Maintenance Strategy By Using Big Data Analysis

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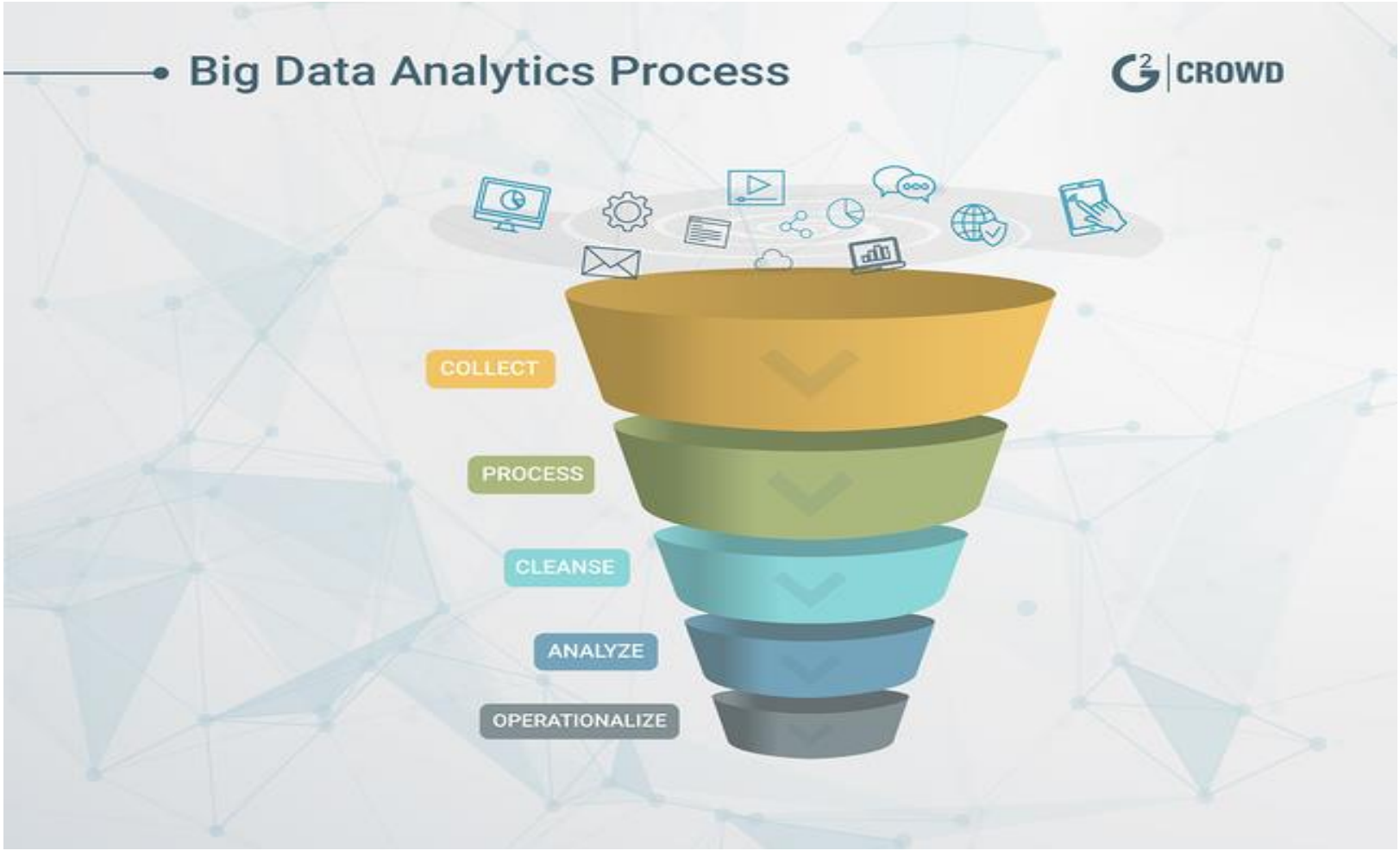
INTRODUCTION

- **Data Science** the combination of statistics, mathematics, programming, problem-solving, capturing data in ingenious ways, the ability to look at things differently, and the activity of cleansing, preparing and aligning the data.
- **Big Data** refers to humongous volumes of data that cannot be processed effectively with the traditional applications that exist. The processing of Big Data begins with the raw data that isn't aggregated and is most often impossible to store in the memory of a single computer.
- **Data Analytics** the science of examining raw data to draw conclusions about that information.

