

BEYOND MACHINE LEARNING

AI & COGNITIVE SYSTEMS FORUM

CONNECTED TRANSPORT

MANUFACTURING

HEALTHCARE

ENERGY AND UTILITIES

BUILDINGS & INFRASTRUCTURE

OPEN INDUSTRY

ENABLING IoT



**AI & COGNITIVE
SYSTEMS FORUM**

A hand and a robotic hand are shown touching a digital grid of white lines and dots. A bright, glowing light emanates from the point of contact between the two hands. The background is a soft, blue, out-of-focus scene with light rays and bokeh effects.

**DEVELOPING TRULY INTELLIGENT
SYSTEMS BY EMBEDDING HUMAN
EXPERTISE TO DIGITAL TWIN**

**BEYOND
MACHINE
LEARNING**

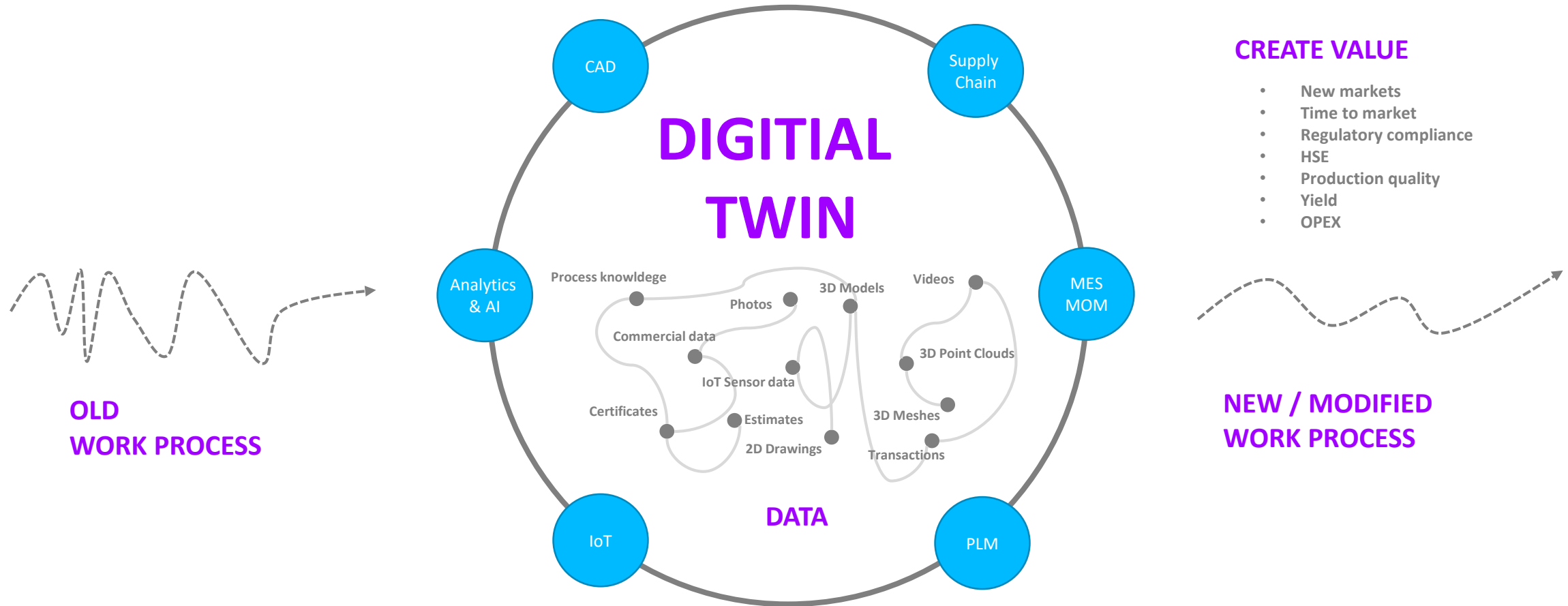
TERESA TUNG

Accenture Labs

accenture

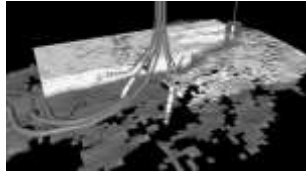
DIGITAL TWIN

DIGITAL TWIN IS A DIGITAL MODEL OF A PHYSICAL OBJECT, SYSTEM OR PROCESS THAT EXISTS (OR COULD EXIST)

