Chapter 8
Industrial Automation Using Mobile Cyber Physical Systems

Thangavel M.
 https://orcid.org/0000-0002-2510-8857
VIT Bhopal University, India

Abhijith V. S.
Thiagarajar College of Engineering, India

Sudersan S.
Thiagarajar College of Engineering, India

ABSTRACT

In recent years, the rise in the demand for quality products and services along with systems that could integrate the control mechanisms with high computational capabilities led to the evolution of cyber-physical systems (CPS). Due to the ongoing COVID-19 pandemic, several industries have remained closed, causing several monetary losses. Automation can help in such scenarios to keep the industries up and running in a way that the system could be monitored and controlled remotely using voice. The chapter deals with the integration of both industrial automation and cyber-physical systems in various industries like the automobile industry, manufacturing industries, construction industries, and so on. A proposed approach for machine handling using CPS, deep learning, and industrial automation with the help of voice. The proposed approach provides greater insights into the application of CPS in the area and the combination of CPS and deep learning to a greater extent.

INTRODUCTION

The rapid advancements in computation methodologies and cloud computing along with a rapid expansion of the Internet of things have resulted in tremendous advancements in Cyber-Physical Systems (CPS) especially in industrial systems. As the name suggests, Cyber-physical systems integrate the cyber world with the physical. The integrated cyber and physical objects constitute a Cyber-Physical System (CPS).

The objects could be any hardware or software resources by which the computational process and other functions can be made possible on an extremely large scale especially in the case of industries or for larger communities. Here the term physical objects may refer to the already existing system or computational resources or large-scale production machines as in the industrial perspective. In short, CPS reiterates or modifies the way we communicate with the physical world. A more detailed explanation of CPS and Industrial Automation would be dealt with in the upcoming sections. Some of the main characteristics of CPS include:

1. Querying and real-time for processing of the data and further processing,
2. Decision making from the processed data,
3. Providing the actual results and recommendations.

CPS over the years has provided efficient and innovative solutions in Healthcare management, Transportation systems, household appliances, distribution systems, Smart Grid, and much more.

The vision called "Smart Factory" is facilitated by the technological concepts of the CPS, Internet of Things, and the Internet of services. The CPS in the context of Industries creates a virtual copy of the physical world and makes decisions that are not centralized. T

That is how CPS helps in communicating seamlessly between the cyber world and the humans. The year 2020-21 has been marked by the COVID-19 pandemic, as a result of which several industries have either remain closed or went out of business, The pandemic has also made industrial experts rethink other production approaches-one such approach is Industrial automation.

Before getting to know what Industrial Automation is, the term "Automation" should be made clear. Automation is the process of providing products and services wherein the process involves minimal human intervention whereas mechanization is the process of manufacturing that requires more human-powered machines and involves decision-making by human intelligence. Thus when we complement Industries with

Related Content

Antipasti: Solving the Software Puzzles
 (2019). *Software Engineering for Enterprise System Agility: Emerging Research and Opportunities (pp. 108-130).*
www.irma-international.org/chapter/antipasti/207084

Spatial Data Mining, Spatial Data Warehousing, and Spatial OLAP
Amira M. Idrees, Mostafa Lamlom Ahmed Khaledand Amal Hassan Ali Talkhan (2018). *Emerging Trends in Open Source Geographic Information Systems (pp. 97-132).*
www.irma-international.org/chapter/spatial-data-mining-spatial-data-warehousing-and-spatial-olap/205158

Adventure Game Learning Platform
Miroslav Minovic, Velimir Štavljanin, Miloš Milovanovicand Dušan Starcevic (2012). *Computer Engineering: Concepts, Methodologies, Tools and Applications (pp. 1022-1032).*
www.irma-international.org/chapter/adventure-game-learning-platform/62495

Information Technology of the Aerial Photo Materials Spatial Overlay on the Raster Maps
Iryna Yurchuk, Oleksiy Piskunovand Pylyp Prystavka (2019). *Cases on Modern Computer Systems in Aviation (pp. 191-201).*
www.irma-international.org/chapter/information-technology-of-the-aerial-photo-materials-spatial-overlay-on-the-raster-maps/222189

Requirements Engineering in the ICT4D Domain
Kristina Pitula, Daniel Sinnigand Thiruvengadam Radhakrishnan (2012). *Computer Engineering: Concepts, Methodologies, Tools and Applications (pp. 187-200).*
www.irma-international.org/chapter/requirements-engineering-ict4d-domain/62442