

Utilizing artificial intelligence in geological, biological, and chemical systems remains a struggle for multiple reasons:

- There are **limited examples** of these events which results in too little data to train a model.
- There is **no clear indication** before an event or state change / interpretation is not achievable with statistical methods.
- Significant delay between the cause and resulting effect keep models from seeing **correlation**. This is critical because everything in nature is catalytic.
- **Probabilistic answers** are not sufficient. Deterministic answers are needed to forewarn of events where lives or significant dollars are at risk.

## Enter Senslytics.

With its Intuition Technology platform, the company has developed a “data-light” approach that enables the company to forewarn of an event, state change, or make an interpretation. In fact, Senslytics has shown the ability to make accurate conclusions in complex cases after working with as few as five data sets.

As the name implies, Intuition Technology utilizes the knowledge of domain experts to build dynamic and flexible models that understand situational dynamics that correlation-based models can’t discern.

Intuition Technology has shown value in the energy industry, but could also be applied to agriculture, healthcare, natural disasters in geological systems, and many more high-risk, low-probability events.

## Two of the top five oil companies worldwide are Senslytics pilot customers.

### Existing Applications:

Avoid fluid sample contamination and excessively long jobs during wireline formation tests by using Senslytics’ **“Contamination Forewarning”** application.

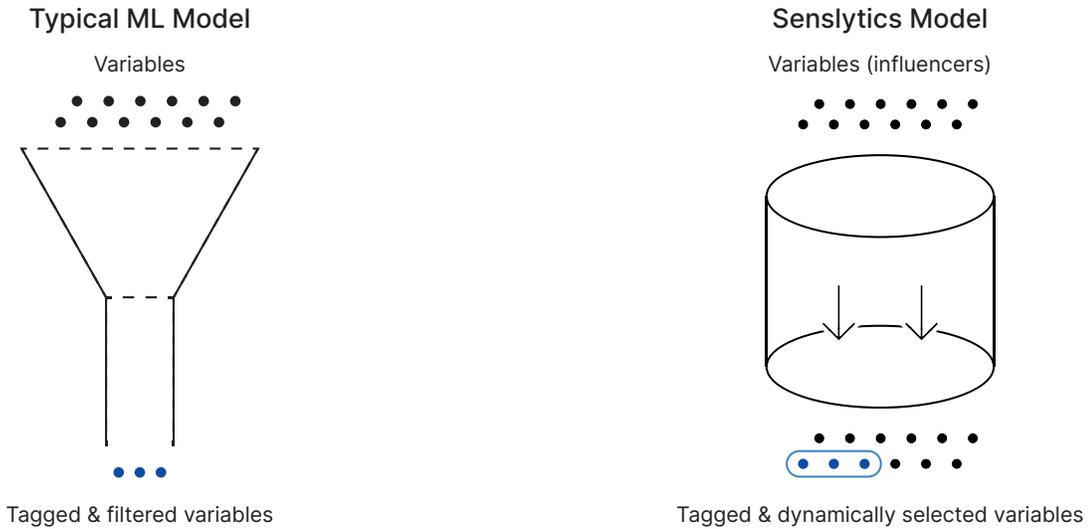
Move mudgas logging estimations closer to ground truth for GOR, BVHC, and net pay thickness using Senslytics’ **“Mudgas Reservoir Estimation”** application.

## The Funnel

Senslytics unique process starts with data ingestion. Intuition Technology can ingest time-series data (referred to as “influencers” and coded as “ring”, “neutral”, or “core”), discrete events, situational data, and hypotheses. While all models use variables selected by domain experts and data scientists,

once the model is built the funnel has narrowed to a limited number of variables determined to be relevant when training the model. Intuition Technology holds on to all the influencers provided and dynamically selects which ones are most relevant in a given situation.

SEE GRAPHIC ON NEXT PAGE



## Time Series Data

When data is input into the Intuition Technology platform, **time series data** follows one path while **discrete events, situational data, and hypotheses** follow a different path:

### Time Series Data

Each “core” influencer is considered a “view” and is given a fidelity score that changes in real-time.

#### Core

These influencers provide the views used to determine if an event or state change is about to occur.

Core influencers do not change as much as ring influencers.

For the contamination forewarning application, this includes things like sound speed, resistivity, and absorbance.