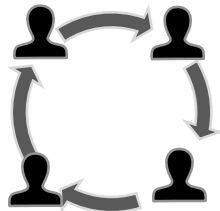


EXAMPLE: DIGITAL TWIN FOR OIL WELL

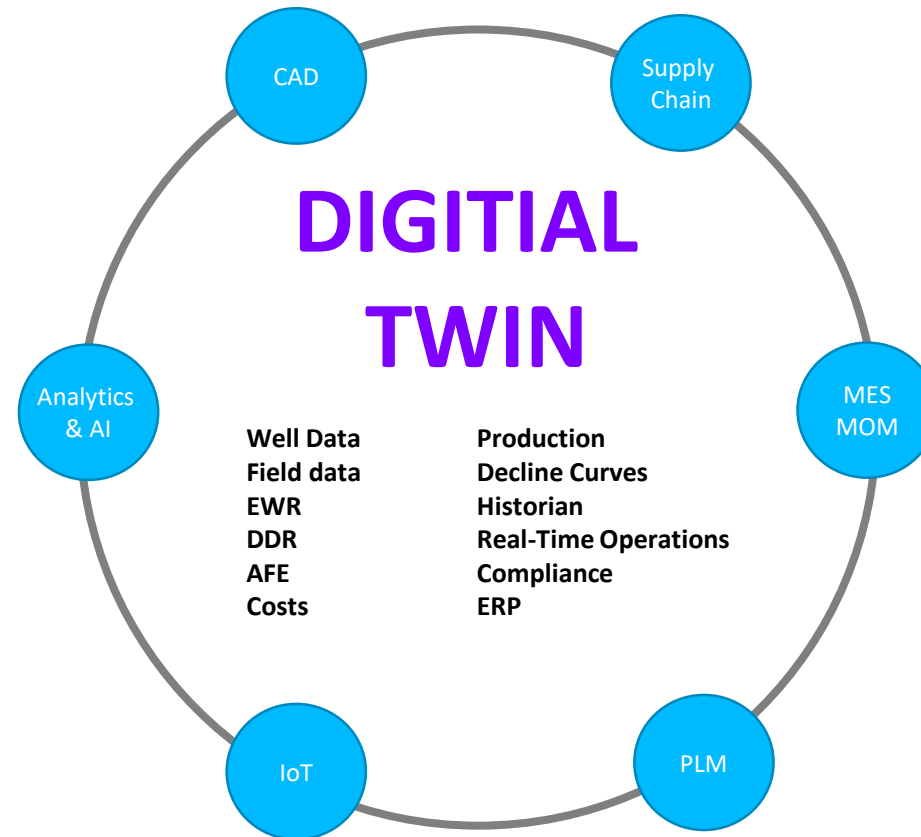
WELL DESIGN



ML generates Optimal Well Design and Execution plan



ML supports Continuous Improvement Across Multidisciplinary teams



DRILLING & COMPLETION



AI-driven Drilling & Completion



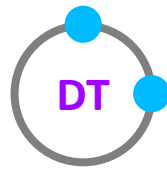
Predictive Analytics on Integrated Digital Supply Chain



Real-Time Analytics for Wells Optimization Center

+HUMAN EXPERTISE

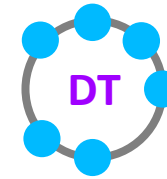
ADDS THE CONTEXT FOR DIFFERENT VIEWS OF THE DIGITAL TWIN



Leverage past designs to generate engineering detailed design to fulfill requirements



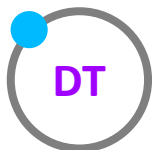
What information goes into creating well offset study?



Apply cross system lessons with instance-specific needs to optimize operations



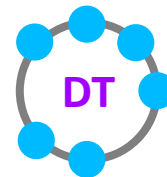
What is the insight from the specific pattern of events?
What is the next-best action?



Leverage past performance results to generate design requirements



What results are interesting? E.g., high productivity, loss circulation



Reconcile as-designed and as-built through manufacturing build and commissioning




What measurements are used? What is acceptable variance?

LIFECYCLE OF THING / SYSTEM

EXAMPLE: +HUMAN EXPERTISE IN SEARCH

EXAMPLE: INTERNET SEARCH FOR ACCENTURE

Accenture Company 

Accenture plc is a multinational professional services company that provides services in strategy, consulting, digital, technology and operations. A Fortune Global 500 company, it has been incorporated in Dublin, Ireland since September 1st, 2009. Wikipedia

Stock price: ACN (NYSE) \$186.20 +2.13 (+1.16%)
 Oct 24 12:01 PM EDT - Disclaimer

CEO: Julie Sweet (Sep 1, 2019-)

Headquarters: Dublin, Ireland






Revenue: 41.6 billion USD (2018)

Customer service: 1 (877) 889-9009




Number of employees: 492,000 (2019)

Subsidiaries: Avanade, Droga5, IMJ Corporation, MORE

Profiles

 LinkedIn  YouTube  Twitter  Facebook  Instagram

People also search for [View 15+ more](#)

Deloitte  Cognizant  EY  Tata Consultancy Services


Deloitte Caggemini Cognizant Ernst & Young Tata Consulta... Services

Show less Feedback







People also ask

- What do they do at Accenture?
- What is special about Accenture?
- Why should I join Accenture?
- Is Accenture a good company?


[Feedback](#)



Hours *

A Accenture St. Charles, IL · (312) 737-2233 Open · Closes 5PM	 WEBSITE	 DIRECTIONS
B Accenture Chicago, IL · (312) 693-0161 Open · Closes 5PM	 WEBSITE	 DIRECTIONS
C Accenture Chicago Innovation Hub Chicago, IL · (312) 427-2470 Open · Closes 5PM	 WEBSITE	 DIRECTIONS

[More locations](#)

Accenture (@Accenture) · Twitter
<https://twitter.com/Accenture> 

Enterprises that invest in—but don't effectively scale—new technologies are sacrificing significant annual revenue. Our new report identifies how to increase ROI in innovation: [accntu.re/2B8nU5g](https://www.accenture.com/us-en/2019/10/24/into-the-new) [#IntoTheNew](#)

2 hours ago

[View on Twitter](#)




What's the buzz on #IndustryX0? Our @MikeSutcliff shares new research on scaling digital innovation—including the four best practices for success. [accntu.re/2J0KqKq](https://www.accenture.com/us-en/2019/10/24/industry-x0) [#ITAP2019](#) [pic.twitter.com/38tnK9F...](https://www.pic.twitter.com/38tnK9F...)

