



HEALTHCARE INSURANCE DEVELOPING TRENDS

41ST ANNUAL CARIBBEAN
INSURANCE CONFERENCE

JORGE OTERO, MD
JUNE 2023



JORGE OTERO MD, MSC, RDMS

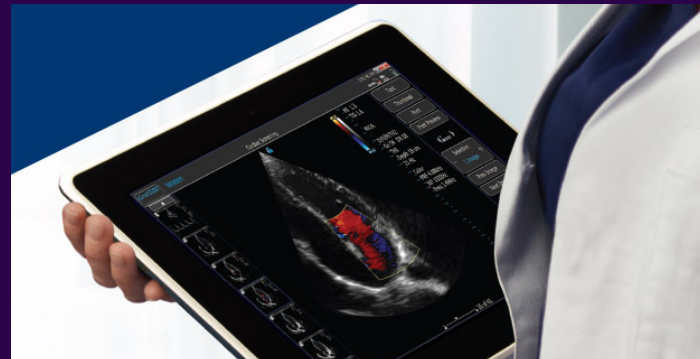
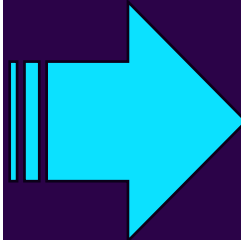
- Associate Professor: POCUS Ultrasound & Healthcare Management
Yale School of Medicine jorge.otero@yale.edu
- Chief Medical Officer – BlockRisk <https://blockrisk.io/>
Blockchain mutually driven life insurance start-up
- Associate Director ER & Director ER Ultrasound
Sharon Hospital – Connecticut
- Former Chief Medical Officer
Best Doctors Insurance – Florida



Article to be published: Prevalence of Rheumatic Heart Disease in Rural Bali, Indonesia
Douglas Barber¹, Michael Mankbadi², Alysha Rose¹, Ida Bagus Rangga Wibhuti³, Luh
Oliva Saraswati Suastika³, Jorge Otero¹, Taylor Libera¹, Andrea Baldick¹, Robert
McNamara¹, Lissa Sugeng⁴, Bernardo Lombo¹
Yale Echocardiography, Bali, 2016

HEALTHCARE COULD ACCELERATE TECHNOLOGY ADOPTION

CASE: POINT OF CARE ULTRASOUND
FROM CURRENT STETHOSCOPE TO HANDHELD ULTRASOUND DEVICES



COST-EFFECTIVE, ACCURATE, REQUIRES TRAINING & INVESTMENT

Images for illustration purposes:

<https://www.terason.com/>

<https://www.butterflynetwork.com/>

HEALTHCARE INSURANCE DEVELOPING TRENDS



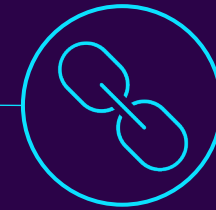
Data Acquisition

Improved data collection and use of accurate customer information to make smart business and healthcare management decisions



Artificial Intelligence

Incorporate Machine Learning to replicate and optimize human behavior to perform simple tasks faster and more efficiently for better healthcare management

