Industrial Automation in Nuclear Power Plants

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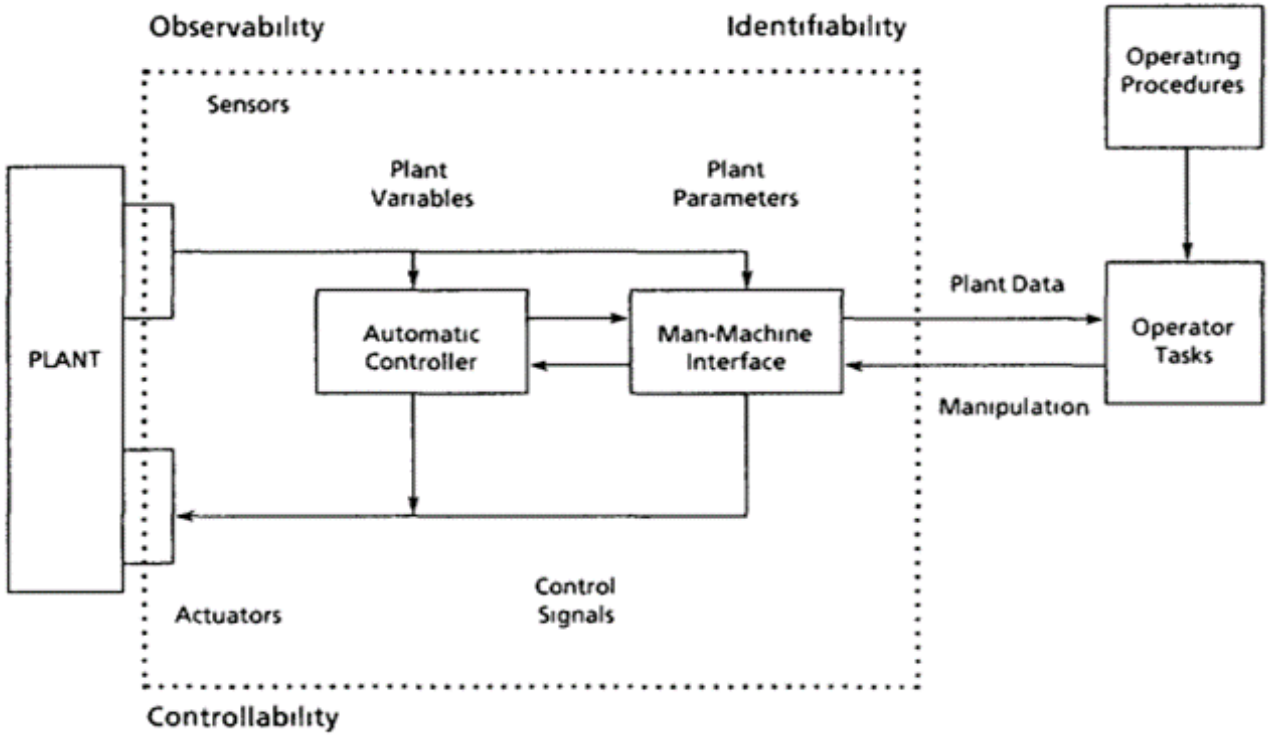
Industrial Automation

- Automation is a technique of making an apparatus, process or a system to operate with self-acting or self-regulating mechanisms.
- The industrial communication system helps monitor and operate entire production lines, manage power distribution, and control machines.
- The most popular protocols for industrial communication are Fieldbus, PROFIBUS, EtherCAT, EtherNET