11 hours ago

What does disruption in your industry look like now—and in the future? Our Disruptability Index report digs in: [accntu.re/2WdTTxW](https://www.accenture.com/us-en/2019/10/24/disruptability-index) [#WisePivot](#) [pic.twitter.com/o9WekLc...](https://www.pic.twitter.com/o9WekLc...)

22 hours ago

Top stories

-  **Accenture Expands Innovation Hub in Chicago, Adds New Industry X.0 Studio to Accelerate Smart, Connected ...**
Business Wire · 3 days ago
-  **Accenture appoints new PR agencies, severs ties with Teneo**
PR Week · 21 hours ago
-  **Accenture, SAP to use Corda for central bank real-time gross settlements**
Ledger Insights · 5 hours ago

[More for accenture](#)

KNOWLEDGE GRAPH

EXAMPLE: INTERNET SEARCH

Extract Information

Mona Lisa - Wikipedia

https://en.wikipedia.org/wiki/Mona_Lisa

The **Mona Lisa** is a half-length portrait painting by the Italian Renaissance artist Leonardo da Vinci that has been described as "the best known, the most visited, ...

Year: c. 1503–06, perhaps continuing until c. 1517 Medium: Oil on poplar panel

Subject: Lisa Gherardini Location: Musée du Louvre, Paris

Lisa del Giocondo · Speculations about Mona Lisa · Lisa Mona Lisa · Mona Lisa

Mona Lisa | History & Facts | Britannica.com

<https://www.britannica.com/topic/Mona-Lisa-painting>

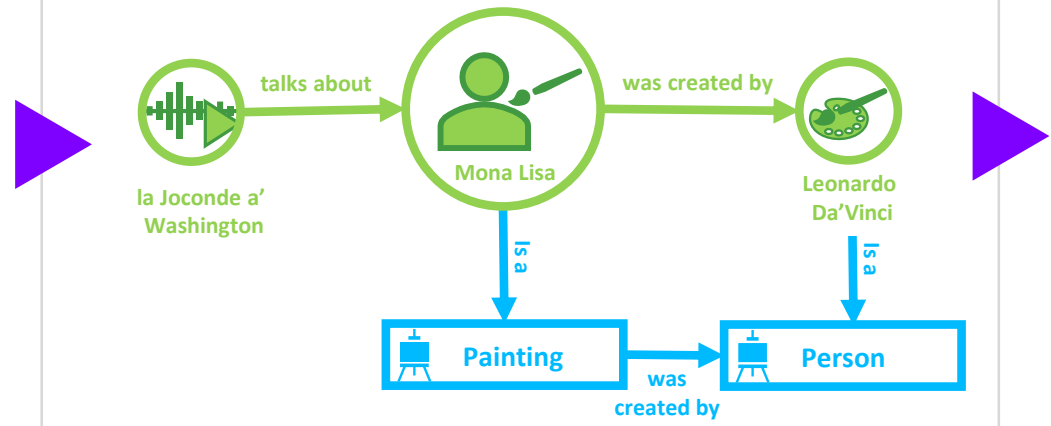
Mona Lisa, oil painting on a poplar wood panel by the Italian painter, draftsman, sculptor, architect, and engineer Leonardo da Vinci, probably the world's ...

Mona Lisa – Portrait of Lisa Gherardini, wife of Francesco del ...

<https://www.louvre.fr/.../mona-lisa---portrait-lisa-gherardini-wife-francesco-del-gioco...>

This portrait was doubtless started in Florence around 1503. It is thought to be of Lisa Gherardini, wife of a Florentine cloth merchant named Francesco del ...

Contextualize Information



Assemble Information

Mona Lisa
Painting by Leonardo da Vinci.

The **Mona Lisa** is a half-length portrait painting by the Italian Renaissance artist Leonardo da Vinci that has been described as "the best known, the most visited, the most written about, the most sung about, the most parodied work of art in the world." Wikipedia

Artist: Leonardo da Vinci
Dimensions: 2' 6" x 1' 9"
Location: Louvre Museum (since 1797)
Created: 1503
Period: Renaissance
Medium: Oil paint

People also search for

- The Last Supper
- Salvator Mundi
- The Starry Night
- Lady with an Ermine
- David

See results about

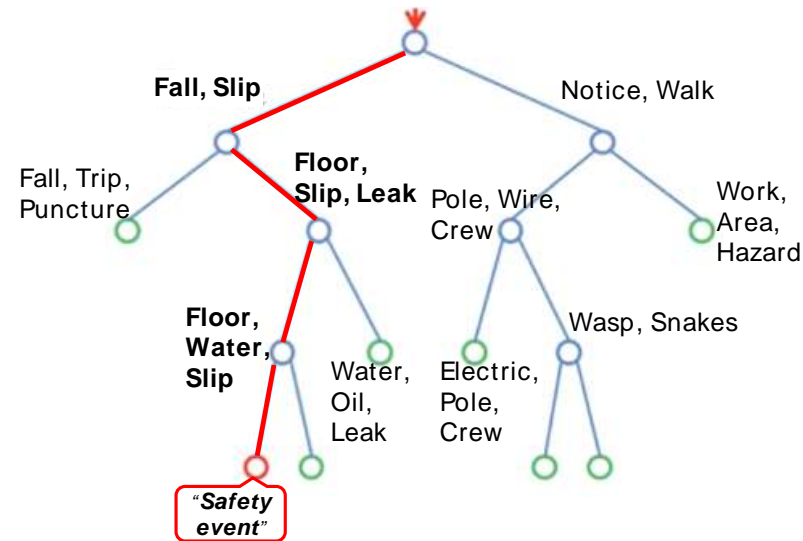
Lisa del Giocondo (Italian model)
Lisa del Giocondo was an Italian noblewoman and member of the Gherardini family of Florence and ...