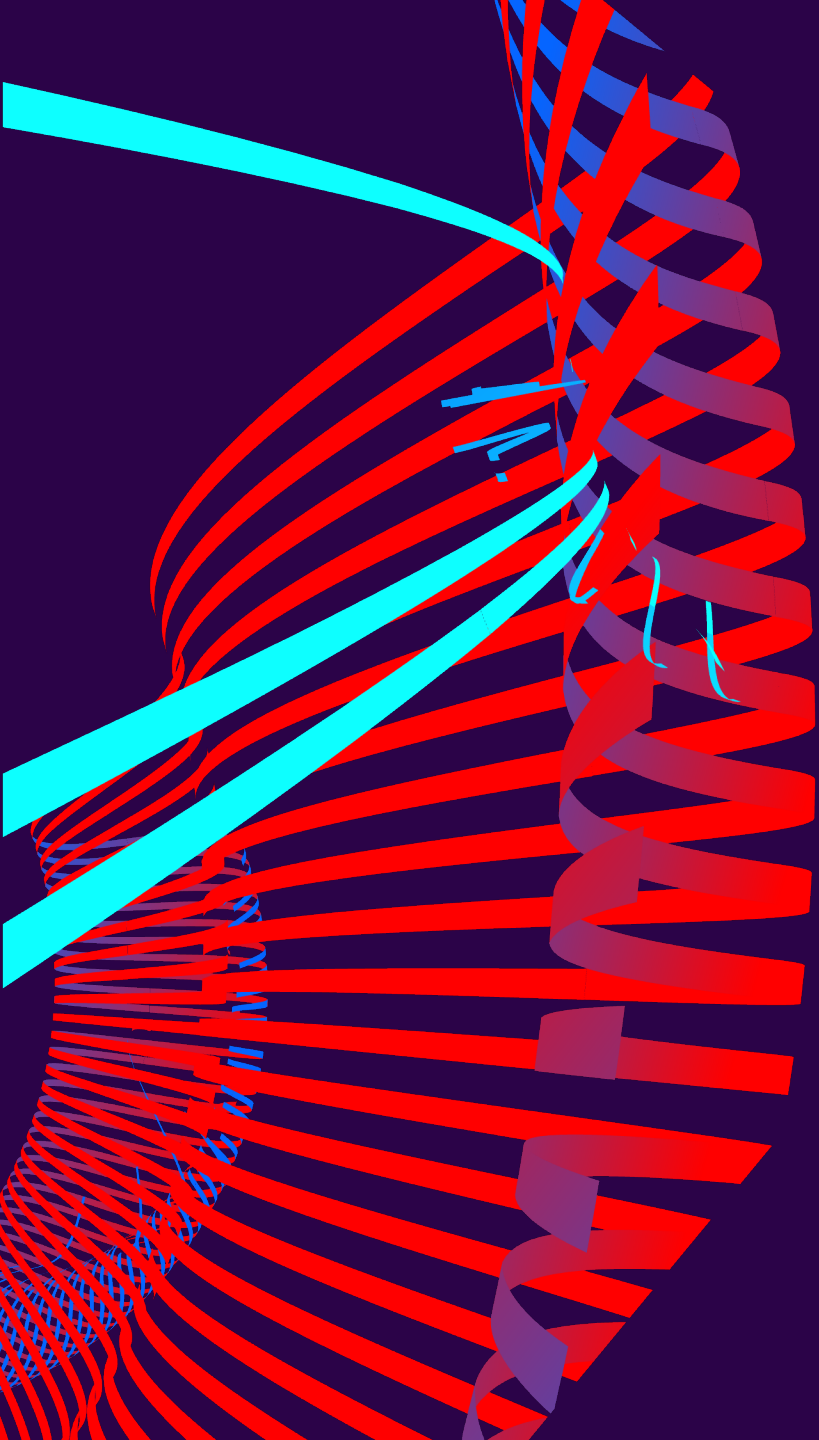


Blockchain

Leverage to create a secure and interoperable repository of healthcare information and ledger, therefore enabling a trustworthy insurance-customer relationship with transparency

IN ORDER TO MAKE AN APPOINTMENT, HE
FIRST HAD TO UPDATE HIS OPERATING
SYSTEM, DOWNLOAD AN APP, GET A
USERNAME, CHOOSE A PASSWORD, LOG IN
TO A HEALTH PORTAL, NAVIGATE TO
MESSAGES AND WRITE HIS DOCTOR...BY
THEN IT WAS TOO LATE.





MANY FACTORS AFFECT OUR HEALTH LONG BEFORE
THE HEALTHCARE SYSTEM EVER GETS INVOLVED

... yet there is a growing recognition that medical care alone cannot
address what makes us sick...

CONDITIONS IN WHICH PEOPLE ARE
BORN, GROW, LIVE, WORK, AGE
THE **FUNDAMENTAL DRIVERS OF THEIR
HEALTH**

Meeting Individual Social Needs Falls

Short Of Addressing Social

Determinants Of Health

Brian C. Castrucci, John Auerbach

JANUARY 16, 2019

<https://www.healthaffairs.org/>



FACTORS INFLUENCING COST OF HEALTH INSURANCE MANAGEMENT

EXTERNAL FACTORS

- Medical Inflation
- Higher life expectancy
- Coronavirus pandemic
- Member behavior and moral hazard
- Population Health
- Legislative changes

INTERNAL FACTORS

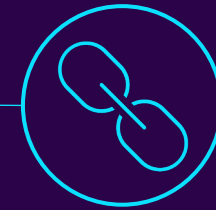
- Claims management and the company's ability to pay claims
- Financial and incentive opportunities for intermediaries (agents)
- Communication levels
- Member's health status throughout the life of the policy
(Member profile and accountability)

