

AI in Clinical Decision Making and Patient Health Outcomes

Harshal Chalke

IDAI 720—Research Methods for Artificial Intelligence

Profs. Rantanen and Yu, Semester II, 5th Year

Rochester Institute of Technology

Term paper part 2

Thesis Statement:

The integration of advanced AI technologies, such as machine learning and deep learning, in medical diagnosis and treatment, significantly enhances patient health outcomes. This improvement is achieved through more accurate diagnostic predictions and the development of personalized treatment plans, supported by empirical evidence.

Hypotheses:

H1: Artificial Intelligence tools provide more accurate and in-depth diagnosis than traditional methods.

H2: Artificial Intelligence tools provide effective treatment plans tailored to specific patients, based on their diagnosis, patient history and analysis of similar patient data.

H3: Patient's trust and acceptance as well as effectiveness of treatment plans and accuracy of diagnosis contribute to improvement and dependency of such tools, over time, in the healthcare domain.

Independent variables:

1. Types of AI techniques used: Differentiates between the types of AI techniques employed for prediction and analysis, such as machine learning algorithms for pattern recognition in diagnostic imaging, or deep learning models for predictive analytics in treatment outcomes. This categorization will allow us analysis of which AI methodologies are most effective in improving patient outcomes.
2. Degree of Personalization in Treatment Plans: This measures the extent to which AI tools tailor treatment plans to individual patients. It can be quantified based on the number of patient-specific factors (e.g., genetic information, medical history, lifestyle) that the AI system considers when generating a treatment plan.
3. Level of Transparency and Explainability of AI Decisions: Given the importance of patient trust and acceptance, this variable will assess how transparently AI tools present their diagnostic and treatment recommendations to healthcare providers and patients. Higher transparency is expected to correlate with greater trust and acceptance.

Dependent variables:

1. Accuracy of diagnosis: Can be measured by true predictions versus false predictions confirmed by subsequent tests, studying precision of these tools compared to traditional diagnosis.
2. Effectiveness of treatment plans: Can be evaluated through recovery rates, treatment duration, cost of treatment, and other such factors that may contribute to success or failure of treatment plans.
3. Patient's trust and acceptance: Can be analyzed through continuous surveys and questionnaires measuring patient's confidence and satisfaction with AI-assisted diagnosis and treatment processes.