Big Data Process



The volume of data and its management is a major concern for any big data initiative. Because big data deals with petabytes of data, the only solution to manage it is by using data centers. At the same time, the cost component has to be considered before selecting and finalizing any storage facility. Cloud services are often the best choice, but the services of different cloud environments must be evaluated to determine the appropriate one. As storage is one of the most important components in any big data implementation, it is a factor that should be evaluated very carefully in any big data initiative.

- The main promise of Predicted Maintenance is to allow convenient scheduling of corrective maintenance, and to prevent unexpected equipment failures.
- The key is "the right information in the right time".
- An example of non-business related prescriptive analysis today is a GPS device utilizing large amounts of geospatial data to provide you with the most efficient route (accounting for traffic, road closures, crashes, and more).

- Prescriptive analysis is not widely incorporated, and is extremely complex. While prescriptive analysis provides calculated answers, it still requires a user to input the goal they're trying to achieve.
- Using advanced predictive analytics and diagnostic technology as part of a comprehensive maintenance program, utilities can monitor critical assets to predict, diagnose and prioritize impending equipment problems continuously and in real time.
- As many utilities struggle to make sense of the massive amount of data available through smart devices, smart grids and machine sensors, predictive maintenance remains a practical application. Power delivery companies can transform their maintenance strategies by leveraging data and predictive asset analytics solutions to spend less time looking for potential issues and more time taking actions to get the most out of every asset.

- Big data carries a lot of promise for all types of industries. If this big data is leveraged effectively and efficiently, it can have a significant impact in decision-making and analytics. But the benefit of big data can only be achieved if it is managed in a structured way. The best practices of big data are gradually being established, but there are already some clear do's and don’ts when it comes to implementation. A big data initiative is not an isolated and independent activity, and the involvement of all business units is a must to get real value and insight. Big data can help organizations leverage large volumes of data and gain insight into customer behavior, events, trends, predictions, etc. This is not possible with a data snapshot, which only captures a part of the entire volume of data processed in big data. As a result, companies are increasingly concentrating more on all types of data coming from all possible avenues/business units to understand the correct pattern.

MAINTENANCE STRATEGIES

- The Big Data platform has the ability to handle huge amounts of data in manufacturing or production logistics databases along with the development of computerized maintenance management systems, which assist decisions making so as to formulate maintenance strategies.
- Maintenance procedures will be undertaken when a machine failure has occurred in the maintenance strategy. Manufacturers are required to keep components inventories for maintenance, repair and operations in order to prevent disruption of the overall production by failure of machine parts or equipment. The design of preventive maintenance is a protective, process-oriented approach in which machine failure and downtime cost could be reduced by taking proper prevention and prevention to smoothen the production.

- Decisions on maintenance schedules is based on a machine's physical properties or asset condition.
- However, preventive maintenance attempts to provide an empirical basis for the development of a framework design of manufacturing flexibility at machine idle periods and during maintenance activities.
- The impact of failure in a critical machine is a tremendous risk to the downtime costs and, it in turn becomes bottleneck in production logistics operations.
- The ideology of a predictive maintenance is to create transparency of the machine condition and in the utilization of available information for maintenance decision making.
- The framework of a big data platform in predictive maintenance is designed for closer integration of data acquisition and the maintenance decision support system, which highlights the dataflow process in diagnostics and prognostics modeling for predictive maintenance.

FUTURE RESEARCH

- Future research is oriented to the utilization of manufacturing information in the Cyber Physical System (CPS). Big Data Analytics are able to achieve better transparency of production, which provides knowledge insight to practitioners.
- With the technological advancement in Internet of Things and the utilization of sophisticated prediction tools, specialized automotive networks in a manufacturing company could
- Be developed for real time monitoring and control at the strategical level. Incorporating the manufacturing computational intelligence into the machine health monitoring allow the manufacturers to enhance the overall system reliability and production efficiency, especially in reducing the machine downtime. Predictive maintenance is not only about health assessment but also detect the abnormality of the machine before it breaks down.
- To have a step forward from predictive maintenance, production plant should realize the importance of just-in-time maintenance strategy for the whole production process. Implementation of
- CPS synthesizes data from WSNs to enable the remaining life prediction so as to improve the asset utilization.

CONCLUSION

- The feature extraction through Big Data Analytics can be beneficial to managing the machine condition and in predicting machine failure.
- The proactive strategies in maintenance can be achieved by embedded sensors and real time based machine monitoring systems.
- Besides, the prediction from Big Data Analytics and suggested analytics processes are well-designed to reduce the maintenance turnaround time and substantially enhance the production system availability.
- The overall maintenance efficiency can be much improved by the implementation of predictive maintenance under a Big Data platform.

THANK YOU FOR ATTENTION