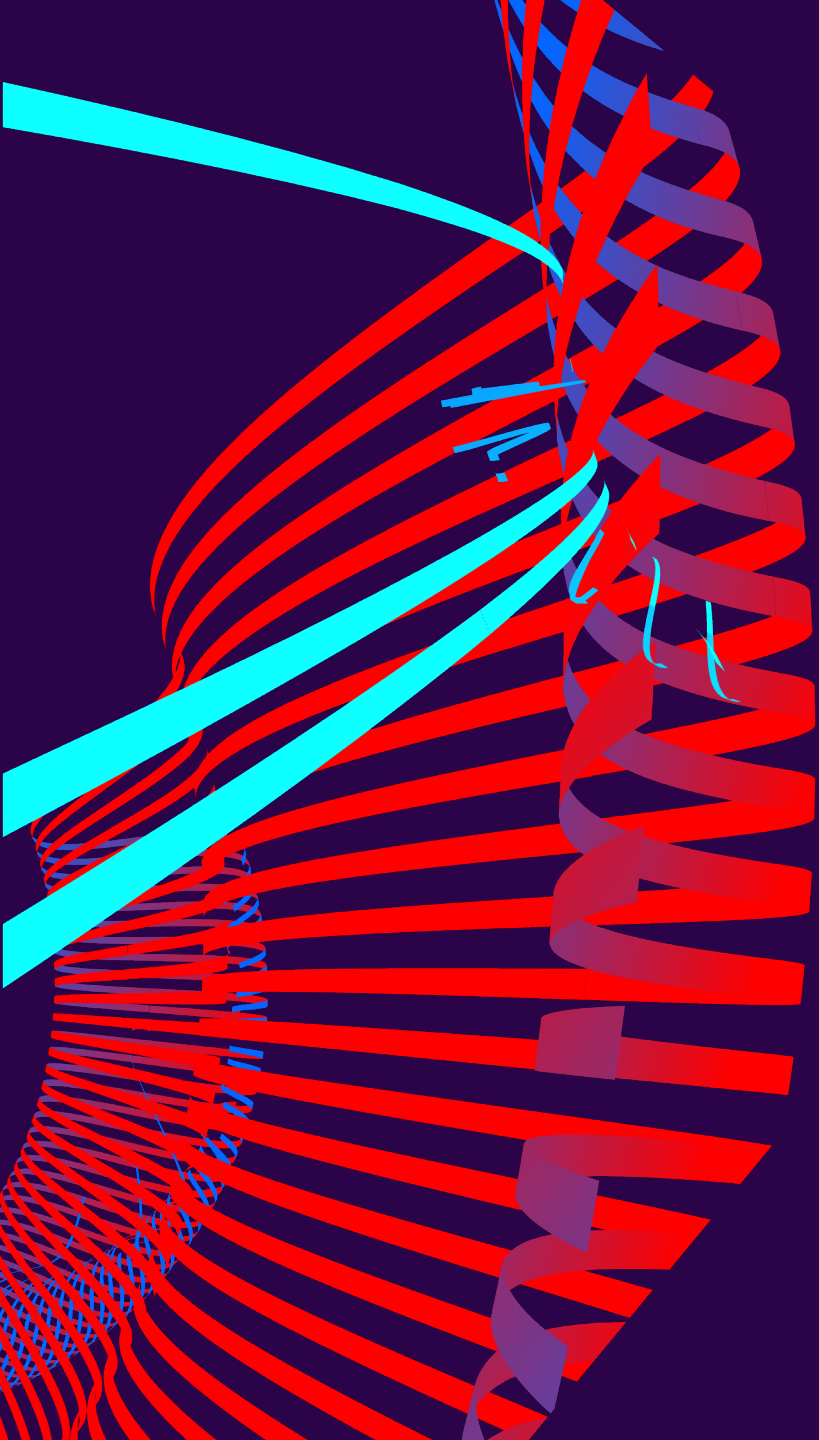
HEALTHCARE INSURANCE DEVELOPING TRENDS



Data Acquisition

Improved data collection and use
of accurate customer information
to make smart business and
healthcare management
decisions