DIGITAL TWIN + HUMAN EXPERIENCE

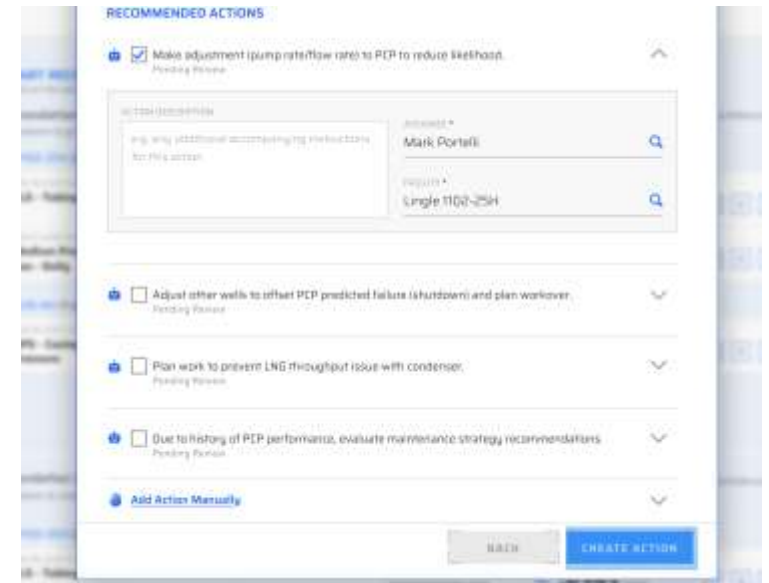
CREATE A DESIGN



IDENTIFY A ROOT CAUSE



REDEFINE A PROCESS



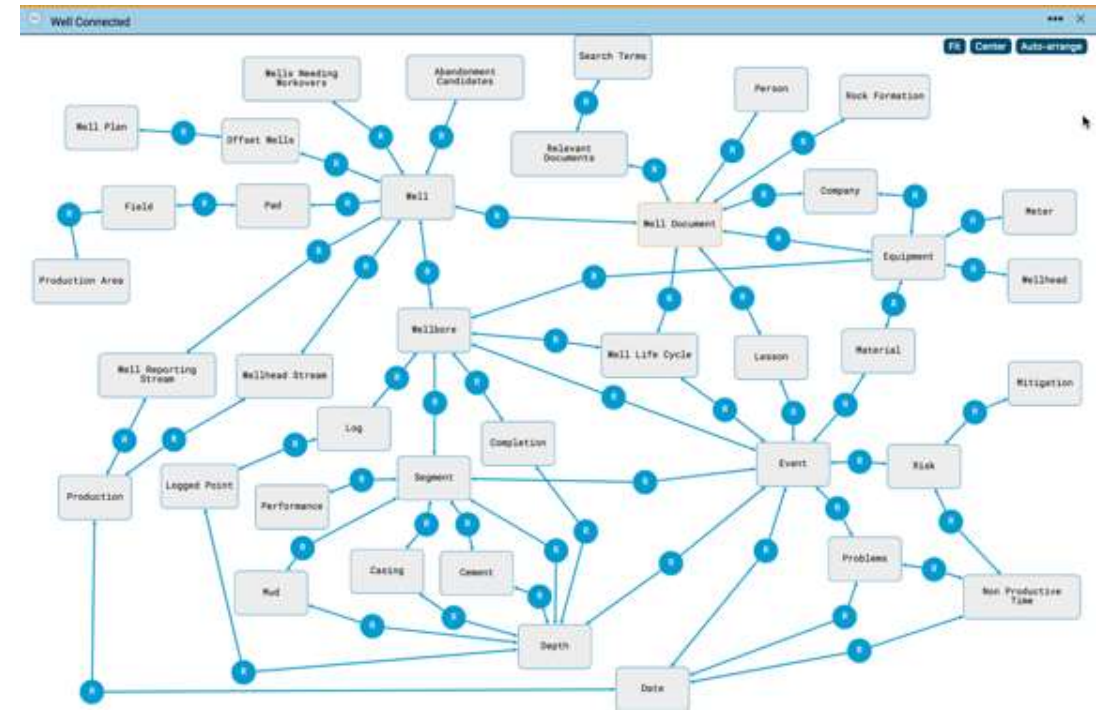
MODEL HUMAN REASONING

Start with the questions

- How should we plan our next well?
- What are similar offset wells?
- What are events I should be aware of?
- What sort of impact do they have?
- How often does it happen?
- Under what conditions?



