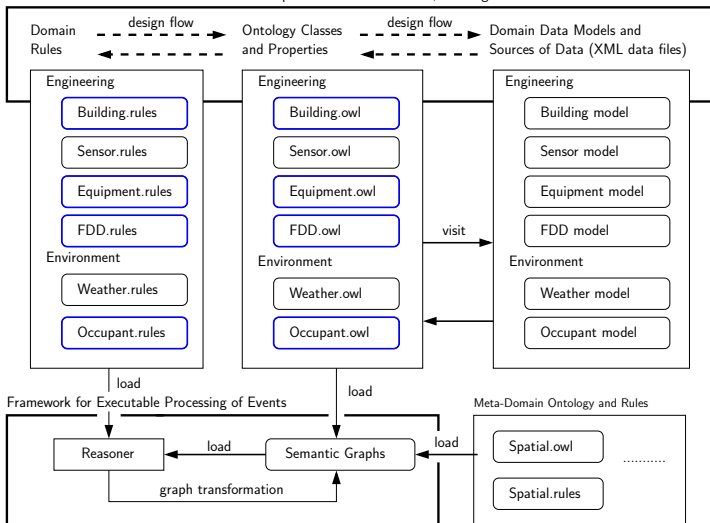


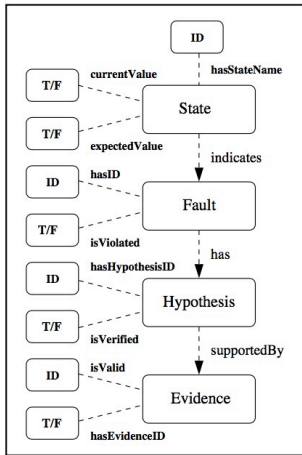
Multi-Domain Building Semantics

Framework for Concurrent Data-Driven Development of Domain Models, Ontologies and Rules

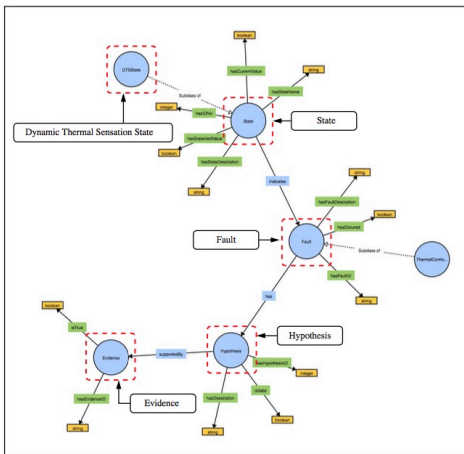


Multi-Domain Rule-based Reasoning

Flowchart for Processing of Faults

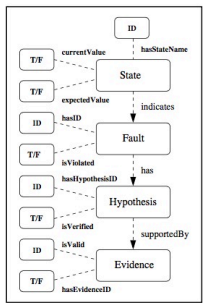
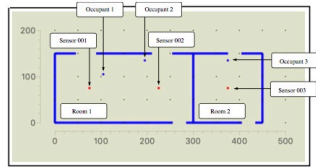