**DATA FOR DRIVING PERFORMANCE
AND NOT JUST TRACKING
PERFORMANCE**

EVIDENCE BASED MANAGEMENT

HOW CAN DATA ANALYTICS BENEFIT HEALTH INSURANCE COMPANIES

- Product development
- Pricing and risk selection
- Underwriting
- Claims management
- Proactive Healthcare Management
- Contact Center optimization
- Automation and efficiency



DATA ANALYTICS PROCESSES IN HEALTH INSURANCE COMPANIES

Claims TRIAGE

- Evaluate claim information
- Autoadjudication (low-cost claims)

Claims Outlier detection

- Abnormality in the process

Fraud detection

- Identify false positives ML

Customer experience

- Personalization



An abstract graphic on the left side of the slide. It features a dark blue background with several overlapping, flowing ribbons. The ribbons are primarily red and cyan, with some purple and blue tones. They appear to be moving from the left towards the right, creating a sense of dynamic motion and complexity. The ribbons are of varying thickness and are layered, with some appearing to pass over others.

DATA GOVERNANCE STRATEGY

COLLABORATE WITH SUBJECT MATTER EXPERTS TO
DESIGN A PREDICTIVE MODEL

FEATURE ENGINEERING TO TRANSFORM RAW DATA IN
ORDER TO CAPTURE THE UNDERLYING PROBLEM

- Right data acquisition tools
- Statistical model
- Predictive model

DISRUPTIVE MEDICAL TECHNOLOGIES FOR DATA ACQUISITION

Quantification

Sleep monitoring

Fitness

Wearables

Nutrition



Monitor Health Data

Population health of groups insured

Diagnosis

Point of care testing

Pocus

Vision apps

Facial recognition



Point of sale underwriting

DMV records

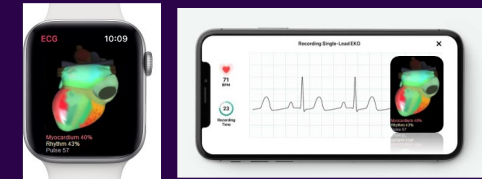
Pharmacy records



Images for illustration purposes:

Hyperfine portable MRI

<https://hyperfine.io/>



Home Health & Consumer B2C APP

Images for illustration purposes:

Dr Carmen Balzano MD

Plainsight test - confidential

DATA ACQUISITION

RISKS

- INFORMATION OVERLOAD
- INSURER OVERREACH
- REGULATORY ACTION FOR PRIVACY VIOLATION
- ADVERSE SELECTION AND DISCRIMINATION

BENEFITS

- RAPID AND EFFICIENT POINT OF SALE (UW)
- IMPROVED PUBLIC WELLNESS
- AVOID CATASTROPHIC CLAIMS
- IMPROVED CUSTOMER ENGAGEMENT AND PERCEPTION
- CLIENT ACTIVE PARTICIPANT
- LOYALTY AND PERSISTENCY

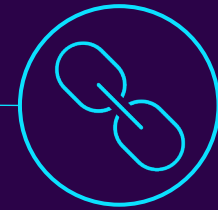


EARLY DETECTION EXAMPLES

- MGH and MIT Mammography
- Smart Watch and atrial fibrillation to prevent stroke
- POCUS for screening



HEALTHCARE INSURANCE DEVELOPING TRENDS



Artificial Intelligence

Incorporate Machine Learning to replicate and optimize human behavior to perform simple tasks faster and more efficiently for better healthcare management

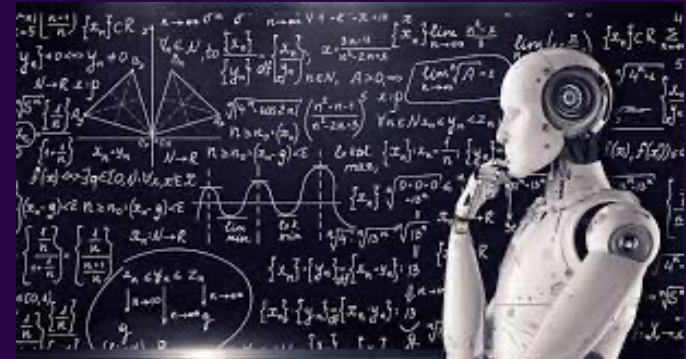
AI REINASSANCE

- DIGITAL AVAILABILITY OF DATA
- INCREASED COMPUTING POWER (CLOUD COMPUTING)
- ALGORITHM IMPROVEMENTS
- SYNERGY BETWEEN PREDICTIVE MODELING AND MACHINE LEARNING
- CRITICAL TO BUSINESS SUCCESS



