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Information Technology Trust

Machine Learning (ML) beyond the hype
Use Science to improve Business

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The Data Conference 2021
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Platinum Business Partner IBM

Overview

- Hype & Real status of ML today
- Real ML paradigms
- Conclusions

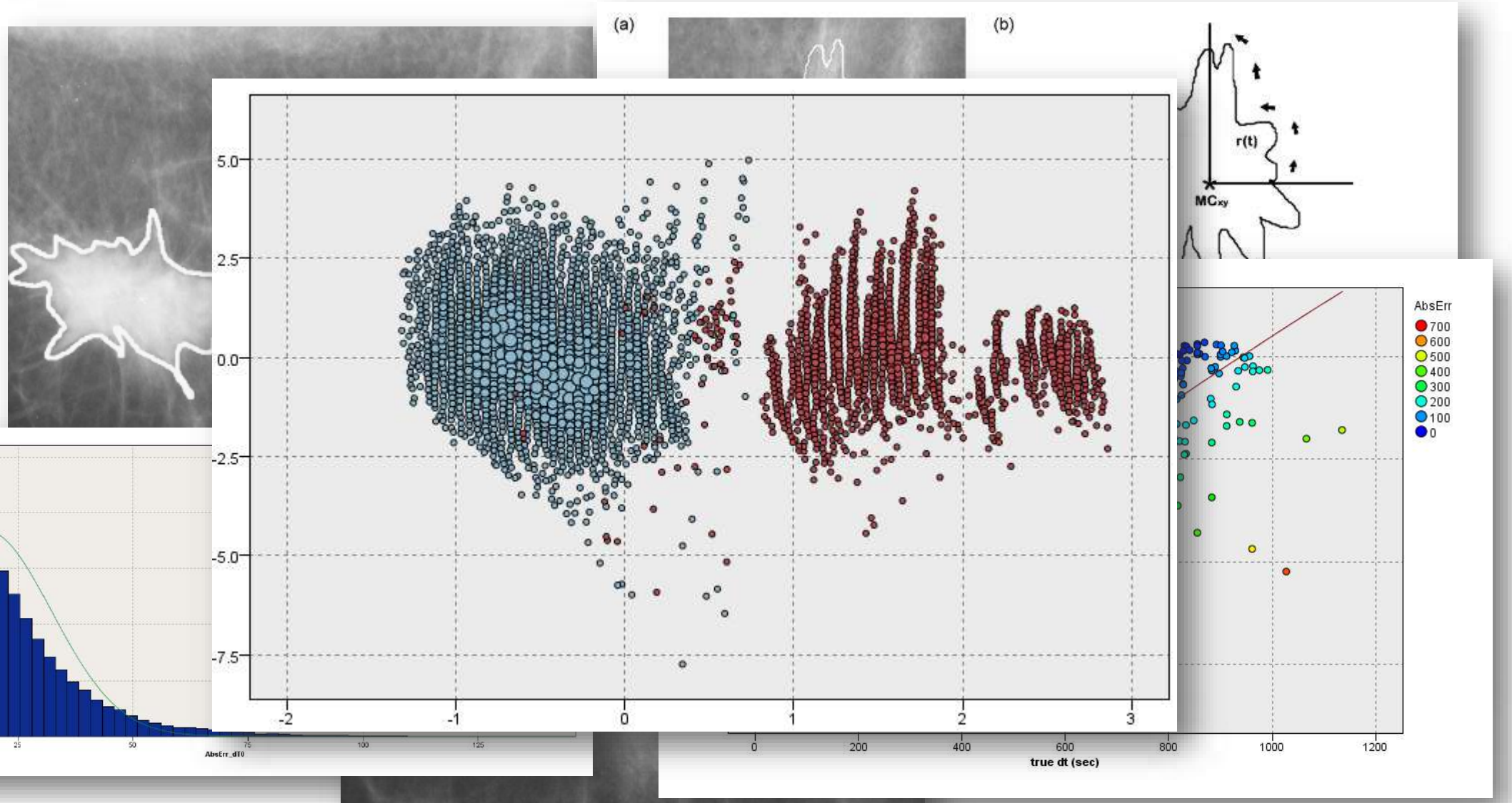
The hype of ML today...

