

Analysis in Motion Initiative

Interactive Streaming Analytics at Scale



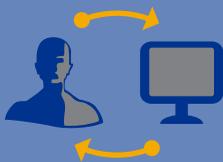
In a world where data are continually streaming from distributed and diverse sources—from scientific instruments, to web traffic, to live imagery—making timely discoveries requires computing capabilities that can keep pace with rapidly evolving phenomena.

AIM is developing new analysis algorithms to provide continuous, automated synthesis of new knowledge and to enable measurement systems to be steered in response to emerging knowledge, rebalancing the effort between humans and machines.



APPROACH

Human-Machine Feedback



Interaction with human interfaces to implicitly weight, tune, and modify underlying models

Visual strategies for bidirectional communication of and interaction with multiple interpretations

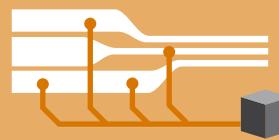
Hypothesis Generation & Testing



Scalable symbolic deduction and incremental machine learning to track a stream

Generate, update, and validate human-understandable interpretations from streaming classifiers

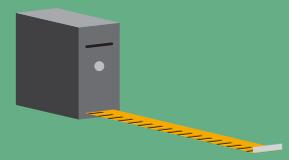
Streaming Data Characterization & Processing



Foundational streaming algorithms, methods for extracting features from streams

Data reduction techniques for higher effective throughput

Work Environments



Integration framework and testing range

Instrumentation to measure overall accuracy, utility, and throughput

USE CASES

Insider Threat Detection in the Cloud

As global computing quickly migrates away from traditional IT environments to cloud computing solutions, existing cybersecurity challenges become even more difficult to mitigate. AIM will develop a methodology and scientifically-rigorous approaches to understand Insider Threat detection and mitigation in cloud computing environments.

Imaging of Dynamic Processes in Electron Microscopy

Electron microscopes are used in the biological and material sciences; however challenges are faced during data acquisition. Compressed sensing addresses these challenges; AIM's research focuses on enabling users to interact with the compressed image streams.

PREVIOUS USE CASES

Strategic Surprise

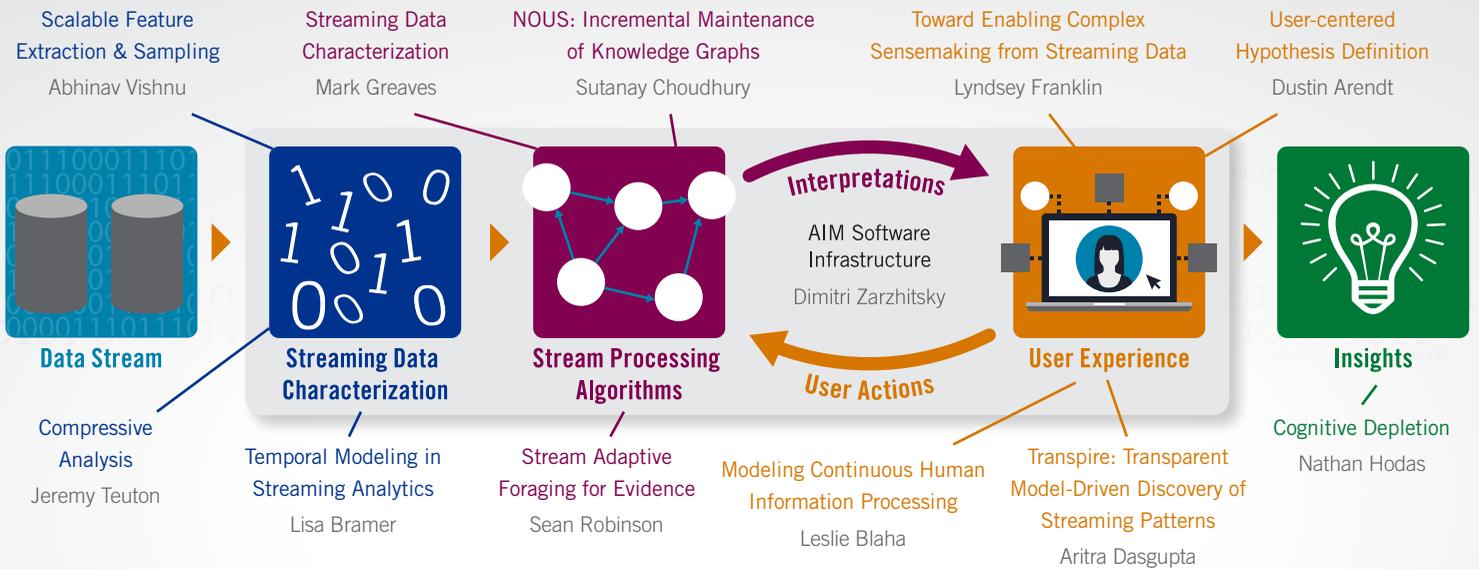
Computing advances as applied to the nuclear trafficking domain

Evolution of Nuclear Magnetic Resonance (NMR)

Enabling faster, more accurate NMR metabolomics

AIM is developing theories, architectures, and technologies that support construction of human/machine systems operating on streaming data to produce correct, useful, and timely interpretations of the world.

THE R&D AGENDA



AIM by the numbers

- 81 staff / interns
- 9 university subcontracts
- 33 seminar speakers hosted
- 5 invention disclosures

How AIM is sharing its research

- 9 formal reports
- 50 presentations
- 35 conference papers
- 19 abstracts
- 12 journal articles

Collaborate with us

We're interested in partnering with individuals and organizations. If you have expertise in the areas of machine learning or human-computer interaction, and are interested in partnership opportunities, then we'd like to talk with you.