#### Ring

These influencers impact the core influencers and are constantly changing.

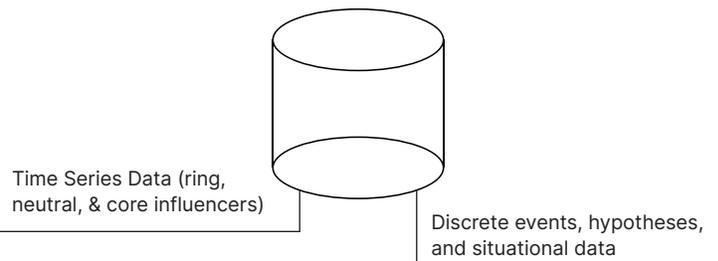
For contamination forewarning, this includes items like pump rate.

#### Neutral

These influencers are the unknowns. They are what keep existing ML models from scaling when applied in new environments.

Intuition Technology® uses these as a way of getting to the “unknown unknowns.”

- o When a hypothesis that normally works fails, what changed?

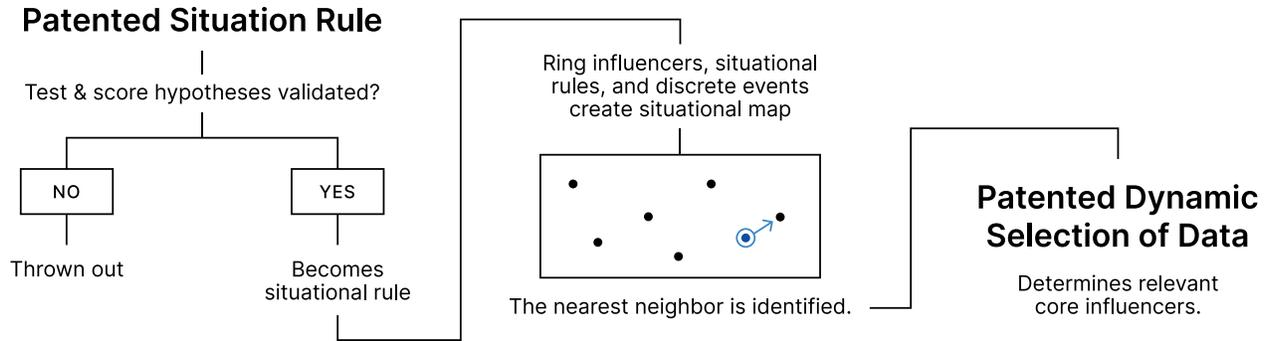


### Hypotheses and Situational Rule Management

Discrete events, hypotheses and situational data are used to determine which core influencers are most relevant in a given situation and time.

This starts with Senslytics’ patented situational rule which goes through a process of hypothesis iteration. Hypothesis iteration tests and scores domain expert hypotheses. Hypotheses that prove to be true become situational rules. Those that do not hold up are removed from the process.

The event or state change being evaluated is put on a situational map, where it is mapped to its nearest neighbor. Ring influencers are also utilized on the situational map. This determines what situational rules and discrete events are relevant at the current time to get to ground truth. Senslytics’ patented dynamic selection of data (influencers) now comes into play. The situational context determines the relevant core influencers.



## Converging on an Inference

Core influencers that are selected (which change over time as the situation changes) are given a fidelity score that is constantly calculated to determine if they can be trusted or if the noise level is too high to draw conclusions from them. Senslytics has developed a proprietary method for finding

signatures indicating an event or state change is about to take place. When multiple core influencer signatures agree (or converge on the same conclusion) this means that Intuition Technology can indicate an inference/event with confidence.