- *"Deep learning is the train-n-play black box that can solve everything"*
- *"Enough GPU parallelization can overcome any algorithmic deficiencies"*
- *"Everything can run in the cloud, even real-time Big Data Analytics (DA)"*
- *"We don't need DA experts with deep background, just good programmers"*
- (...)

➢ Over-rated "automatic" ML suites

➢ Under-rated engineering required

...and the real ML in practice



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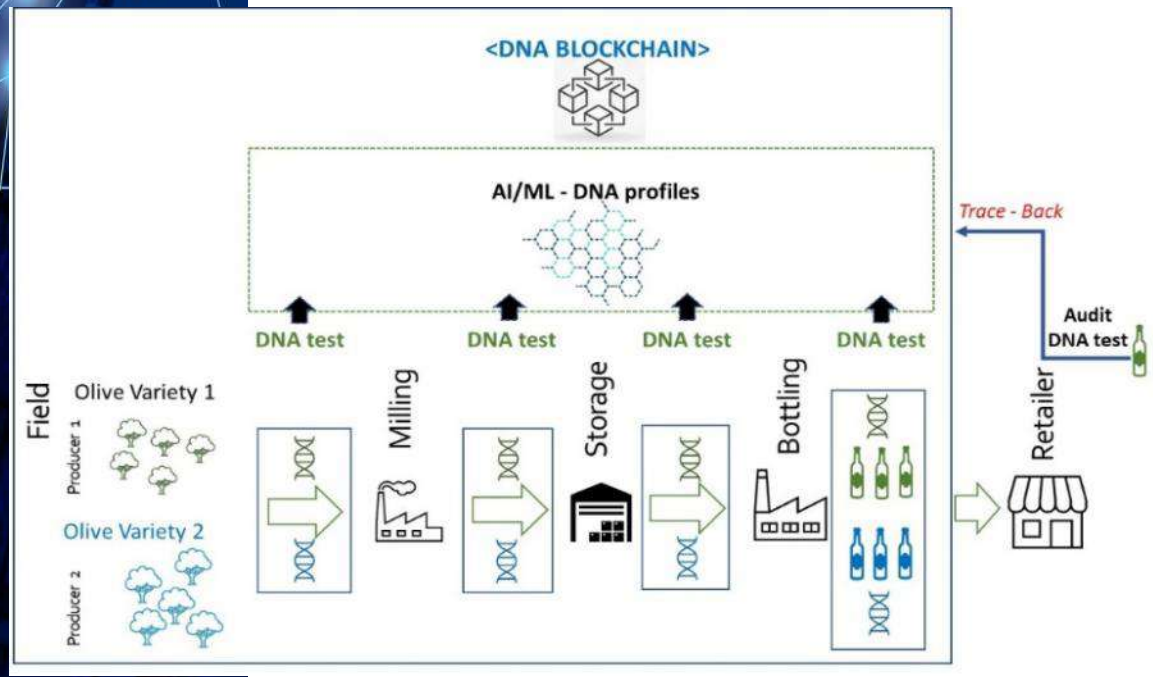
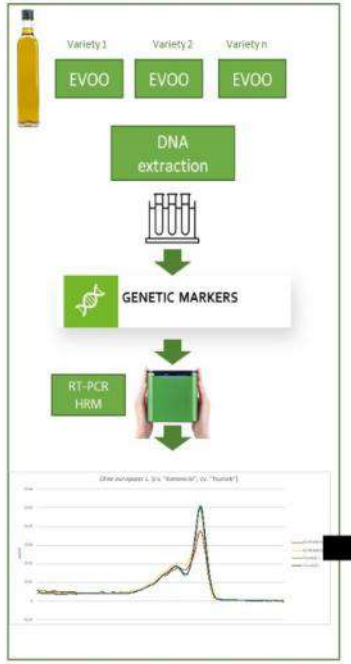
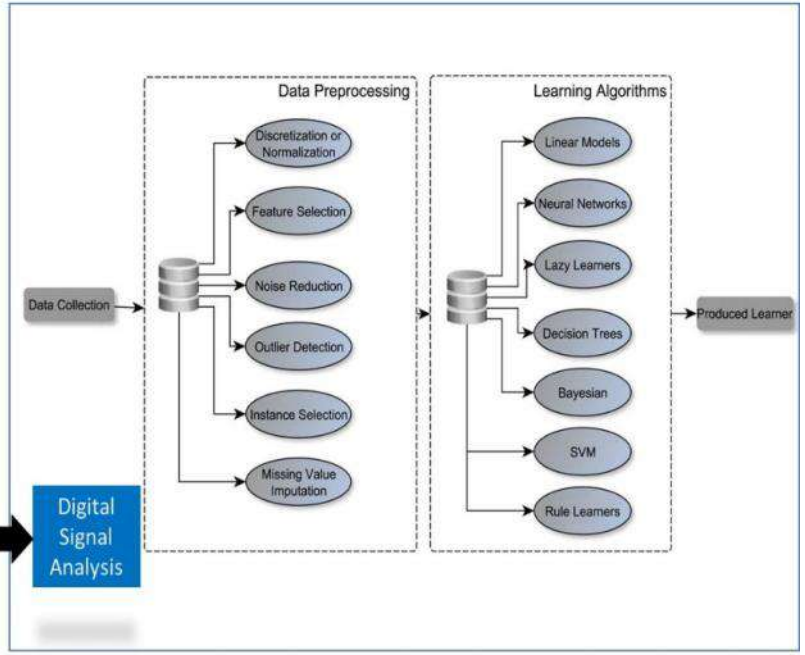
DNAblockchain

