JGC Corporation
Technology Innovation Center
Takuya Ono

Nov. 27th, 2018
JGC Activity with AI

External Business
- Data Analysis
- Oil and Gas/
Chemical Plant/
Manufacturing/
Infrastructure
for O&M
- Agriculture
- Healthcare

Internal Process
- Data Centric EPC
- Security
- RPA/OCR/HRT, etc.
## JGC Digital Solutions

### Our Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| **Visualize Operation**  | - For more efficient operation  
                          - For more stable operation                                           |
| **Detect Anomaly**       | - For less down time  
                          - For finding cause of trouble                                         |
| **Predict Longevity**    | - For condition based maintenance  
                          - For extending life of materials                                       |
| **Increase Production**  | - For maximizing production rate  
                          - Even weather condition analyzed                                       |
JGC Job Reference of Plant Data Analysis

<table>
<thead>
<tr>
<th>Client</th>
<th>Subject</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refinery</td>
<td>To prevent reoccurrence of an unprecedented amine foaming.</td>
<td>Solved</td>
</tr>
<tr>
<td>Refinery</td>
<td>To precisely predict a catalyst longevity.</td>
<td>Solved</td>
</tr>
<tr>
<td>Refinery</td>
<td>To precisely predict an equipment clogging speed.</td>
<td>Solved</td>
</tr>
<tr>
<td>Refinery</td>
<td>To prevent reoccurrence of a start-up failure of the hydrogenation unit.</td>
<td>Solved</td>
</tr>
<tr>
<td>LNG Plant</td>
<td>To eliminate occurrence of frequent amine foaming troubles.</td>
<td>Solved</td>
</tr>
<tr>
<td>Refinery</td>
<td>To eliminate occurrence of frequent amine foaming troubles.</td>
<td>Solved</td>
</tr>
<tr>
<td>Chemical Plant</td>
<td>To eliminate occurrence of frequent equipment clogging troubles.</td>
<td>Solved</td>
</tr>
</tbody>
</table>

Jan., 2016 ~ Nov., 2018
## Digital Solution Projects In Coming

<table>
<thead>
<tr>
<th>Client</th>
<th>Subject</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNG Plant</td>
<td>To minimize weather related production loss.</td>
<td>Service on going</td>
</tr>
<tr>
<td>Metal Smelting</td>
<td>To minimize metal loss.</td>
<td>Service on going</td>
</tr>
<tr>
<td>Remote Monitoring</td>
<td>To provide anomaly detection system for 50 or more power plants.</td>
<td>Service on going</td>
</tr>
<tr>
<td>Refinery</td>
<td>To prevent reoccurrence of a compressor functional failure.</td>
<td>Cost estimate</td>
</tr>
<tr>
<td>Chemical Plant</td>
<td>To digitalize skilled operator’s work procedure.</td>
<td>Cost estimate</td>
</tr>
<tr>
<td>O&amp;M Company</td>
<td>To digitalize sludge combustion systems.</td>
<td>Workshop</td>
</tr>
<tr>
<td>Refinery</td>
<td>To precisely predict equipment corrosion speed.</td>
<td>Workshop</td>
</tr>
<tr>
<td>Chemical Plant</td>
<td>To visualize the plant power consumption trend.</td>
<td>National project</td>
</tr>
</tbody>
</table>

As of Nov., 2018
【Subject】
To find out cause of frequent occurrences of an equipment clogging.

AI found out a several most affecting factors from thousands of sensor data to help operators learn how to keep the trouble from reoccurring.
AI visualizes relations between clogging trouble and operating conditions:
Detect Anomaly

【Subject】
To find out anomaly and cause of an amine foaming occurring for the first time in the refinery history.

AI found anomaly and identified the failure developing route to help operators learn cause of the trouble and ways to prevent it.
Predict Longevity

【Subject】
To know catalyst degradation speed from operating conditions

AI clarified relations between catalyst degradation speed and operating conditions to help operators know precise timing of the catalyst replacement and ways to extend catalyst life time.
AI predicts catalyst longevity

- For longer utilization and condition based maintenance
Increase Production

【Subject】
To enhance refrigeration efficiency of LNG plant for increasing production rate.

AI found relations between occurrence of hot air recirculation, and weather and operating conditions to help system to automatically function for minimizing production loss.
Predict hot air recirculation and take action before it happens.

Maximize plant production rate.
Anomaly Detection System for Remote Plant Monitoring Center

Cloud (VPN)

Data Analysis Anomaly Detection

Operating Data

Remote Monitoring Center

Cloud (VPN)

Makers Vendors

Procurement

Advice

Condition based Maintenance

100~ Power Plant Sites

Local Control Room

Photo for illustration purposes

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AI for Plant Data Analysis

Engineers make AI with process-wise data analyzing techniques, powered by engineering knowledge.

The AI augments engineers’ intelligence and plant operator’s performance to improve services and products.
Thank you.

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