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Engineering Analytics : As Predictable As It Can Get

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BY DR T C RAMESH ON MAR 17, 2016   ARTICLES

Exploding data in the engineering space has made Engineering Analytics an imperative across various industries. Engineering Analytics is likely to benefit companies to the tune of $250 billion and this is expected to double to $500 billion by 2017. The current spend on Engineering Analytics product engineering, analytics and system integration is close to $13 billion. Services that enable the planning and deployment of engineering analytic solutions go by as Engineering Analytics services and from a $5.4 billion, it is expected to triple by 2017 to $14.8 billion.

Engineering Analytics are being adopted by OEMs and suppliers in three key areas of their operations: design, manufacture and after-sales support.

1. In design, all OEM's have huge clusters of high power computing, which are used in the design process and generate terabytes of data on each simulation on their products. There is a need to visualize and tease out design patterns from this data. This will decrease development time and improves the quality and performance of their products.
2. As manufacturing systems increasingly network and communicate with each other in an Industrial Internet of Things (IIoT) environment, automatic measurement and quality control at factory level become a reality. Terabytes of manufacturing data produced will have to be analyzed and leveraged for decision making.
3. The next generation of aircraft will include engines that are permanently connected to a data centre allowing engineers to analyze and monitor the fleets and help diagnose faults, correcting them and preventing them from occurring again.

Below are some examples of Engineering Analytics services mapped to various industries:

Industries	Services
Aerospace & Aviation	Predictive analytics
Rail Transportation	Descriptive Analytics
Heavy equipment	Diagnostic analytics
Medical devices & Electronics	Data visualization
Oil and Gas	Industrial Internet
	Internet of things
	Machine to Machine
Aero Engines	Engine Health Monitoring
	Engine Diagnostic Assessment
	Component Life Assessment
	Trend Monitoring

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Dr TC Ramesh heads the Technology Excellence Group at QuEST Global. He is based out of Bangalore, India and is responsible for Capability Development, Knowledge Management, Engineering Processes and Technical Solutions in QuEST Global. Dr Ramesh comes with a rich experience of over two decades in developing finite element (FE) codes, simulation and operations management of delivery units. Dr Ramesh joined QuEST Global in 2001 as the head of the delivery Centre at Hubli, India. He then led the QuEST Global Innovation Center and subsequently CAE operations until March 2009, post which he moved to the Technology Excellence Group. Prior to joining QuEST he worked for Transoft International where he developed FE based codes for Fluid Structure Interaction and Acoustics. He was also responsible for consultancy based activities. An alumnus of IIT Madras, Dr. Ramesh holds Masters and Doctorate degrees in the field of Structural Mechanics and Dynamics. *Read Full*
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Engineering Analytics are found to be more pervasive in the Energy industry with a spend of $1.4 billion as well as have the largest addressable market for Engineering Analytics service providers. Some of the key Engineering Analytics services that can be outsourced include:

1. data cleaning and integration
2. data visualization
3. predictive modelling and decision optimization

In the energy industry, predictive modelling and analytics will help in the development of next-gen system planning & operations tools and controls to understand system dynamics, earmark areas prone to fallibility, prevent and mitigate subsequent fall-out events, and support analyses after the incident.

The instability of renewable energy sources owing to factors such as wind speed and solar availability restrict their usage to just about 60-80%. Accurate energy production forecasts of such renewable energy power plants are possible through predictive modelling and analytics. By predicting equipment failure and downtime, it is therefore possible to optimize overall operational efficiencies. Such diagnostic analytics also improve the life of these valuable renewable energy equipment.

In the Oil and Gas industry, predictive modelling and decision optimization is useful across upstream, midstream and downstream operations. In Upstream, predictive modelling enables asset maintenance, optimization in drilling/exploration/production optimization, risk assessment, etc.

Outcomes of predictive modelling and analytics include better planning of maintenance activity, using insights from intelligent analysis of data and then feeding that back into design and reduced service disruption. All these translate to huge cost savings and reduction and improved operational efficiency.
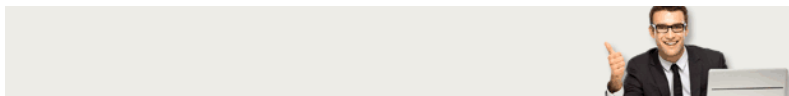
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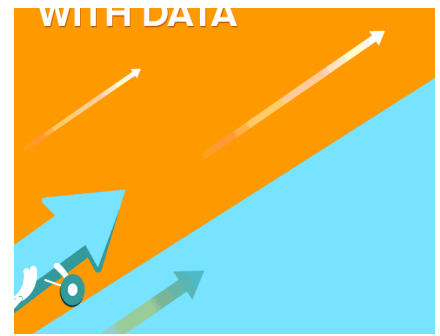[Wipro in talks with colleges to launch analytics courses](#)
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