Protect EVOO label & prevent fraud

DNAblockchain = DNA HR-PCR + Signal Analysis + DA/ML + Blockchain







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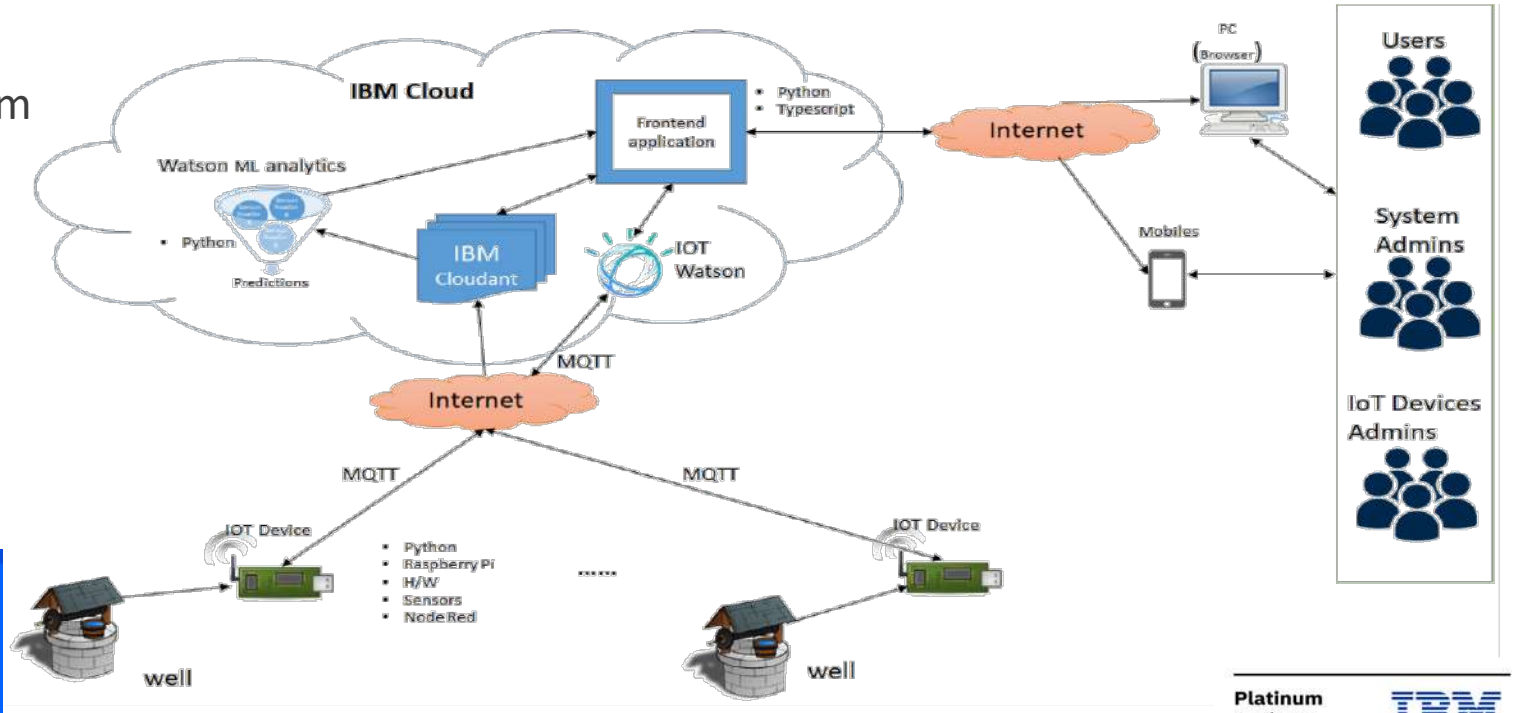
Water Underground – IoT & Architecture

