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NPTEL ONLINE CERTIFICATION COURSES

Smart Factories

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What is smart factory?

- According to Deloitte University Press –

"The smart factory is a flexible system that can self-optimize performance across a broader network, self-adapt to and learn from new conditions in real or near-real time, and autonomously run entire production processes. "

Source : "The smart factory", Deloitte

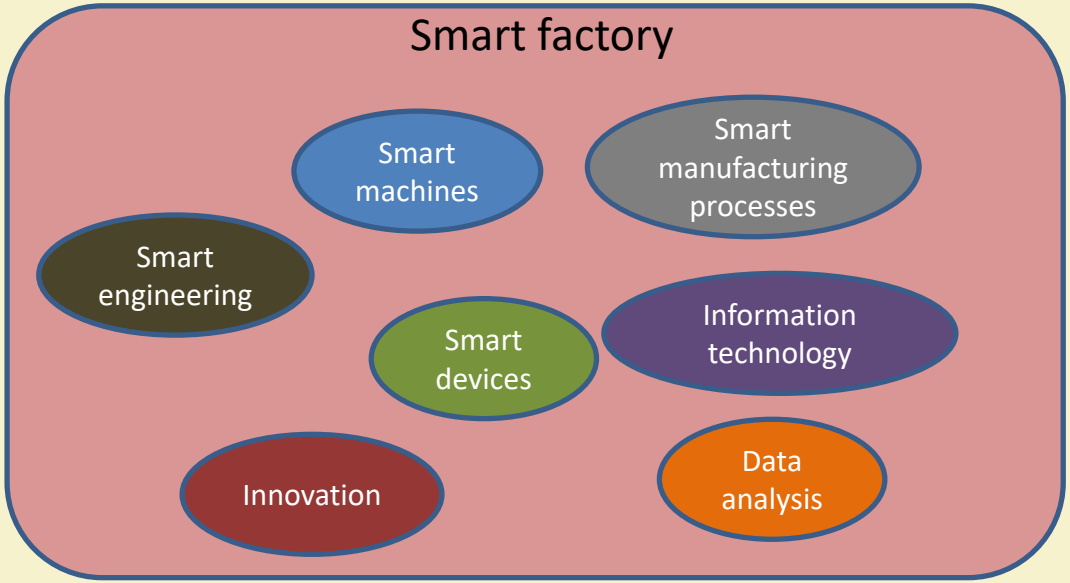
Why do we need smart factories?

- Evolution of technologies.
- High competitive market.
- High amount of production within minimum timeline.
- Reduce risk of failure.

Advantages of running smart factories

- Reducing cost.
- Increasing efficiency.
- Improving quality.
- Improving predictability.
- Improving safety.

Components of smart factory



Source: **"**Smart factories in Industry 4.0: A review of the concept and of energy management approached in production based on the Internet of Things paradigm. **",** IEEE ICIEEM.

Smart machines

- Communicate with other machines.
- Communicate with other smart devices.
- Communicate with humans.

Smart devices

- Connected with smart devices including
  - Field devices.
  - Mobile devices.
  - Operating devices.

Smart manufacturing process

- Dynamic.
- Automation.
- Real-time.
- Efficient.

Smart engineering

- Smart design of product.
- Smart development of product.
- Smart planning.

Information technology

- Smart software application.
- Monitoring.
- Control.
- Smart management process.

Characteristics of smart factories

- Connection.
- Optimization.
- Transparent.
- Proactivity.
- Agility.

Connection

- Connected smart devices.
- Connected smart machines.
- Connected with data.
- Connected processes.

Optimization

- Optimizing the task scheduling.
- Optimizing the use of energy.
- Optimizing the cost of production.
- Optimizing the tracking.
- Optimizing the throughput.
- Optimizing the reliability.

Transparent

- Real-time monitoring.
- Taking required action on time.
- Generating alert messages.
- Real-time tracking.

Proactivity

- Predicting the quality issues.
- Improving safety.
- Forecasting the future outcomes.
- Predicting the future challenges.