TYPES OF ARTIFICIAL INTELLIGENCE

- NARROW AI
- GENERAL AI (Human behavior)



Narrow AI	General AI
○ Application specific/ task limited	○ Perform general (human) intelligent action
○ Fixed domain models provided by programmers	○ Self-learns and reasons with its operating environment
○ Learns from thousands of labeled examples	○ Learns from few examples and/or from unstructured data
○ Reflexive tasks with no understanding	○ Full range of human cognitive abilities
○ Knowledge does not transfer to other domains or tasks	○ Leverages knowledge transfer to new domains and tasks
○ Today's AI	○ Future AI?



An abstract graphic on the left side of the slide. It features a dark blue background with several overlapping, flowing ribbons. The ribbons are primarily red and cyan, with some purple and blue tones. They appear to be moving from the left towards the right, creating a sense of depth and motion. The ribbons are of varying thickness and are layered, with some appearing to be in front of others.

NARROW AI EXAMPLES

- OCR (OPTICAL CHARACTER RECOGNITION)
 - OPTICAL DATA EXTRACTION
- NLP (NATURAL LANGUAGE PROCESSING)
 - BOTH NEED CONVERGE TO CONTEXTUALIZE (I.E. CANCER)
- BUSINESS INTELLIGENCE
 - DATA VISUALIZATION

OCR



**DOCUMENT
SCAN**



**SCANNED
IMAGE FILE**



OCR
(Optical Character
Recognition)



**TEXT
DOCUMENT**

Images for illustration purposes: <https://github.com/topics/ocr-text-reader?l=c%23>

