

Cognitive Intelligence for Big Data

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November 17, 2015

Agenda

- IBM Research (WATSON)
 - <http://www.research.ibm.com/cognitive-computing/#fbid=LsW-NUkOVhK>
- Translation of Domain Knowledge
- Goals
 - Industrial Sectors
 - Industrial Translation
 - Domain Areas
 - Decision Trees
 - Big Data Requirements

Goals

- Improve production thru recovery of domain knowledge that can be used for machine learning
- Define approach to structure data sets so they can be rapidly used to reveal information
- Provide a means that is extensible and adapts to changes including minimization of storage and transport of information

Translation of Domain Knowledge

- Industrial control
- Many years of experience
- Domain experts in many cases is limited
- Artificial Intelligence has been applied where it was difficult to control a process
 - Expert System
 - Fuzzy Logic
 - Neural Networks

Industrial Sectors

- Metals and Mining
 - Cement Manufacturing
- Power
 - Long Distance Power Lines use of Synchrophasors
 - Smart Grid
- Chemicals
- Food
 - Organics
- Pharmaceutical
- Manufacturing

Industrial Translation

- The following areas require domain knowledge:
 - First Principles Modeling (Conceptual Design)
 - Startup/Shutdown
 - Process disturbances
 - Emergency considerations
 - Safety considerations
 - Security considerations
 - Environmental monitoring and reporting
 - Shifts in quality of materials
 - Equipment outages and scheduling
 - Changes in company policy

Domain Areas

- Process Engineering
- Operations
- Quality Control
- Environmental
 - EPA
- Project Management
 - Planning
- Executive Management
 - Corporate

Decision Trees

- Shifts to age of equipment
- Shifts in production requirements
 - Types of products
- Shift in environmental changes
 - Weather (rain, snow, wind, cold, heat)
- Shifts that may effect energy consumption

Big Data Requirements

- Different protocols used to collect data
 - Conversion of data sets into a common format
- Unique identification of domain knowledge
 - Collected data may mean something different
- Metadata definition of Relationships
 - XML
- Transport protocol with built-in Security
 - XMPP (Instant Sensor Messaging) to provide alerts and notifications to users including mobile devices

Thank You

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