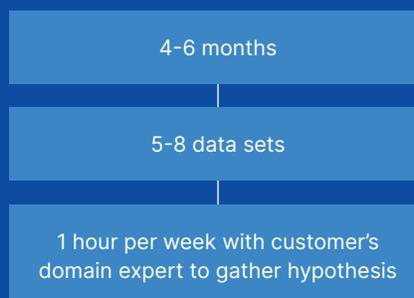
### Relevant Core Influencers

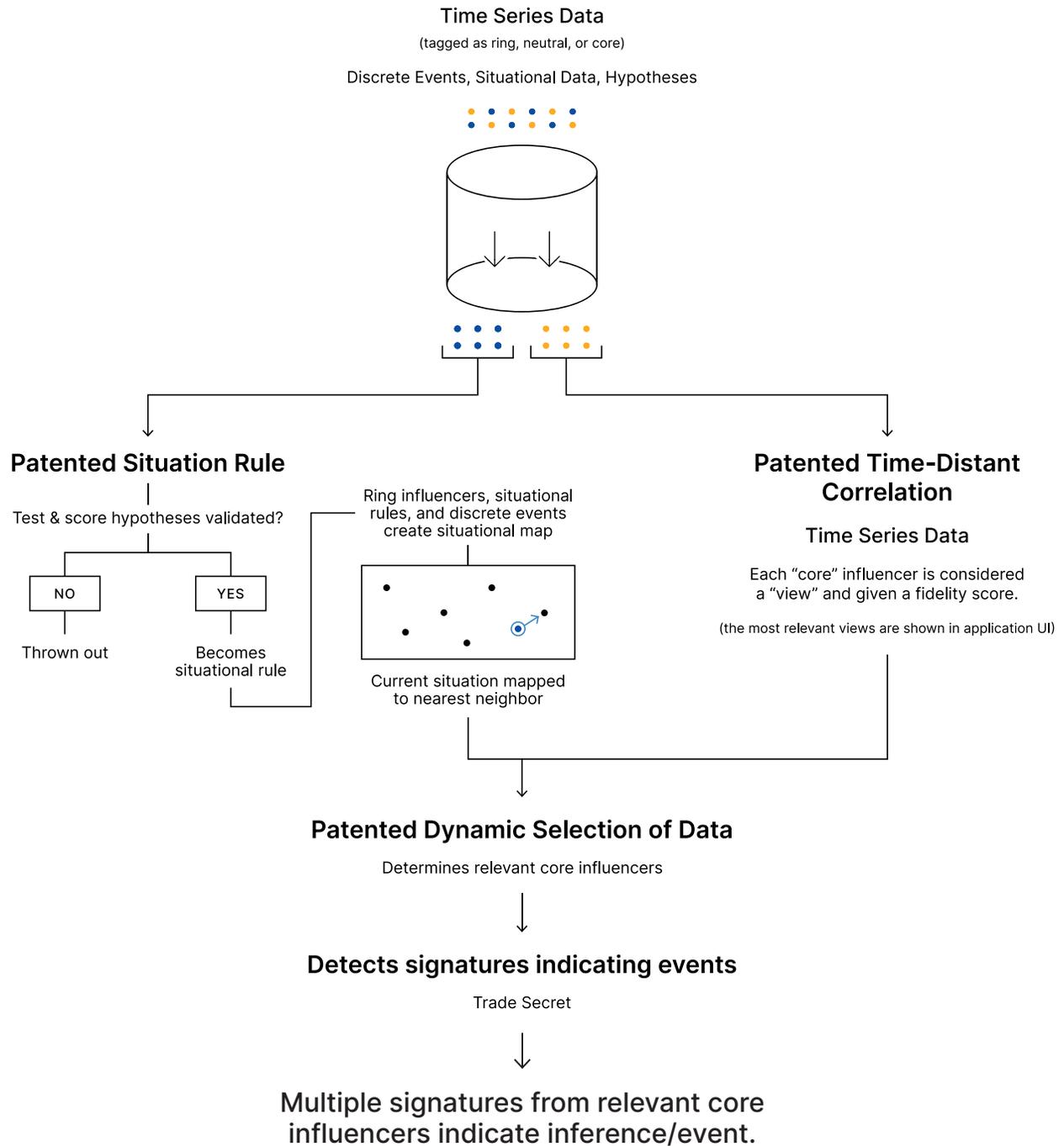
A	Low-fidelity	X
B	High-fidelity	Look for signature
C	High-fidelity	Look for signature
D	High-fidelity	Look for signature
E	Low-fidelity	X



Because Senslytics gets to the cause of an event and validates through multiple signatures, its conclusions are **deterministic** rather than **probabilistic**.

### Requirements for developing new uses cases:





**Relevant Core Influencers**

A	Low-fidelity	X
B	High-fidelity	Look for signature
C	High-fidelity	Look for signature
D	High-fidelity	Look for signature
E	Low-fidelity	X

