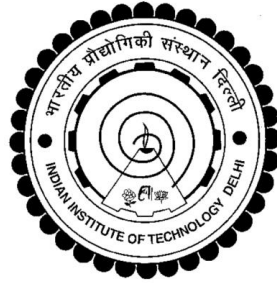


**ARTIFICIAL INTELLIGENCE IN HEALTHCARE :
PRECISION FANTASIES AND CONTEXTUAL RUPTURES**

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**DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
INDIAN INSTITUTE OF TECHNOLOGY DELHI**

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**ARTIFICIAL INTELLIGENCE IN HEALTHCARE :
PRECISION FANTASIES AND CONTEXTUAL RUPTURES**

by

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Submitted in fulfilment of the requirements of the degree of

DOCTOR OF PHILOSOPHY

to the



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May 2024

CERTIFICATE

This is to certify that the thesis entitled “**Artificial Intelligence in Healthcare: Precision Fantasies and Contextual Ruptures**” being submitted by **Nishtha Bharti** to the Department of Humanities and Social Sciences, Indian Institute of Technology Delhi, for the award of **Doctor of Philosophy**, is a record of the bonafide work carried by her under my supervision. In my opinion, the thesis has reached the standards of fulfilling the requirements for submission relating to the degree. The contents of the thesis have not been submitted in part or full, to any other university or institute for the award of any degree or diploma.



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May 27, 2024

ABSTRACT

This thesis explores the tensions inherent in the ideation, development and deployment of Artificial Intelligence (AI) applications in the realm of healthcare in India and their implications for diverse citizenry. By engaging with the affordances and constraints brought about by this technology, it investigates the viability of data-driven, AI-mediated, precision medicine-led visualisations in India's healthcare provisioning. It further examines competing imaginations of 'public benefit' in an AI-framed healthcare discourse by asking: who are the targeted beneficiaries of specific technological configurations, how the desirability of potential benefits is weighed and what are the conditions under which benefit itself can be re-evaluated.

The thesis demonstrates that the terrain of innovation policymaking in India is presently saturated with narratives of epochal technological 'disruptions' in which data-powered digitisation and AI applications are projected as crucial to improving the accessibility and affordability of healthcare services. These narratives and the expectations they engender are affecting research and policy trajectories, mobilisation of resources through grants and investments and formation of medical knowledge communities. This thesis studies these developments together and establishes that the unfolding of AI in India's healthcare can be examined to better depict not only the political and economic stakes in innovation trajectories but more importantly, the prioritisation of problems that need concerted intervention. Ultimately, such prioritisations in social policies can have the potential to define which futures are worth aspiring to, within the fragile healthcare ecosystem of India.

सार

यह शोध कार्य भारत में स्वास्थ्य के क्षेत्र में आर्टिफिशियल इंटेलिजेंस (एआई) अनुप्रयोगों के विचार, विकास और परिनियोजन में निहित तनाव और विविध नागरिकों के लिए उनके महत्त्व की पड़ताल करता है। इस तकनीक द्वारा उत्पन्न सुविधाओं और बाधाओं को देखते हुए, यह भारत के स्वास्थ्य सेवा प्रावधान में डेटा-संचालित, एआई द्वारा मध्यस्थ चिकित्सा पद्धति के दृश्यावलोकन की जांच करता है। इन पद्धतियों के द्वारा 'सार्वजनिक लाभ' की प्रतिस्पर्धी कल्पनाओं का अध्ययन करते हुए यह शोध कार्य निम्नलिखित प्रश्नों का अवलोकन करता है : इस विशिष्ट तकनीकी व्यवस्था के लक्षित लाभार्थी कौन हैं, संभावित लाभों की वांछनीयता का मूल्यांकन कैसे किया जाता है और वे कौन सी स्थितियाँ हैं जिनमें लाभ का पुनः-मूल्यांकन किया जा सकता है

यह शोध कार्य दर्शाता है कि भारत में नीति निर्माण का क्षेत्र वर्तमान में तकनीकी नवोन्मेषों की ओर प्रवृत्त है, जिसके तहत डेटा-संचालित डिजिटलीकरण और एआई अनुप्रयोगों को स्वास्थ्य सेवाओं की अभिगम्यता और सामर्थ्य में सुधार के लिए महत्वपूर्ण माना जा रहा है। यह प्रवृत्ति अनुसंधान और नीति प्रक्षेप पथ, अनुदान और निवेश के संसाधन तथा चिकित्सा ज्ञान समुदायों के गठन को प्रभावित कर रही हैं। यह शोध कार्य इन घटनाक्रमों का अध्ययन करता है और स्थापित करता है कि भारत की स्वास्थ्य सेवा में एआई के विकास का परीक्षण न केवल तकनीकी नवोन्मेषों में राजनीतिक और आर्थिक सिद्धांतों को बेहतर ढंग से चित्रित करने के लिए किया जा सकता है, बल्कि उन समस्याओं की प्राथमिकता को दर्शाता है, जिनके लिए पुख्ता हस्तक्षेप की आवश्यकता है। अंततः, सामाजिक नीतियों में ऐसी प्राथमिकताओं में यह परिभाषित करने की क्षमता है कि भारत के स्वास्थ्य तंत्र में कौन सा भविष्य आकांक्षित होना चाहिए।

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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
AIIMS	All India Institute of Medical Sciences
ANMs	Auxiliary Nurse Midwives
API	Application Programming Interface
ASHA	Accredited Social Health Activist
AYUSH	Ayurveda, Yoga, Naturopathy, Unani, Siddha and Homoeopathy
BIRAC	Biotechnology Industry Research Assistance Council
BITS	Birla Institute of Technology
CDSS	Clinical Decision Support System
CHC	Community Health Centre
CHE	Current Health Expenditure
CHWs	Community Health Workers
CMNNDs	Communicable, Maternal, Neonatal, and Nutritional Diseases
CSIR	Council of Scientific and Industrial Research
DALYs	Disability Adjusted Life Years
DBT	Department of Biotechnology

DST	Department of Science and Technology
FHWs	Frontline Healthcare Workers
GDP	Gross Domestic Product
GHE	Government Health Expenditure
GoI	Government of India
HAIC	Healthcare Artificial Intelligence Catalyst
HTIC	Healthcare Technology Innovation Centre
ICT	Information and Communication Technology
IIM	Indian Institute of Management
IIT	Indian Institute of Technology
IIIT	International Institute of Information Technology
IISc	Indian Institute of Science
IoT	Internet of Things
INR	Indian Rupee
LVPEI	L V Prasad Eye Institute
MEITY	Ministry of Electronics and Information Technology
ML	Machine Learning
MoHFW	Ministry of Health and Family Welfare
MoSPI	Ministry of Statistics and Programme Implementation

NASSCOM	National Association of Software and Service Companies
NCD	Non-Communicable Diseases
NCR	National Capital Territory
NGO	Non-Governmental Organisation
NIT	National Institute of Technology
NITI	National Institution for Transforming India
NSS	National Sample Survey
PHC	Primary Health Centre
PIB	Press Information Bureau
SPIC MACAY	Society for the Promotion of Indian Classical Music and Culture Amongst Youth
STS	Science and Technology Studies
THE	Total Health Expenditure