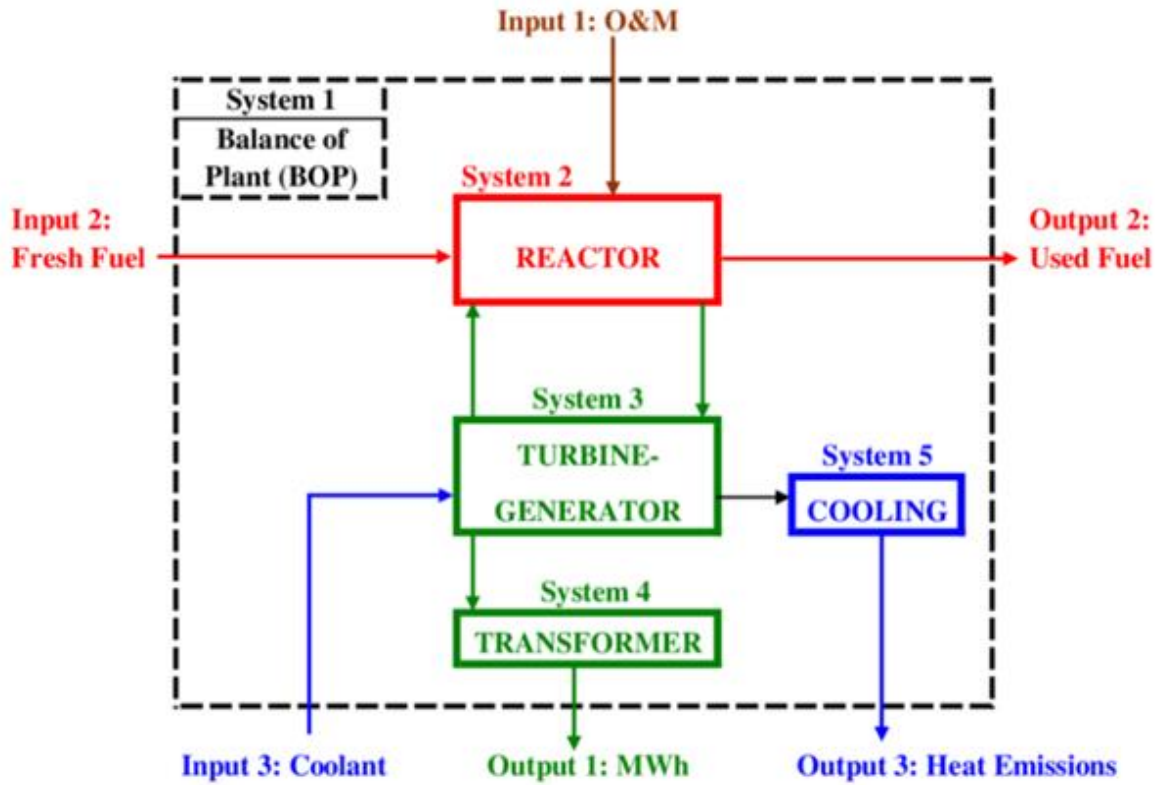
Characteristics

Reactive systems:

- Nuclear power plants use closed loop control systems which to processes parameters such as temperature, pressure, flow etc.
- Sensors are used to track these parameters and any change in these parameters, will be immediately notified to the technicians.

Real-time systems:

- An automated equipment monitoring system helps observe the working condition of all the equipment in the manufacturing unit.
- Sensors, cameras, and network can be used to observe the equipment from afar.
- The monitoring system also helps diagnose any issues in the equipment and do the necessary repairs and services.



Characteristics

Dependable systems

Reliability: Industrial automation also helps increase and maintain consistent quality of the output. automated machines in the manufacturing industry have an error rate that is as low as 0.00001%.

Availability: Automation is employed to reduce scram (trip) frequency and hence improve plant availability by backup controls or limitation systems to prevent plant parameters reaching limits which would invoke protective action.

Safety: Using robots for loading and unloading materials or transferring huge machine parts reduce risks of accidents.

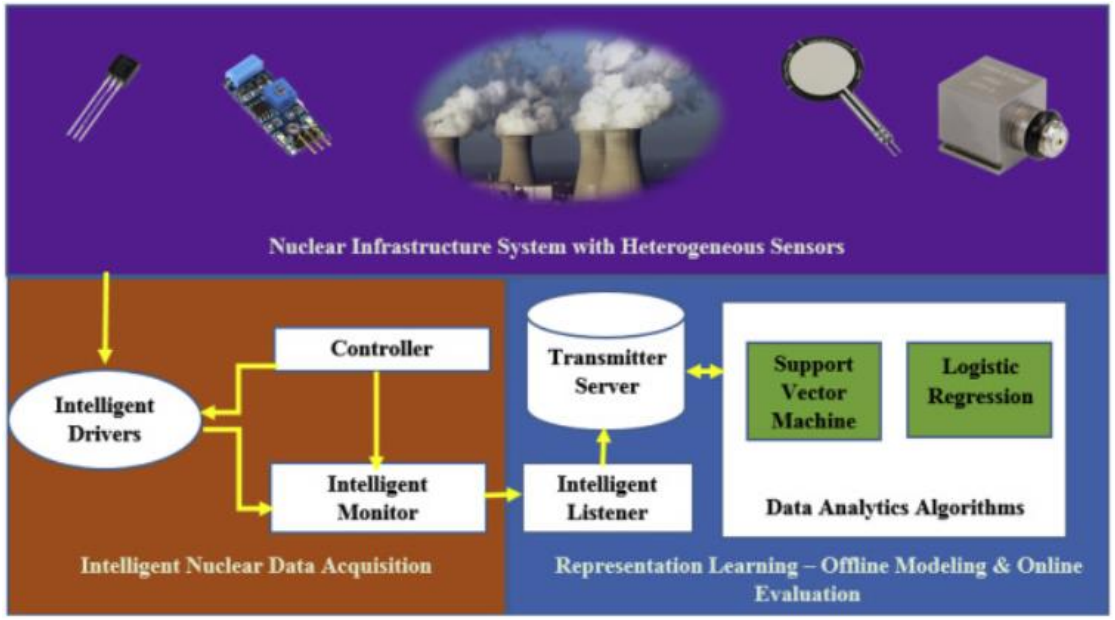
Industrial automation also keeps workers from going too close to the assembly lines, thereby improving safety.

Security: Using security automation, one can reduce the threat of hacking the access to the nuclear power plant or modifying the pre-set parameter data.

Characteristics

Distributed System

- Data automation is based on accurate data integration and connectivity.
- When accurate information is used in the production process, you can be assured of precise results.
- AI and ML solutions help you get detailed data that can be analysed using data analytics tools to get accurate information. Also, they are scalable and self-learning.



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