Association Based Distributed System for Medication Error Detection and Tracking (ADEDT)
Sachin Singh, Chintan Patel, Yugeyung Lee
School of Interdisciplinary Computing and Engineering, University Of Missouri, Kansas City

Problem Focus: Medication errors are related to prescribing, dispensing, or administering medication and could lead to major health problems or even death. The objective of our research is to design a system to detect such errors and their underlying causes, so that they can be prevented.

Motivation: Overall, deaths from medical errors ranges from 44,000 to almost 100,000, ranking closely behind U.S. deaths from heart disease, cancer, stroke, and lung disease and can incur financial damages to U.S. hospitals up to a whopping $1.5 billion every year.

Our Solution: The system mines a database of medication errors to discover interesting patterns. These patterns are distinguished into semantically meaningful patterns from illogical patterns using ontology as a meta-level specification of domain knowledge. The ontology also supports the transformation of the raw patterns into human readable sentences in a given context. In addition, the system keeps track of actions taken against discovered patterns, which can be used for future decision making.

System Architecture: The System Consists of following Components implemented using given technologies:
- Manager Component: C# .NET
- Ontology Component: RDF, Jena
- Association Component: Java
- UI Component: ASP.NET
- DB Component: MS SQL Server

Features:
- Latent Error Detection
- Active Error Updates
- Association Based Data Mining
- Extensible Ontology based semantic pattern filtering
- User Profile management
- Management of Action taken information.

Results and Conclusions: The ADEDT system was tested using a real-world medication error database. The snapshot above depicts couple of error causes discovered like “Rate of certain type of error occurrence is high in ward A and occurs mostly in evening shifts”. This ‘discovery’ forms the decision support system for the management to prevent the occurrence of such errors. System also keeps track of the relevant actions taken, which serve as a benchmark for their own effectiveness.

... because Life is Precious !!