Incorporate:

- Smart sensors – IoT – Edge computing
- Back-end processing, ML/analytics, short/long-term predictions
- Aquifers' modeling
- Cloud computing
- Front-end application, User Interface

Interconnected IoT devices for real-time monitoring of the underground waters' level and quality.



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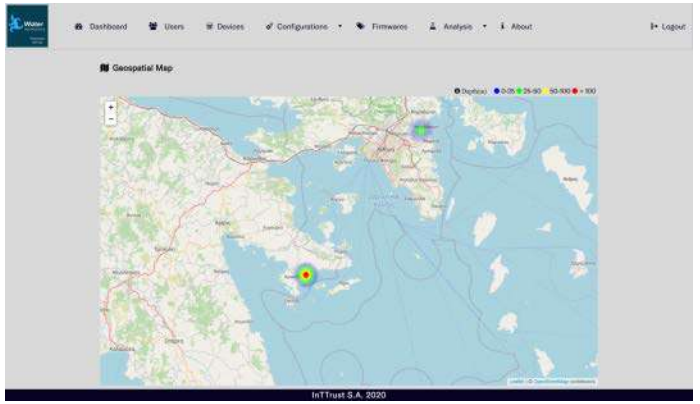
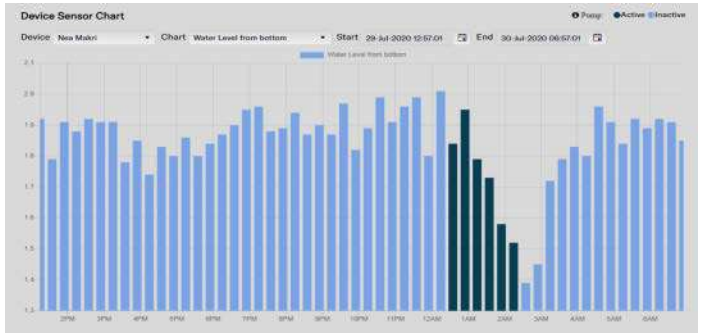
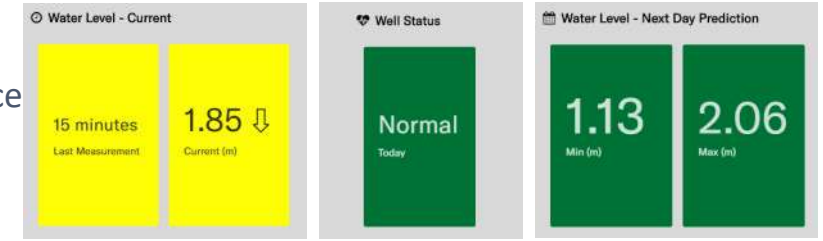
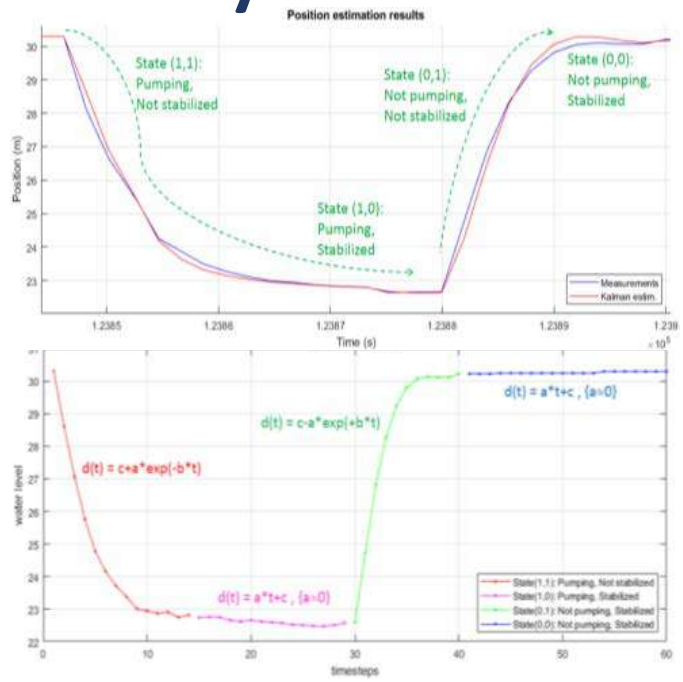
Water Underground - functionality

