Silent intelligence in manufacturing industry

How Smart Connected Products are Transforming Manufacturing Industry

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CYIENT – Who we are

- Aerospace
- Heavy Equipment
- Oil & Gas
- Rail Transportation
- Medical & Electronics
- Utilities & Energy
CYIENT – What we do

- Engineering design
- Network & Operations
- Product realization
- Big Data
- IoT and M2M
- Advanced Analytics
Silent intelligence in manufacturing industry

How Smart Connected Products are Transforming Manufacturing Industry
The New Product Anatomy

- Mechanical parts
- Electrical and Electronic parts
- Sensors
- Microprocessors
- Data storage
- Controls
- Software
- Embedded OS
- Digital UI etc.
- Ports
- Antennae
- Protocols
- Networks
Reinventing the Product Design

Interdisciplinary Systems Engineering

- Monitor & Report
- Enable remote control
- New Business Models
- Optimise

Mechanical Engineering

- Interoperability
- Stable Design
- Augmented Reality
- Connected Service

- Insights
- Efficient
- Software Defined
- Autonomous
- Simplified Assembly process
- Optimise production
- Low cost modification
- Remote quality mgmt.
- Self learning
Unlocking the full value of data is a new business function.

Source: HBR article on smart connected products, Oct 2015
Cyient case studies
**Airframe OEM: Prescriptive Analytics**

**Observations:**
1) Are outliers present in data?
2) What are the common characteristics of these outliers?
3) What is their impact on overall performance objectives?

**Method:**
Hierarchical clustering and predictive modelling

**Output:**
1) **TRANSIENT** behavior – Are components dynamically changing clusters?
2) Contributing **REASONS** - Why, if so?
3) **FEATURE** extraction - What are the features that are contributing to such migration?
Heavy Equipment Fleet – Predictive Maintenance

Sensor info, abuse events, exceptions, fluid samples, repair history, site conditions. – Over 170 different data sets

Deduction of Risk categories

Situational Intelligence Engine

Condition Based Monitoring Module

Recommendations

Customer Benefits
- Anomaly detection
- Similar Asset based analysis
- Fleet based analysis
- Site based analysis

Operational Intelligence
- Asset Health Score
- In-between repair time estimation
- Important component failure prediction

New Insights
- Repair Recurrence models
- Event – Repair Association
- Risk category to health quantification
Predictive Maintenance for MRI Machines

- **Imaging system**
  - MR imaging controls

- **Onboard sensors**
  - Captures temperature at various positions on MR Machine

- **Other data sources**
  - Equipment History
  - Maintenance Records
  - Environmental data

- **Magnetic Field Control**
  - Manual setting of magnetic field required for scan as prescribed by the doctor

- **Patient Data**
  - Body part for scan
  - Weight of patient

**Value to Client**

- More accurate prediction of failures in MR machines
- Temporal pattern recognition across failures
- Efficient scheduling of maintenance visits to client installations
- Better predictive maintenance of MRI machines
- Optimized inventory holdings at Field Service Locations
Thank You

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