Example Model Schema



POPULATE THE GRAPH

Data Sources

Drilling Databases



Drilling Report

FWR	HIS Report	FDP
Bit record	NOOP & AFE	DDR
Rushmore	Mud Logs	Final DD/MWD Report
Final Geologic Report	Post Drilling Report	Final Cement Report

Drilling Data Type

- Well Architecture (stick chart)
- Actual Mud weight ranges, cement type & quality
- Downhole related problems
- NPT data
- Lessons Learnt/After Action Review/TL Performance
- Well Depth
- Well Cost & Days
- Rig type
- Time and date of historical well
- Geological & Lithological Prognosis
- Any relevant regional info/issues
- Sidetracking method & info
- ...

Non-Exhaustive

Legend:

Structured

Unstructured

Extract from Original System

Example from Drilling Report:

Skid out cantilever 50 ft to transom afterwards, 2 ft transverse portwards to well center and secure same.

Natural Language Processing

- Regular Expressions
- Dictionary-based approaches
- Pattern-based approaches
- Machine Learning
- Other combinations

Example Well Design Schematic

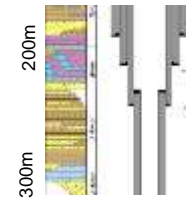


Image Processing

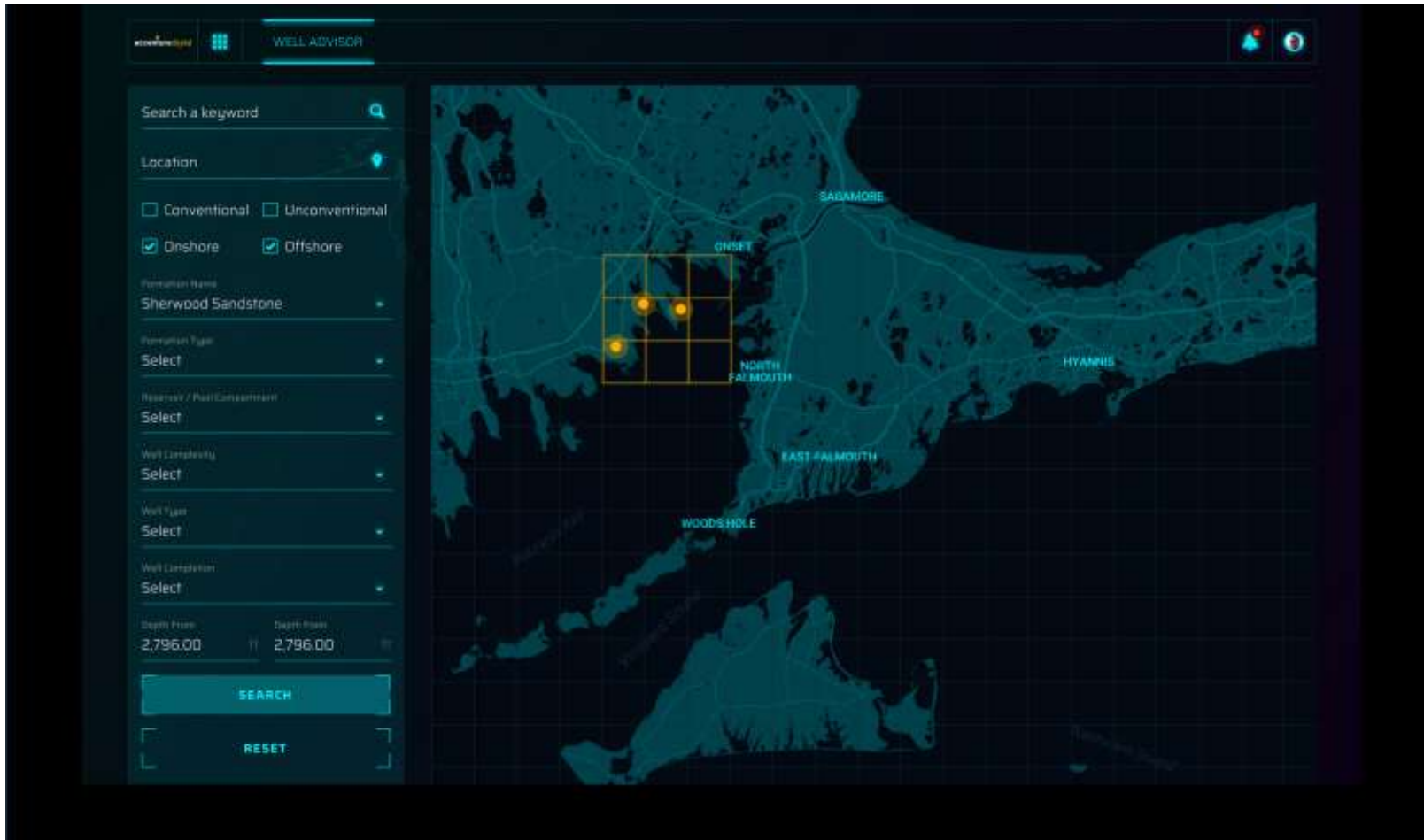
- Image Recognition
- Image Detection
- Image Classification
- Edge Detection
- Corner Detection



