Drilling optimization for oil and gas wells

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Agenda

1. Industry context
2. Our process with you
3. A data driven example
4. Your next steps
Industry Context
### Who we generally work with and why

<table>
<thead>
<tr>
<th>Persona</th>
<th>Field Ops</th>
<th>Maths Skills</th>
<th>Pain</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rig operator</td>
<td>Expert drillers</td>
<td>Not so good at math</td>
<td>Time on rig is cost</td>
<td>End user</td>
</tr>
<tr>
<td>Planners</td>
<td>Knowledge of process</td>
<td>Pretty good, maybe background with MATLAB</td>
<td>Needs field drilled ASAP</td>
<td>Can allocate work</td>
</tr>
<tr>
<td>Management</td>
<td>Separate from process</td>
<td>Not needed: focus on accounting</td>
<td>Shareholder accountability</td>
<td>Allocates budget</td>
</tr>
</tbody>
</table>
Persona interactions

- **Driller**
  - Needs work contract
  - Wants to go fast to get contract

- **Planner**
  - Can allocate work
  - Needs to complete field
  - Needs project approval – e.g. Machine Learning & Analytics

- **Manager**
  - Needs field(s) done

COLLABORATION
Or
Its all about people!
Where we normally become involved

“I need to maximise the drilling across my field. I’ve seen a lot of discussion of machine learning but how to get started”
Our Guiding Process
How we work with you

1. Collaboration
2. Leverage the Technical Computing Workflow
3. Enable your project ownership
4. Empower you for the future
Technical Computing Workflow

Access
- Files
- Software
- Code and Applications
- Hardware

Explore and Discover
- Data Analysis & Modeling
- Algorithm Development
  
  \[
  \text{for } k=1: \text{max} \\
  x = \text{fft}(da) \\
  y = 20 \log
  \]
- Application Development

Share
- Reporting and Documentation
- Outputs for Design
  - MATLAB
  - Excel
  - Java
  - C/C++
  - .exe
  - .NET
  - .dll
  - Python

Deployment
Let's do this live in MATLAB
Your Next Steps
Add Extended Data Sets

- Add extended data to include
  - Dynamics
  - Vibration
  - Higher frequency sampling

- Value add for you
  - Move to machine learning
  - Deploy expert systems to the edge
Deploy to Edge Systems

- Graphical Apps on Embedded Systems
- Apps included in core MATLAB
- Designed by planners
- One click compile
- Deploy to hardened devices on rig for operator use in the field
Conclusion

1. Its all about people
2. Start with quick wins in analytics
3. Look to advance with
   1. Machine Learning
   2. Deployment
4. How can you benefit:
   1. Download a trial to try yourself
   2. Contact us for more information