- Map representation
- Dashboard - Metrics
  - Depth
  - Prediction
  - Trends
  - Statistics
  - Quality
- Time Analysis
  - Water height/level graph
  - Water quality graph (pH, TDS, ORP, EC, Temp)
- User roles
- Configuration
  - Application, System, Device
- Remote IoT Device Updates









pH : Alkalinity
ORP : Oxidation Reduction Potential (disinfection potential)

- **TDS** : Total Dissolved Solids
- **Electrical Conductivity** : Salinity

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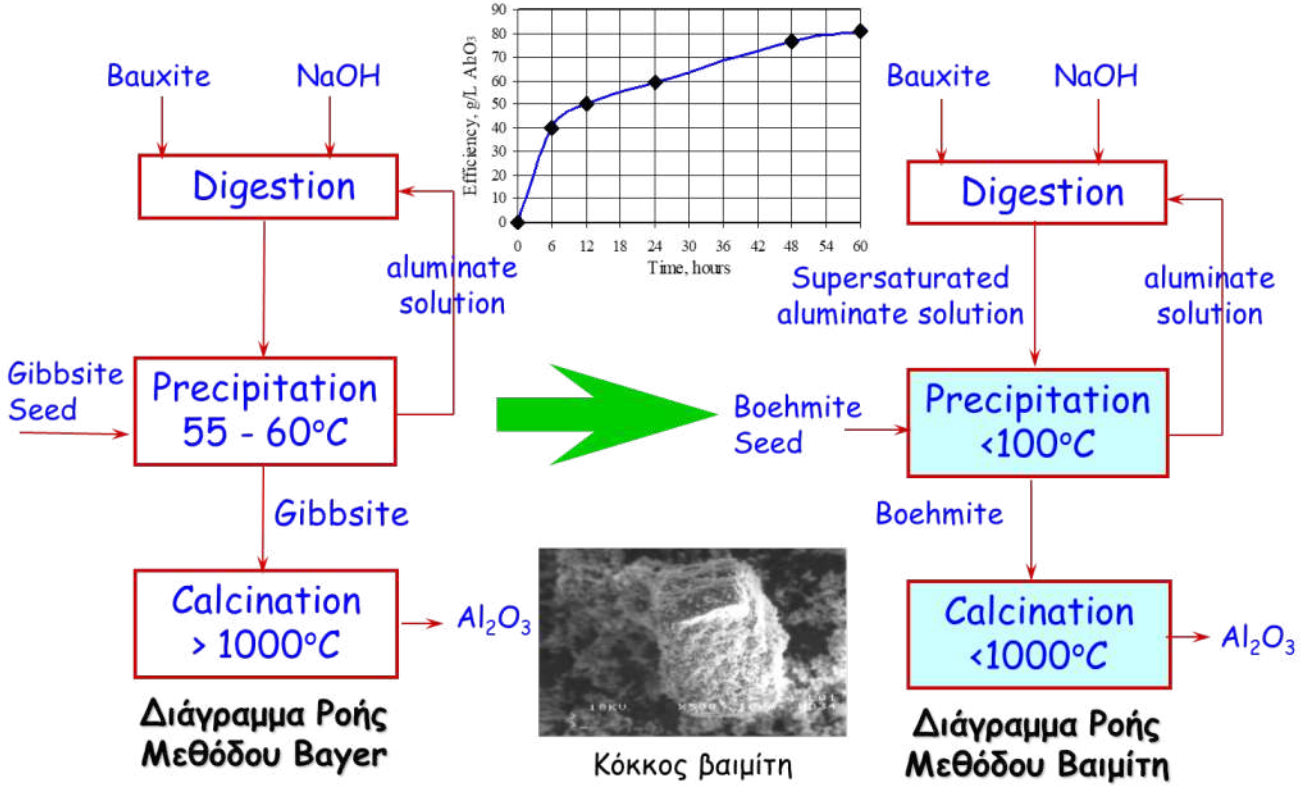
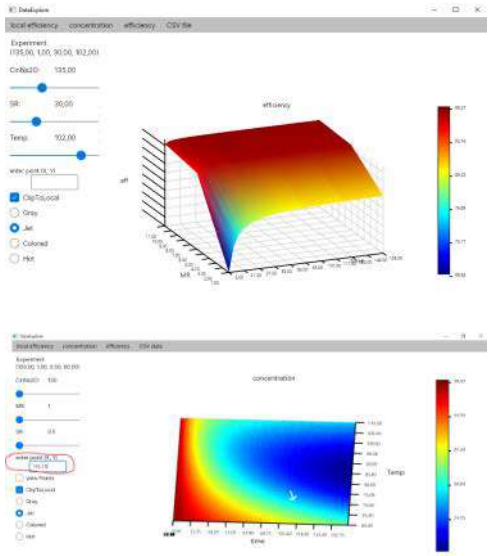
Boehmite Alumina Precipitation

Boehmite precipitation = Energy consumption optimization of Bayer Process

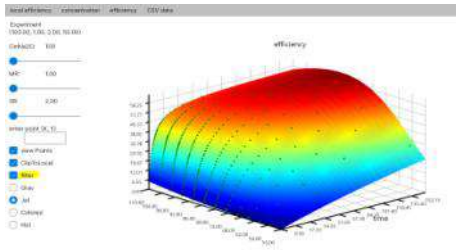


Analytic Digital Twin

$$\frac{dC_{pr}}{dt} = 2.29 \times 10^{13} (C_{Na_2O})^{-1.8} \times (SR)^{0.54} e^{-\frac{10,750}{T}} (C - C_e^{app})^2$$



ML Digital Twin



Advantages

- Analytical model not required (e.g., complex/unknown processes)
- Relies only on observed data
- Fast and responsive (analytical model often time consuming)
- Low resources' consumption
- Graceful to errors/deviations from abstract/ideal processes

Result: Energy consumption reduction by 1.8 GJ/ton Al_2O_3 – ML process optimization simulation

About InTTrust S.A.

- Founded in 2006
- Certified and Highly Qualified Engineers
- Active research and experience in the field of AI/ML
- Awarded International Expertise
- Innovation, in cooperation with the Customer
- Presence in North America (Canada)

Some of InTTrust's customers

Patents, Awards & certifications

100+ Engineers

300+ Certifications

Platinum Business Partner IBM

Gold Microsoft Partner Microsoft

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Conclusions

- ML is real and is here – it cannot do everything we can imagine, but it is a strong tool & we must use it today, as our competitors do
- ML real apps need more than programmers & tools: Data Scientists & Skilled domain experts
- Each case has to be examined separately – there is no one-size-fits-all solution
- Find a trusted, knowledgeable partner to focus on your specific needs

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Thank you for your attention