Relational Data Processing

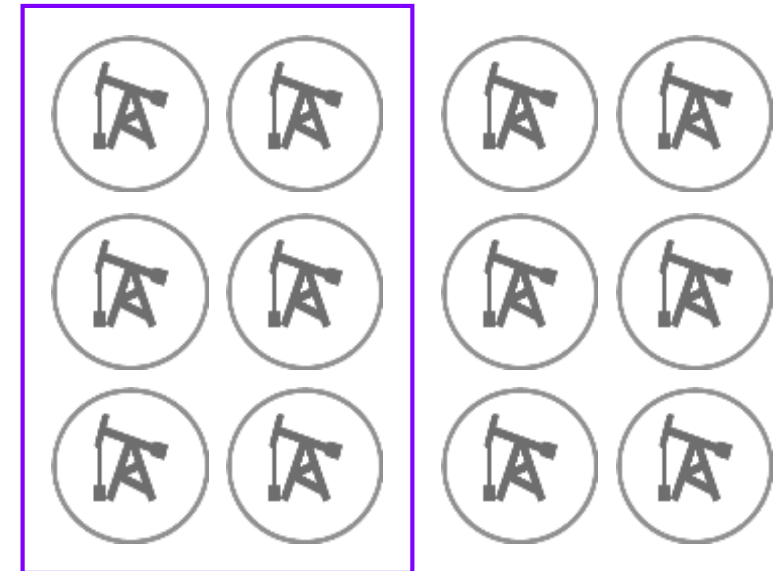
- Schema Parsing
- Entity Relationship Diagram to Hierarchy Parsing
- Data Normalization/ Denormalization

