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(86) International Application No	:NA	(72)Name of Inventor : 1)JOYDEEP KUNDU, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----
Filing Date	:NA	----- 2)Dr. DAIZY DEB, Associate Professor Address of Applicant :BRAINWARE UNIVERSITY BARASAT ----- --
(87) International Publication No	: NA	3)SHANKAR PRASAD MITRA, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----
(61) Patent of Addition to Application Number	:NA	----- 4)Dr. KASHI NATH DATTA, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----
Filing Date	:NA	----- 5)POULOMI GHOSH, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----
(62) Divisional to Application Number	:NA	----- 6)ARITRA BHATTACHARYYA, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----
Filing Date	:NA	----- 7)PULAKESH ROY, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----
		----- 8)GOURAB CHAKRABORTY, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----
		----- 9)SAYON DEY, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----
		----- 10)MNITYANANDO MAHATO, Assistant Professor Address of Applicant :BRAINWARE UNIVERSITY, WEST BENGAL -----

(57) Abstract :

With the growing demand for intelligent, data-driven healthcare systems, machine learning (ML) has emerged as a powerful tool for enhancing patient health analysis and monitoring. This study presents a novel approach that leverages real-time patient data, including electronic health records (EHRs), wearable sensor data, and lifestyle metrics, to enable early disease detection, continuous monitoring, and personalized health forecasting. Our system integrates explainable AI models to ensure transparency in clinical decision-making, fostering greater trust and usability among healthcare professionals. Unlike traditional systems that rely on retrospective data, we adopt proactive and adaptive learning techniques to support timely interventions and reduce the risk of critical health events. Additionally, our architecture supports federated learning, allowing secure, privacy-preserving model training across distributed medical institutions. The proposed framework is designed to be scalable, cost-efficient, and applicable in both urban and resource-constrained environments. Experimental results demonstrate improved predictive accuracy and responsiveness, positioning this system as a step forward in intelligent, patient-centric healthcare delivery.

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