Clustering algorithms
Synthetic network model
Web scraping
RAND Lex
Agent-based model (ABM)
Advanced tuning of microsimulation models
Linear regression
Decision trees
Traditional causal inference
Deep neural network
Causal inference supported by machine learning estimation
Text analysis
Principal component analysis (PCA) & factor analysis
Data visualization
Network analysis
Ordinary differential equation model
Monte Carlo analysis
Agent-based model (ABM)

Exploratory Analysis
- Purpose: Explore data and generate viable hypotheses
  - This type of analysis helps make sense of what data you have and is well suited to unsupervised learning and factor analysis.

Statistical Inference
- Purpose: Test a hypothesis or calculate an estimate and its precision
  - This type of analysis is a mathematically formalized way of approximating reality. The approximation can be used to test relationships and estimate outcomes.

Modeling & Simulation
- Purpose: Create and tune models that meaningfully represent real-world dynamics
  - This type of analysis is useful for observing dynamics that cannot or should not be directly observed in the real world.

For inquiries and SAM expertise, please email us at AskSAM@rand.org.

Identifying dependencies and systemic risk in the broad economy
Used SAM to build more complete and detailed network maps of U.S. firms to identify dependencies between them. Uncovered new insights because of the maps' higher fidelity.
www.rand.org/WR4185

Hunting Russian trolls on Twitter and Reddit with AI
Tested whether machine learning (ML) can be used to identify Russian trolls across social media platforms. The ML model achieved 98% precision and almost 100% accuracy.

Using ML to dramatically reduce the time needed to update systematic reviews
Compared standard methods for updating systematic reviews with ML-assisted updating. ML drastically reduced the effort required to update systematic reviews without sacrificing quality.
www.rand.org/EP67251

Testing a social network intervention to reduce substance use
Employed computer-supported social network visualizations with motivational interviewing to test the impact of social network interventions on high-risk behavior among individuals transitioning from unhoused to supportive housing.
www.rand.org/EP67485

Better representations of flu vaccination behaviors using reinforcement learning
Used reinforcement learning (RL) on agent-based models (ABMs) of flu vaccination behavior to test RLs impact. Found that RL effectively generates reward-seeking and maximising behaviors and can outperform default ABMs.

Seeking COVID-19 exit strategies for reopening California
Calibrated a disease model using a SAM technique piloted at RAND (incremental mixture approximate Bayesian computation, or IMABC algorithm) that is better suited to high-dimensional parameter spaces and many calibration targets.

SAM refers to a broad collection of novel data-intensive methods, including artificial intelligence, machine learning, techniques for manipulating “big data,” and data science. SAM approaches are promising but can be challenging to incorporate effectively into research.

The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest.

For more information on this publication, visit www.rand.org/t/CPA1893-1.

www.rand.org  |  © Copyright 2022 RAND Corporation CP-A1893-1