WELL ADVISOR: OFFSET STUDY

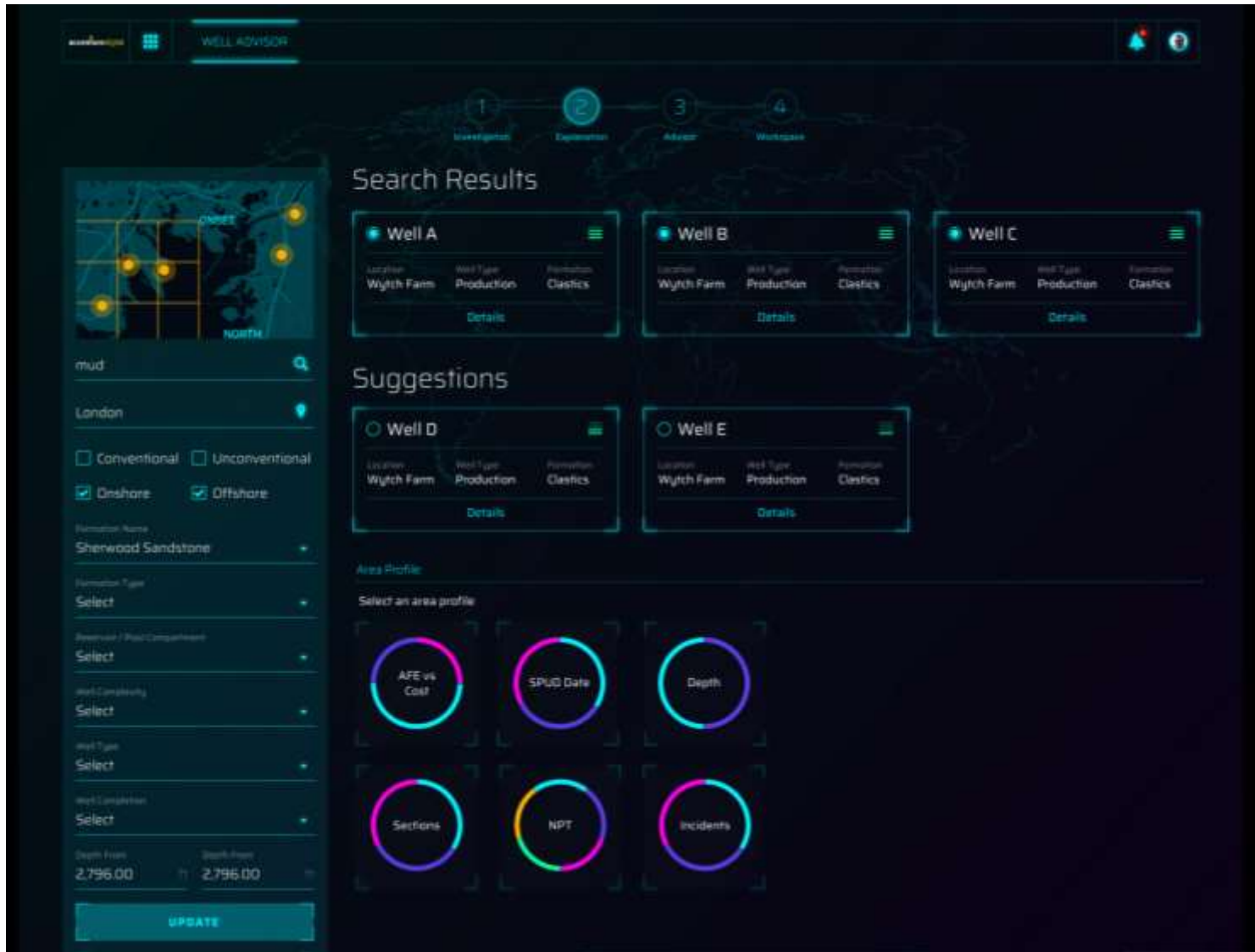


1

Identify population of wells that meet the search criteria

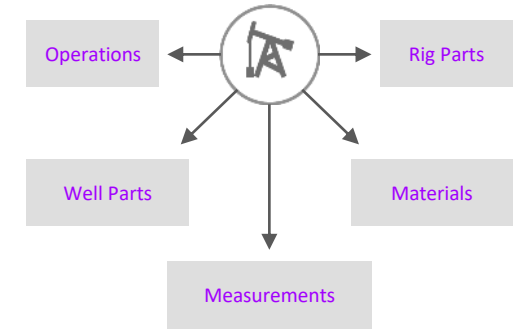


WELL ADVISOR: OFFSET STUDY



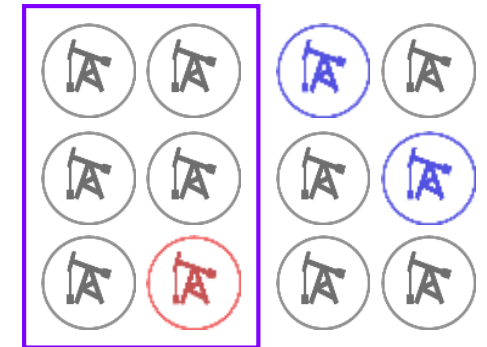
2

Generate a unique profile based on the population

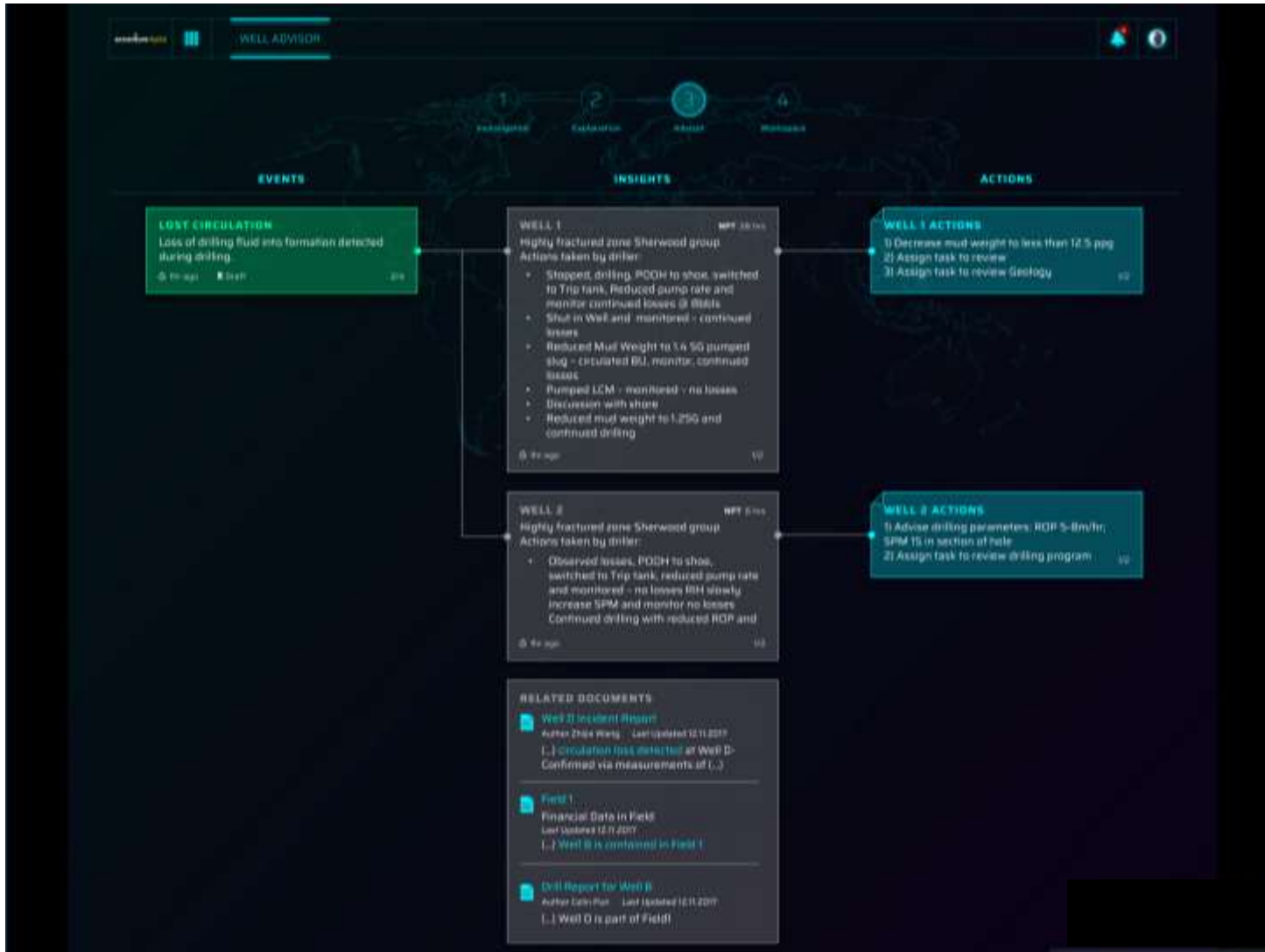


3

Recommend similar wells to the profile or identify outliers

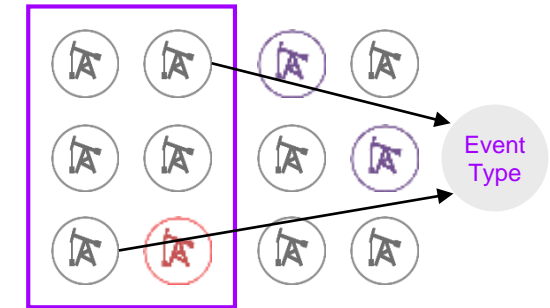


WELL ADVISOR: OFFSET STUDY



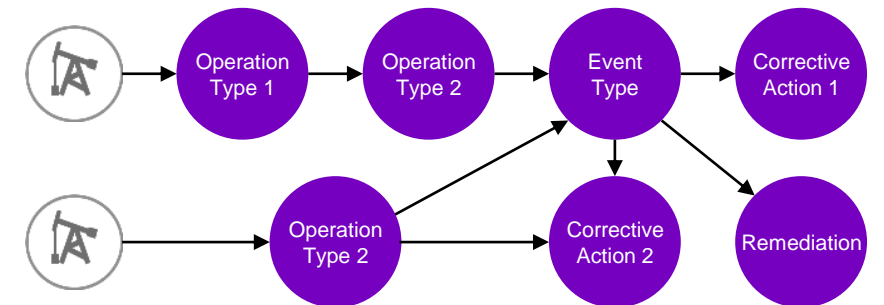
4