Agility

- Flexibility.
- Adaptation.
- Self-configuration.

Supporting technologies for smart factories

- Big Data.
- Cloud computing.
- Smart grid.

Use of Cloud computing in smart factories

- Provides the capability of high-performance computing.
- Easy access for product designing software and tools.
- Easy access for present and past data for analyzing.
- Scalability provides freedom in terms of computing and data storage.

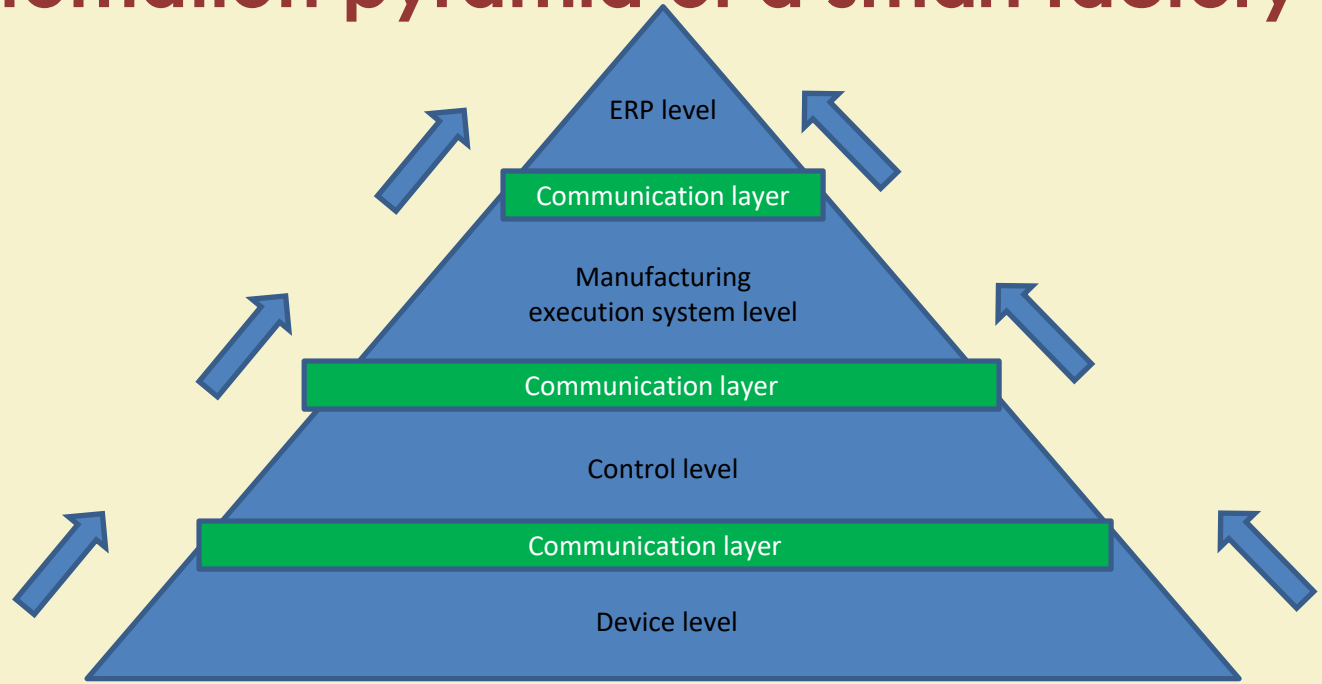
Use of Big Data analytics in smart factories

- Generating knowledge.
- Improving value streams.
- Future prediction.
- Key Performance Indicator (KPI).

Use of smart grid in smart factories

- Persistence in energy consumption.
- Load balancing.
- Reduction of energy consumption cost.
- Increase the life cycle of electronic equipment.

Automation pyramid of a smart factory



Source: "Towards a factory-of-things**",** ESLEVIER

Use of augmented reality in smart factories

- Operate instruments from remote.
- Providing precision.
- Providing safety especially for radio active zones.

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Thank You!!