



Michigan Tech Research Institute

MICHIGAN TECH RESEARCH INSTITUTE (MTRI) VISION

MTRI is a recognized leader in the research, development and practical application of sensor and information technology to solve critical problems in national security, protecting and evaluating critical infrastructure, bio informatics, earth sciences and environmental processes.

The Institute works to establish the pairing of new phenomenological (cause-effect) understandings and the development of mathematical paradigms to extract new knowledge from existing and non-traditional data sources that lets the responsible party make better decisions in the real world. It is the combination of the phenomenological model, and an understanding of the sensing mechanism that pervades the approaches being developed to accurately and completely reflect the state of the system(s) under observation and the strength of the conclusions reached on the system's purpose and intent (future state).

Focusing on education, research, and development of technology to sense and understand natural and manmade environments

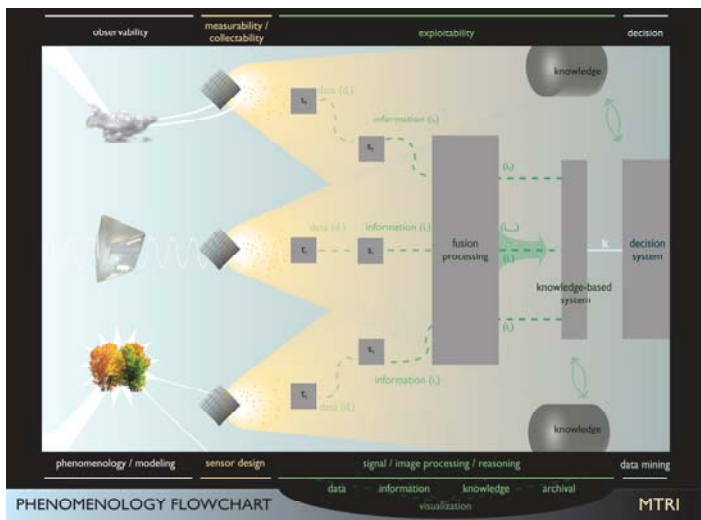


Figure 1: Phenomenologically Driven Information Extraction

The process illustrated above captures the intimate connection between the data, information, knowledge and actions to be taken as a result of the observations/measurements. Taking into account this interaction provides unique insights into the processing approaches that are developed to support the customer's needs. This paradigm is at the crux of the activities within MTRI.

MISSION

Be a recognized leader in the research, development and use of Information Technology to support solution of critical problems in national security, infrastructure, bioinformatics, earth sciences and environmental processes.

Be acknowledged nationally and internationally as an innovator for the marriage of phenomenological understanding and implementation of the mathematically rigorous algorithms to build information from data in support of sponsor needs.

Provide visibility and outreach for Michigan Technological University (Michigan Tech) in Southeastern Michigan.

Establish collaborations with Michigan Tech academic departments, institutes, and centers to increase funded contract revenues for all organizations involved.

Maintain a creative environment that rewards and encourages innovation.



MTRI Core Competencies

MTRI core competencies are in the analysis, modeling and phenomenology (cause-effect relationships) associated with:

Remote Sensing Systems

- Radar scattering and imaging for military and civil applications
- Radar and electro optic sensing for agricultural, water quality, ecological, environmental, and transportation applications
- Research into “with-in” building imaging and exploitation
- Synthetic aperture concepts for communications
- Design of multi-frequency antenna systems

Biomedical Sensing

- Tissue segmentation
- Sleep analysis
- Object morphology
- Active and passive imaging technologies

Experiment Design and Execution of Remote Sensing Field Studies

- Flight line generation/satellite acquisition
- Remote areas
- Rigorous ground truth
- Hypothesis testing
- Multi-fusion data sets

Information Processing

- Statistical analysis
- Signal/signature modeling
- Space, time, wavelength, entity
- Parametric and non-parametric hypothesis testing
- Parameter estimation
- Hidden parameter estimation (inverse problems)

GIS Based Dynamic Decision Support Systems

- Water quality
- Human health
- Environmental and ecology
- Forestry and agricultural
- Oil and gas development
- Disaster monitoring
- Transportation applications

Database Management and Dissemination

- Specialized Geographic Information Systems (GIS)
- Innovative relational databases
- Application specific web/portals
- Unique/efficient Internet Map Servers (IMS)

Workshop, Focus Groups and Technical Conferences

- Trained facilitators
- Technical focus groups
- International remote sensing conferences
- Remote Sensing of Marine and Coastal Environments
- Geospatial Information in Agriculture and Forestry
- Airborne Remote Sensing
- Applied Geologic Remote Sensing

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