MACHINE LEARNING AND PREDICTIVE MODELING CONVERGE



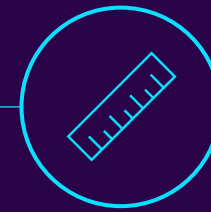
INPUT

DATA OCR AND NLP
SCANNED



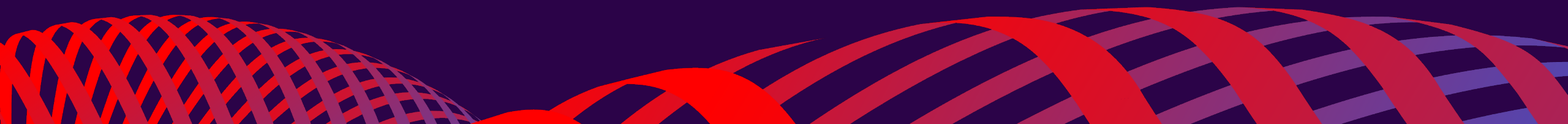
BOX-MODELING

PREDICTIVE MODELING,
ALGORITHMS AND
MAPPING



OUTPUT

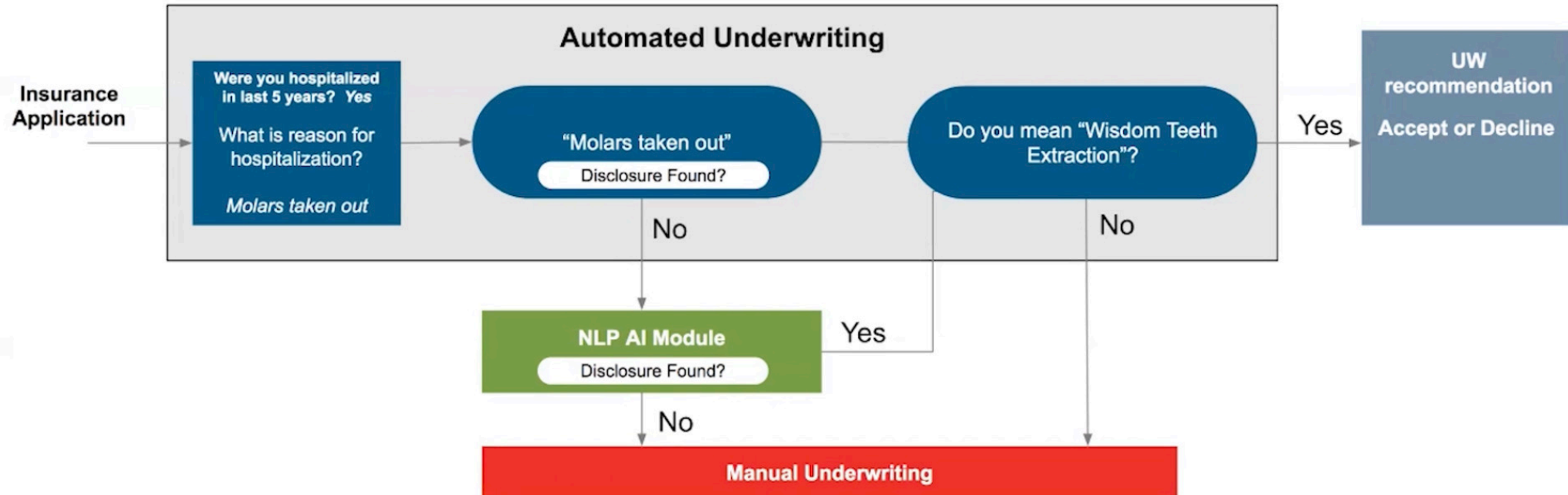
RESULTS IN DATA
DIGITALIZATION



NLP is natural language processing (and uses ML)

Automated manipulation of natural language speech or text by software

- Includes linguistics, computer science, data science and domain expertise



Source: Dr Abigail Doolittle PhD January 2021

<https://www.rgare.com/knowledge-center/article/videos-ai-demystified-the-abcs-of-ai-ml-ocr-nlp-bi>

BUSINESS INTELLIGENCE

BI is business intelligence (aka data visualization)

Visualization of data & insights to aid business decision making

- Includes business analysis, user interface design and domain expertise



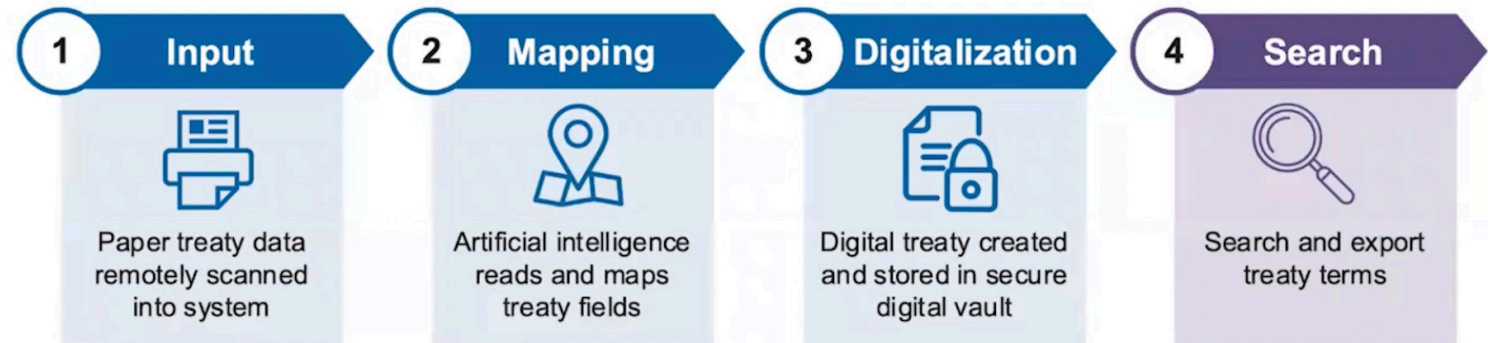
Source: Dr Abigail Doolittle PhD January 2021

<https://www.rgare.com/knowledge-center/article/videos-ai-demystified-the-abcs-of-ai-ml-ocr-nlp-bi>

AI AND HEALTH INSURANCE

Treaty digitalization uses OCR, NLP and BI (and ML)

AI modules are agnostic tools combined to address insurance use cases



Digitization refers to converting analog data sources into digital files. Some examples include creating spreadsheets based on the data from ink-on-paper records, scanning paper documents or photographs and saving them in PDF format on a company's drive.

