AI in Production

Course Description

Production is undergoing a revolution thanks to the adoption of AI technologies, both for single processes and strategic decisions. This course gives an overview of the changing production paradigm, introducing the concept and main characteristics of a smart factory. After that, the course illustrates some common use cases of AI in production, such as design, quality, supply chain, and autonomous planning and scheduling, the latter being very important for the successful implementation of cyber–physical systems in the context of the industrial Internet of Things.

Contents

1. Introduction: The Smart Factory
   1. Goals of a Smart Factory
   2. Internet of Things
   3. Cyber–Physical Systems
   4. Cyber–Physical Production Systems
   5. A New Paradigm for Automation
2. Basics of a Smart Factory
   1. Intelligent Products, Object Identification, and Digital Object Memory
   2. Formal Languages and Ontologies
   3. Autonomous Cooperation
   4. Humans and Machines
   5. Order–Controller Production
   6. Smart Services
3. AI for Design
   1. Generative Design
   2. Methods
4. AI for Quality
   1. Fault Detection and Identification
   2. Predictive and Prescriptive Maintenance
   3. Defect Recognition
5. AI for Supply Chain
   1. Demand Forecasting
   2. Inventory Models
6. AI for Autonomous Planning and Scheduling
   1. Introduction
7. Methods