Adaptive Analytics: Detecting Diagnostic Bias Via Social Network Analysis

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Introduction
We present a patent-pending algorithm to characterize and detect bias in social and content networks at scale.

System Features
- Flagged anomalous behavior with respect to group norms.
- Ethical verification layer for ML/AI agent in the network.
- Consensus-driven decision benchmark in the network.
- Ranks individuals at scale for large social and content networks.
- Anonymity preserving analysis and feedback at scale.

Interactive Diagnostics
Interactive interface enables end-user to:
- explore trends by diagnostic category
- review and provide feedback on flagged anomalous cases using expert knowledge

Diagnostics Network
Diagnostics Network connects doctors with patients through diagnoses and symptoms.

Patent-pending network analysis produces a measure of doctor efficacy, and diagnostic hierarchy to the doctor based on the network of colleagues and their decisions. We introduce status as a measure of the “standing” in the network. The system empowers patient portals to seek the most effective treatment plans.

Consensus
Consensus measures the level of agreement in the network. Psychological concept of balance theory is used to model consensus scenarios so that consensus is reached when the overall sentiment of the network is balanced. The likelihood of consensus is called status.

Social Network Analysis
Social network constructed from Wikipedia dataset of over 7000 users participating in administrator election, with the known outcomes of the elections (elected or not elected).

Diagnostics Network Analysis: patient status measure

- status: the red bands establish standard of care
- status histogram in the population
- hierarchy determined by status

We analyzed an anonymous health dataset of ≈12,000 doctor/patient pairs and 55 diagnoses. This method establishes a standard of care and diagnostic hierarchy from Diagnostics Network with one thousand simulated consensus scenarios.

Scientific Method
A signed graph is a graph where each edge has a sign. A directed graph is a graph where each edge has a direction.

Example of graph balancing using balancing theory. Harary cuts are used to compute status measure from multiple balanced graphs.

Outcome anomalies are defined relative to the promotional outcomes to identify questionable and lacking promotions.

People
Faculty:
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