Fault Detection and Diagnostic Analysis Ontology

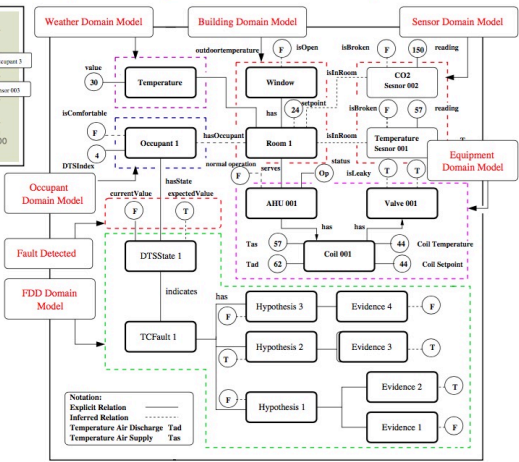


Multi-Domain Rule-based Reasoning

Case Study Problem

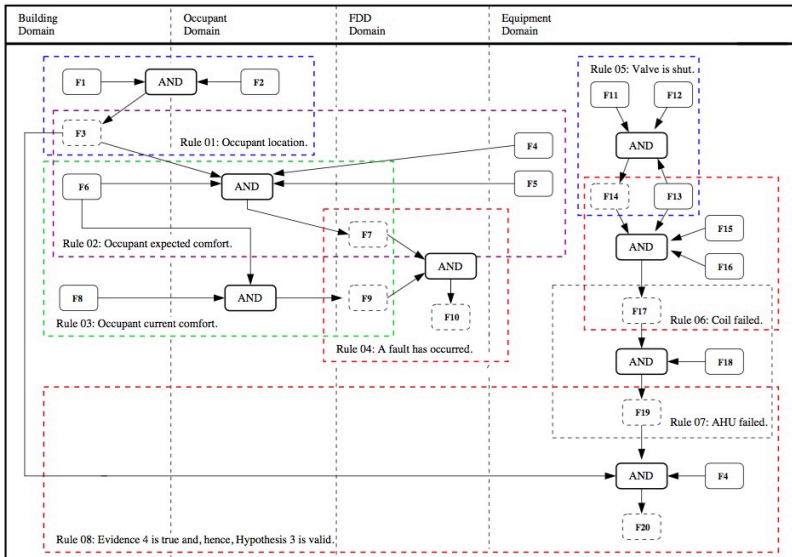


Snapshot of Fully Assembled Semantic Graph



Multi-Domain Rule-based Reasoning

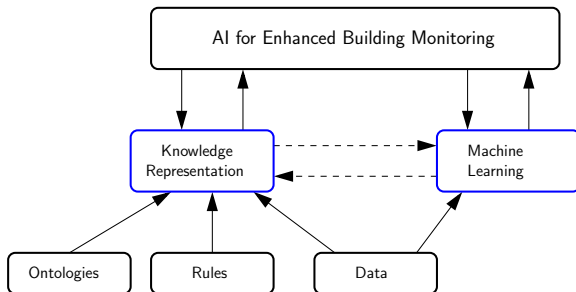
Snapshot of Multi-Domain Evaluation and Forward Chaining of Rules



Multi-Domain Semantic Modeling + Data Mining

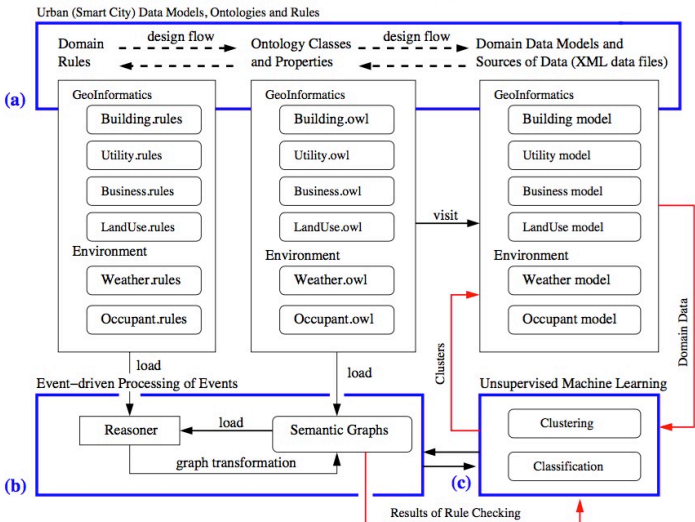
Initial Idea: Ditch semantic modeling → focus on machine learning instead.

Much Better Idea: Understand how can semantic modeling and data mining work together as a team?



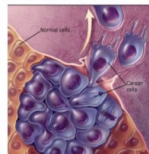
Energy Consumption of Buildings in Chicago

Framework for Integrated Semantics + Data Mining

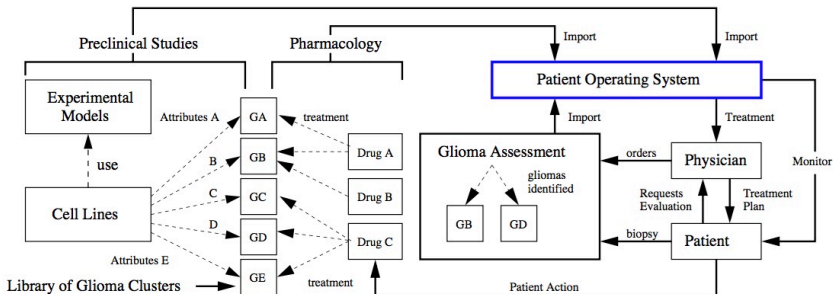


Semantics + Data Mining for Precision Medicine

Pathway from Preclinical Studies and Pharmacology to Patient Diagnosis and Treatment



Dependency Relationships among Preclinical Models, Patient Diagnosis and Patient Treatment



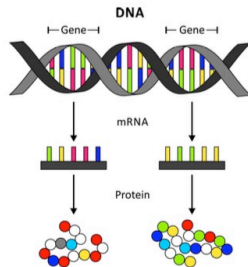
Semantics + Data Mining for Precision Medicine

Problem Complexity

Human Genome: 19,000-20,000 individual genes

Patient data extracted from Cancer Genome Atlas

- 1,019 Patients
- Each patient described by 44,000 units of data assembled from 11,000 gene attributes from 4 sequencing method.



Data-to-Rules Flowchart

