial intelligence is the ideal next step in enhancing healthcare organizations' faxing environments—because such a solution can streamline an organization's operations, save time and money, and even help providers deliver better care.

To understand how significant these workflow improvements could be for your organization, let's briefly review the levels of "intelligence" available with today's various faxing solutions.

No intelligence at all: standard fax machines.
(The worst option, and unfortunately the most common.)

The traditional fax machine transmits faxes by first scanning an "image" of each hardcopy page and then sending the image by phone line to the recipient's fax.

When you receive these pages on your fax machine, you'll have no way of automating the process of turning this unstructured data into structured data that you can use to make informed decisions and take the next steps in your patient's care plan. Your team will have to read, review, and re-enter the fax's contents manually.

Unfortunately, if you're like most healthcare organizations, this is probably the extent of your fax environment's "intelligence"—leaving the work of identifying, interpreting, parsing, extracting, and re-entering the data to your already-busy staff.

As recently as 2019, the Medical Group Management Association (MGMA) published a survey of healthcare leaders that found 89% of their organizations still use a fax machine for such everyday tasks as sending and receiving referrals, sharing records with other providers, and communicating test or lab results.[4]

But this manual faxing process is more than just a daily annoyance for your staff. It is likely costing your organization significant time, resources, and possibly even quality of care, according to industry estimates.

A study published by the **nonprofit Council for Affordable Quality Healthcare (CAQH) found that providers spend an average of 8 minutes (and up to 30) on each manual task, such as faxing a patient's records.** The study also found these manual tasks cost as much as $11 more per transaction than when the staff can handle them electronically.[5]

The beginnings of intelligence: optical character recognition
(Better, but still a long way from true faxing intelligence.)

The bottom rung on the intelligent data extraction ladder, optical character recognition (OCR) software, is a solution that can read and identify pieces of data for instance in a fax.

Why do we call it the bottom rung? Because an OCR tool has limited value when it comes to intelligent data. It can recognize and extract words and numbers, but that's about the extent of its capabilities.

Determining what to do with that data—Smith, John, ABC Physician's Practice, invoice—will fall to your organization. And in most cases, this will mean manually re-entering these pieces of information in the right fields in another system.

## Becoming even more intelligent: natural language processing
(Better still, although not leveraging AI's full capabilities.)

With Natural Language Processing (NLP), your fax solution will be smart enough not only to recognize character strings in the document (Smith, John, follow-up visit, shortness of breath) but also **to know what they mean, such as John Smith is a person's name. The NLP uses machine learning to better understand the context of words and the lexicon of the terminology. NLP knows where to put each detail, and what action to take if the data suggests it** (such as an urgent notification).

Let's say a lab result comes through to your organization's fax line. If your fax solution is a digital cloud fax solution you can use NLP to parse out the key pieces of data—lab name, patient name, patient ID, type of test, results, etc.—and automatically populate those details in the appropriate places in that patient's record.

In fact, NLP algorithms can even be smart enough to recognize that a single fax transmission contains details on multiple patients, and then automatically segment the pages—and even the details contained in a handwritten message on the cover sheet—and keep them with the right patient's record.

"**Another enormous advantage of NLP is that it is a machine learning tool.** *That is, the software is continuously assimilating the information it encounters with each new fax and will become smarter and smarter.*"
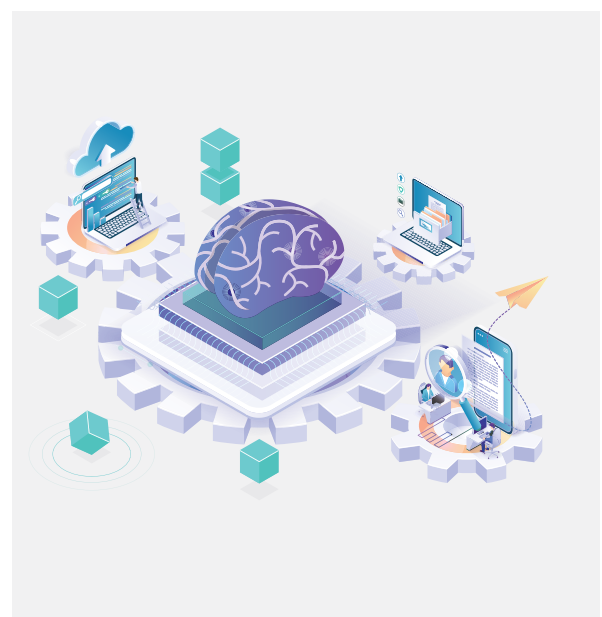
Another enormous advantage of NLP is that it is a machine learning tool. That is, the software is continuously assimilating the information it encounters with each new fax and will become smarter and smarter. Over time, your NLP-powered faxing solution will become capable of understanding an ever-growing range of variations of how different people present the same data.

