Mathematical modeling and machine learning to analyze medical data

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Mathematical modeling can be a valuable tool for exploring complex relationships among various health-related variables, such as disease progression, population dynamics, and treatment effectiveness. By quantifying these interactions, researchers can simulate different scenarios, predict outcomes, and evaluate the potential impact of interventions or policies. These models form the basis for generating hypotheses and making forecasts about health outcomes.

In contrast, machine learning algorithms can extract patterns, associations, and predictive models from large and complex health datasets, enabling researchers to identify hidden relationships, risk factors, and patient outcomes. These algorithms can learn from data and adjust their models iteratively, resulting in improved performance over time.

Integrating mathematical modeling and machine learning offers a comprehensive, data-driven approach to studying health-related issues. By leveraging machine learning algorithms to integrate real-world data and capture complex interactions, mathematical models can be refined and improved. Similarly, machine learning can benefit from mathematical models by incorporating domain expertise, reducing feature dimensionality, and enhancing predictive accuracy. The combination of these two disciplines enables researchers to gain deeper insights into complex health problems, such as infectious disease modeling, where machine learning techniques can be used to estimate disease parameters, predict transmission patterns, and optimize intervention strategies.

Our Special Session is particularly interested in this approach.

List of topics of interest:

Topics of interest include (but are not limited to):

- Medical text analysis
- Clinical diagnosis and therapy
- Clinical expert systems
- Modeling and simulation of medical processes
- Health Care Informatics
- Biomedical imaging and image processing
- Evolutionary Computing for recommendation in healthcare
- Application of deep learning in biomedical engineering
- Mathematical modeling in healthcare data
- Statistical learning theory applied in healthcare data
- Optimization techniques for Machine learning models applied in healthcare