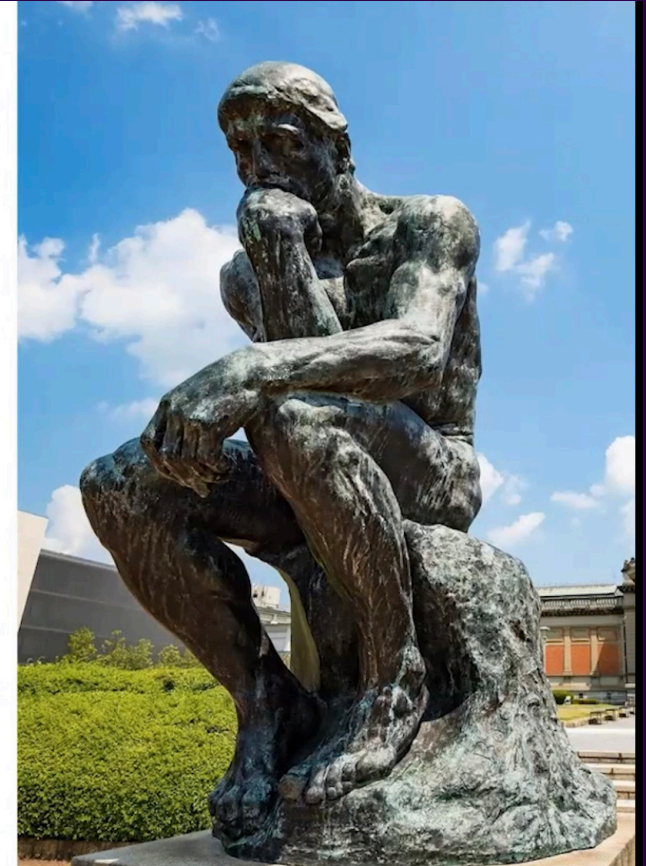
Source: Dr Abigail Doolittle PhD January 2021

<https://www.rgare.com/knowledge-center/article/videos-ai-demystified-the-abcs-of-ai-ml-ocr-nlp-bi>

STEPWISE BUSINESS STRATEGY

“PAVE” your way to AI success

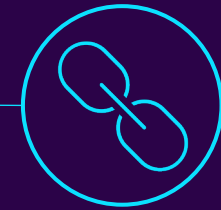
- Proactive Create and execute strategic AI roadmap
- Agile Incremental successes build the foundation
- Value Create value and measure business impact
- Engage Collaborate with experts across your organization



Source: Dr Abigail Doolittle PhD January 2021

<https://www.rgare.com/knowledge-center/article/videos-ai-demystified-the-abcs-of-ai-ml-ocr-nlp-bi>

HEALTHCARE INSURANCE DEVELOPING TRENDS



Blockchain

Leverage to create a secure and interoperable repository of healthcare information and ledger, therefore enabling a trustworthy insurance-customer relationship with transparency

BLOCKCHAIN



Blockchain is a decentralized public ledger that keeps track of transactions across numerous computers referred to as a blockchain. Blockchain is essentially a network of computers, or “nodes,” that share the same transactional history

- Cryptographically secure
- Dynamic relationship
- Confidence in how data is used

Source: BlockRisk <https://blockrisk.io/>



HOW CAN BLOCKCHAIN BE USED IN HEALTH CARE?

- Proper data infrastructure
- Security and privacy in the network
- Provide opportunities for savings
- Offer patients/users control of their data which enhances security and privacy. , by doing so, they can let people decide when and how their data is shared with the insurers or providers.
- Any patient dealing with health issues is bound to visit multiple doctors across his lifetime. This leads to issues when sharing information from one doctor to another.



CASE: MED REC @MIT

- Blockchain-based system for managing medical information created by MIT researchers.
- MedRec fully decentralizes access rights via an Ethereum blockchain, giving patients control over record distribution.
- Even though these use cases are still in the early stages of research, they have the potential to boost healthcare delivery effectiveness and improve patient outcomes.
- However, before blockchain can be widely used in healthcare, numerous issues still need to be resolved, including standardization, regulatory and legal impediments, and interoperability with current systems.

Source: MIT

<https://www.media.mit.edu/projects/medrec/overview/>



HEALTHCARE INSURANCE DEVELOPING TRENDS RECAP



Data Acquisition

The data and governance framework will require a data collection STRUCTURE through training and system changes. This will provide information and reporting collaborating with experts

COLLECT

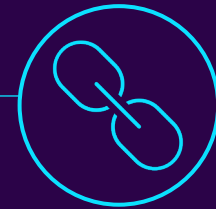


Artificial Intelligence

AI enables to digitalized raw data and to module algorithms for rapid decision-making and agile processing .of tasks.