As an example, consider Amazon's Alexa—which uses voice-enabled NLP to learn. That's why, if you want to turn off the WiFi-enabled light in your bedroom, you can make the request using any number of phrases, and Alexa will understand. You can simply say, "Alexa, please turn off bedroom light," or you can successfully use variations like these:

- Alexa, please cut the light in my bedroom now.

- Alexa, shut off the bedroom light.

- Alexa, power down the bedroom light.

- Alexa, no more bedroom light.

- Alexa, time to end the bedroom light for this evening.

- Alexa, let's stop the bedroom light, okay?

- Alexa, bedroom light… off.

In the years Alexa-powered devices, were released Amazon's NLP software has now had billions—maybe trillions—of inputs from users. People can find hundreds of slightly different ways to ask Alexa to turn off the light in their bedroom—and at this point, Alexa has heard them all.

Over time, your organization's NLP-powered fax solution will similarly process and learn from an ever-increasing number of faxes, making it continuously more intelligent and capable of accurately processing fax data no matter how the sender presents it. The more content fed into NLP, the faster the software learns.

A thinking, learning machine: artificial intelligence

(The best option—making your fax solution an informed, smart, and capable part of your team.)

Artificial intelligence brings all these capabilities together and adds layers of learning, thinking, and continuous improvement to your fax solution.

Here are just a few examples of what a truly effective AI-powered fax solution can do:

- Read, understand and extract free text in a fax document.

- Automatically apply data in fax documents (prescriptions, patient IDs, demographic information, etc.) to the right fields in a digital format

- Integrate with EHRs, enabling an EHR system to consume an inbound fax, parse the data, and populate the correct fields in the patient's record.

- Flag specific data points (in checkboxes, typed text, or handwritten) for actions, such as sending notifications to clinicians for immediate attention.

- **Learn continuously from the many healthcare faxes it reads and processes, allowing the system to become more intelligent, understand more variations of the same data, and even detect and flag patterns over time.**

True faxing with NLP/AI technology is available today

What neither Stanford Medicine's research team nor the health departments who contacted them realized—is that advanced NLP and artificial intelligence capabilities for faxes already exist. In fact, these capabilities are being proven every day by organizations in multiple industries, including healthcare.

Here's a little detail about the solution.

Consensus Clarity, Powered by Consensus Cloud Solutions: NLP/AI-enabled cloud faxing

A trusted leader in healthcare data exchange and digital workflow applications, Consensus Cloud Solutions has announced Consensus Clarity, combining the benefits of the eFax Corporate solution with best in class NLP and AI features.

The eFax Corporate cloud faxing technology has been used by healthcare providers for more than 20 years. Consensus knows clinical workflows and the company is keenly aware of the limitations of faxing, even cloud faxing, and the opportunity to go from unstructured to structured data to remove roadblocks and streamline workflows.

Unlike other commercial offerings, Consensus's new NLP/AI solution, Consensus Clarity, was developed for healthcare process improvement with many useful benefits in a number of care settings.

Here are just a few real-world examples of how Consensus's NLP/AI solution can improve fax workflows, and health outcomes, for providers.

- **Intelligently Streamline Prior Authorizations** Consensus Clarity can intelligently detect text—and understand terms such as 'urgent', 'stat', or 'rush' on forms like prior authorizations to help prioritize it for immediate action.

- **Extract Patient Demographics** Pull demographics contained in locked-down, unstructured documents such as digital fax or PDF, and match it to the patient in other systems, creating a more complete longitudinal record.

- **Convert Digital Fax to C-CDA (FAX2C-CDA)** Identify and map clinical information in a digital fax and output it as a standard C-CDA format for consumption by an EHR.

About Consensus Cloud Solutions

Consensus Cloud Solutions, Inc. (NASDAQ: CCSI) started as a digital cloud faxing solution more than 25 years ago and has grown to be the global leader of digital cloud fax technology. Building on that legacy, Consensus Cloud Solutions spun off from its parent company J2 Global (Ziff Davis) and started trading as an independent, public company on October 8, 2021. The company leverages its technology heritage to provide solutions that transform unstructured digital documents into secure, advanced healthcare-standard HL7/FHIR structured data.

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Consensus' solutions utilize the latest AI technology, such as Natural Language Processing and Artificial Intelligence, to offer meaningful, analytics-ready data that enables clinicians to spend more time with patients and less time deciphering documentation.

The company's interoperability suite of solutions provide a unified digital environment that offers the following:

- Optimized workflows
- Real-time event notifications
- On-demand, patient query
- Direct, secure messaging
- Universal APIs
- Secure, e-Signature
- eFax HITRUST CSF® Certified digital cloud faxing
- NLP/AI that transforms unstructured documents to structured, actionable data

For more about Consensus Clarity and its NLP/AI capabilities for healthcare

Contact Us

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