Identify commonalities or abnormalities in the curated population



5

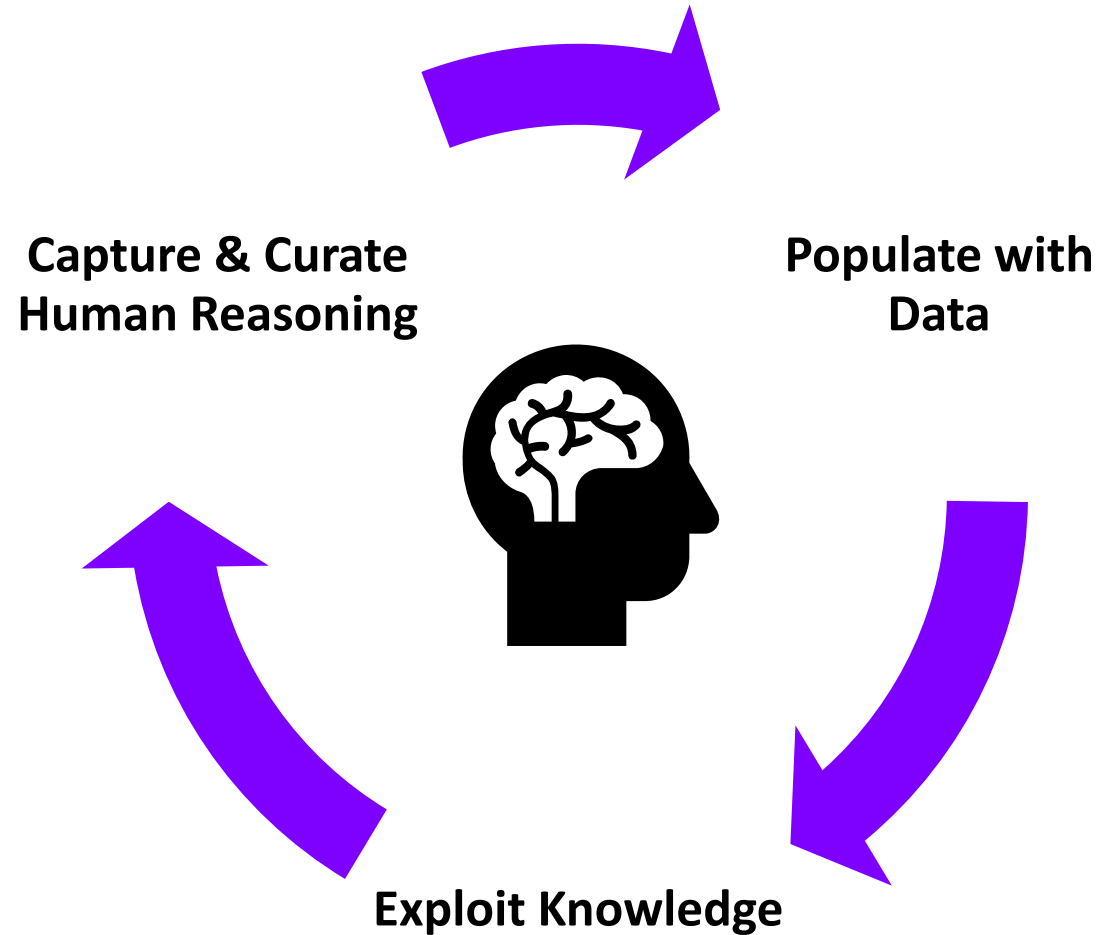
Track remediation and explain consequences or commonalities.



YOU NEED HUMAN EXPERIENCE TO...

+HUMAN EXPERIENCE

- **Configure and Apply Digital Twin**
- **Handle Domain-specific models, processes, regulations**
- **Augment Gaps in Data**





**AI & COGNITIVE
SYSTEMS FORUM**

DIGITALIZING INDUSTRIES

COME JOIN US!



SAVE THE DATE
29 - 31 October 2019



FOLLOW US
#IOTSWC19



FOR MORE INFO VISIT
www.iotsworldcongress.com