Accelerating the research on data-driven methodology

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1. Introduction
2. Research on data-driven methodology
Solution Seeker: Unmatched competence & technology on production optimization

- Years of experience: 15
- Wells: 2000
- Data: 300B+
- Publications: 70+

- Unparalleled experience in O&G data-driven production optimization
- Our experience spans 2000 wells, 15 assets and multiple operators across the world
- 5.5M operating points 150k well tests 6.8M/h from assets 50k data mining alg.
- Our cutting-edge research resulted in 70 scientific publications and 9 patents
Clients in South America, Asia and Europe

3-5% prod. increase
15+ assets
2000+ wells

Clients in South America, Asia and Europe:
- Petrobras
- PTTEP
- AkerBP
- Neptune Energy
- Equinor
- ConocoPhillips
- OKEA
- Shell
Optimal production through robust use of real-time data assuring good, safe and timely decisions

Value proposition

2-10% better utilization of your production asset

Problem statement

Using data in real-time to support production decisions in a timely manner, and thereby staying optimal over time, is non-trivial. The difficulties of robustly converting data into information and value is underappreciated.

Uniqueness

Our ability to at scale:

- Prepare production data in real-time for decision support and automatic ML
- Apply ML on sensor data to find and model patterns of physical systems that often has low observability
- Build and operate tailored applications that fuse operator workflow with data transformation flow, to enable faster and better decisions that taps into asset specific value pools
Deploying both standard and tailored apps

Standard applications
- Flow estimation
- Well test optimizer

Client-/field specific applications
- Slug estimation

Water breakthrough est.

Production optimization
- +10 Sm³/d
- 65 Sm³/d
- 90% increased capacity

- Three actions/strategies:
  - WP1: Decrease gas/90% by 2%
  - WP2: Increase choke by 5 stages
  - WP3: Increase choke until you reach the gas capacity
The data feed and modeling provides the basis for insight

- Library of flagship use cases (with UI)
  - Data-driven Virtual Flow Metering
  - Well test Optimization

- Modeling (multi-patented)
  - Cross asset learning from thousands of wells through patented transfer learning technology
  - Model development, deployment, maintenance, operation, and with online learning

- Automated Data Mining (multi-patented)
  - Identification of asset events, slicing of data set (time interval) and computation of event statistics (e.g., mean value, pressure build-up transient, dynamic responses)
  - Cleaning, ingestion and compacting of raw data to produce optimal data set / database

- Sensor data and asset metadata:
  - Pressure, temperatures, flow rates, valve position, ESP speed, gas lift rates...
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Solution Seeker tech backed by more than 70 research publications

https://www.solutionseeker.no/company/publications/
Why do we invest in research?

- HIRE TOP TALENT
  Research and innovation attracts talent

- GET FUNDING OPPORTUNITIES
  Clients, research and innovation grants

- RESEARCH
  Discover new solutions and build competence

- INNOVATE
  Create new products and services

Research & Innovation
How do we conduct research?

**Funding**
- NFR, IN, ERC, EIC, …
- Competition and project quality assurance

**Problem owner**
- Clients (companies in O&G, energy, fish farming, …)
- Problem, data and domain knowledge

**Research lead**
- Solution Seeker
- Technology (data collection and processing, ML, …) and competence

**Research partner**
- Universities (NTNU, UiO, …) and business partners (BCG)
- Research, education, competence
How do we accelerate our research?

Technology

- Considerable SW & HW engineering is often a requirement for AI/ML research
- Data processing tech can speed up the research process considerably (produce large datasets of high quality data much faster – with built-in best practices)
- Infrastructure and software tools

Work practices

- Open research to avoid wasting resources
- Agile methodology to manage projects

Research quality

- Focus on high impact research
- Use large and rich (cross-asset) datasets to develop methods that generalize
At our tenth anniversary in 2023, we established the non-profit company *Solution Seeker Research*. Its purpose is to conduct *ambitious research on data-driven methodology* by:

- Building a new Norwegian AI/ML competence hub
- Influencing the AI/ML research agenda
- Researching openly (sharing tools, methods, data)
- Competing for research funding (some problems are too hard to solve with poor funding)
- Simplifying research partnerships (sharing IP)