DESIGN SIMPLE OR SERIES

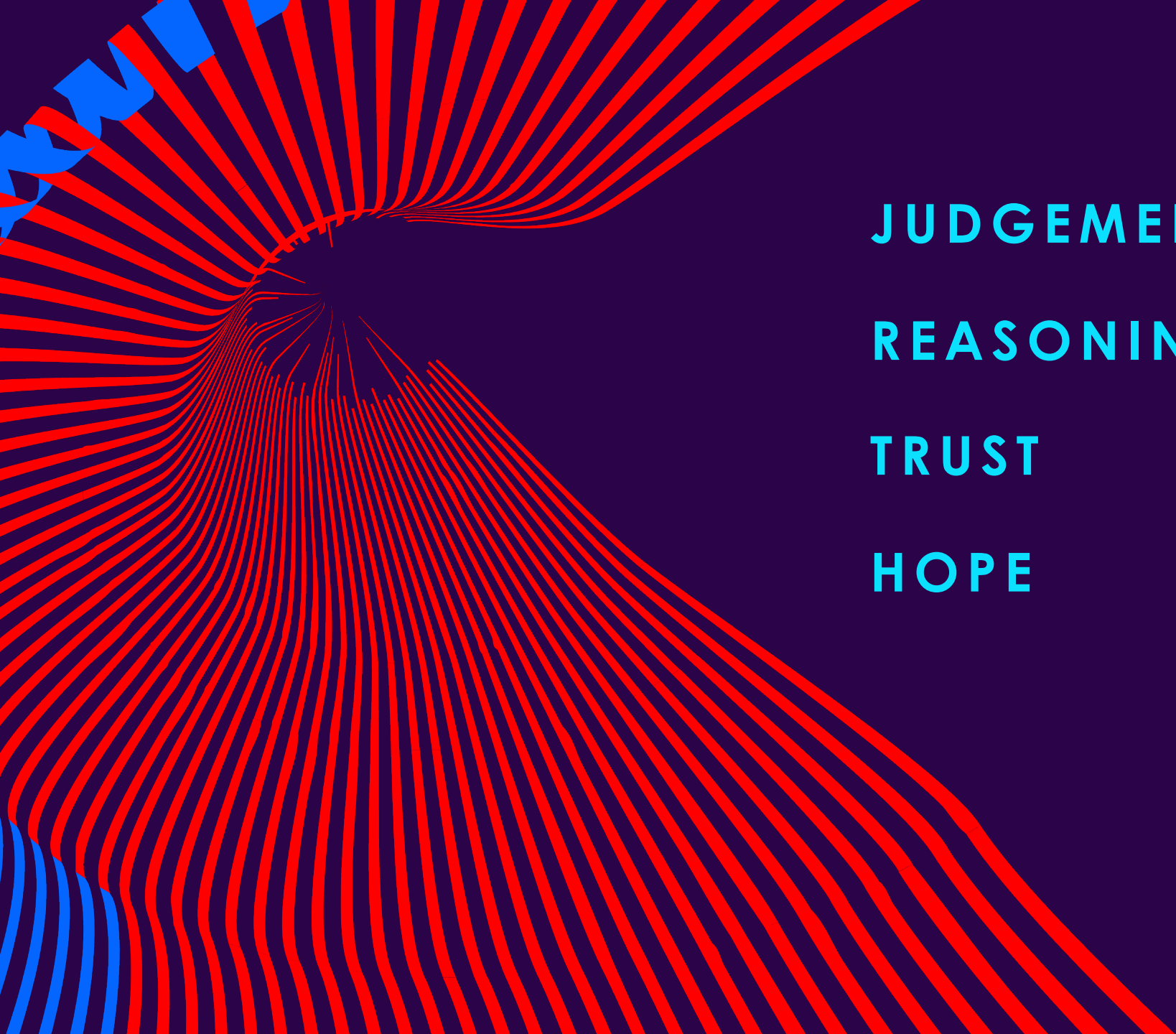
OF SIMPLE TASKS



Blockchain

Blockchain could be applied to processing health insurance claims to increase agility, transparency (reducing risk of fraud) and efficiency.

STORE AND MANAGE



JUDGEMENT

REASONING

TRUST

HOPE

THANK YOU

JORGE OTERO MD

jorge.otero@yale.edu

