Data Utilization

Course Description

The course Data Utilization introduces case-based applications that take advantage of regularities and patterns found within continuously generated texts, images, or sensor data. The cases solve issues of pattern recognition, natural language processing, image recognition, detection and sensing, problem-solving, and decision support. The cases are related to the application fields of cybersecurity, linguistics, augmented reality, intelligent transportation, problem-solving, and decision support.

Contents

1. Introduction
   1. The Meaning of Identity, Similarity, and Diversity
   2. Data Patterns and Ontologies
2. Pattern Recognition
   1. Analysis of User Interaction, Attitude, and Behavior
   2. Predictive Analytics
   3. Preventing the Unknown: User Behavior Analytics in Cybersecurity
3. Natural Language Processing
   1. Concepts of Natural Language
   2. Speech Recognition and Acoustic Modeling
   3. Discerning the Meaning: Linguistics and Social Media
4. Image Recognition
   1. Basics of Image Representation
   2. Integral Transforms and Compression
   3. Exploiting the Visual: Image Recognition for Augmented Reality
5. Detection and Sensing
   1. Sensor Construction and Techniques
   2. Intelligent Agents and Surveillance
   3. Managing the Complex: Sensor Networks in Intelligent Transportation Systems
6. Problem-solving
   1. Knowledge Sharing and the Cloud
   2. Rule-based Systems
   3. Learning from Nature: Expert Systems in Business
7. Decision Support
   1. Invariants, Determinants, and Alternatives in Decision-making
   2. Correlation and Causality in Strategic Decision-making
   3. Approaching the Crossroads: Dashboards and Visualization
8. Data Security and Data Protection
   1. Securing Data Storage and Processing Infrastructure Against Unauthorized Access
   2. Compliance and Regulations, GPDR