Protecting Personal Healthcare Record Using Blockchain & Federated Learning Technologies

Satyabrata Aich*, Nday Kabulo Sinai**, Saurabh Kumar***, Mohammed Ali****, Yu Ran Choi*, Moon-IL Joo*, Hee-Cheol Kim*****

* Institute of Digital Anti-Aging Healthcare, Inje University, South Korea

** K4-security, Seoul, South Korea

*** U1 Geographic Information System, Seoul, South Korea

**** College of Medicine, Yonsei University, South Korea

***** Department of Computer Engineering/Institute of Digital Anti-Aging Healthcare/u-HARC, Inje University, South Korea

satyabrataaich@gmail.com, kabulo.nday@gmail.com, saurabh@u1gis.com, midoabdo@yonsei.ac.kr, dbfks2007@naver.com, joomi@inje.ac.kr, heeki@inje.ac.kr

Corresponding Author: heeki@inje.ac.kr

Abstract— **For decades artificial intelligence (AI) has been used for various applications in the healthcare industry. Machine learning and artificial intelligence algorithms allow us to diagnose and customize medical care and follow-up plans to get better results, and during the covid19 pandemic, it was found that AI models have been using to predict the Covid-19 symptoms, understanding how it spreads, speeding up research and treatment using medical data. However, it is very challenging to make a robust AI model and use it in a real-time and real-world environment since most organizations do not want to share their data with other third parties due to privacy concerns, furthermore, it is difficult to build a generalized prediction model because of the fragmented nature of the patient data across the healthcare system. To solve the above problems, this paper presents a solution based on blockchain and AI technologies. The blockchain will securely protect the data access and AI-based federated learning for building a robust model for global and real-time usage.**

Keyword— **Artificial intelligence, blockchain, federated learning, pandemic, privacy**

Satyabrata Aich, is working as a Lecture at the Institute of Digital Anti-Aging Healthcare, Inje University. He has published many research papers in journals and conferences in the realms of Machine learning, Text mining, and Artificial intelligence. His research interests are natural language processing, Machine learning, supply chain management, Text mining, Bio informatics, and Blockchain.

Nday kabulo Sinai, is a PhD student majoring in digital healthcare at INJE University. He has received his bachelor's degree in software engineering at the "Université Protestante de Lubumbashi", He also attended at KOOKMIN University from where He got his master's degree in Computer Engineering. His research interests include Blockchain, artificial intelligence, micro-services, software quality and IoT.

Saurabh Kumar, received his PhD. degree from Chungbuk National University, South Korea in Feb 2020. He has wide industry experience in companies like Samsung Electronics and HCL Technologies. He has published various journal and conference papers in IEEE and Springer. His research interests include wireless communication, computer vision, artificial intelligence, robotics and block chain.

Mohammed Ali, is a PhD student majoring in Medicine at Yonsei University. He has received his MSc degree in medical sciences from Yonsei University. He has received Korean government scholarship for graduate studies, and currently being member of American Society of Microbiology. His research interests include artificial intelligence, Drug discovery, Bio informatics.

Yu Ran Choi, is a master student at the Institute of Digital Anti-Aging Healthcare, Inje University. She has worked in many real-life projects related to artificial intelligence. Her research interests are artificial intelligence, Machine learning, clinical research, healthcare big data, and data analysis

Moon-Il Joo, received the PhD degree in computer engineering from Inje University in 2018. He is currently working as a research professor at the Institute of digital anti-aging healthcare, Inje University, Korea. His research interests are in software engineering, human computer computer interaction, smart phone programming, and component-based development.

Hee-Cheol Kim, received his BSc at Department of Mathematics, MSc at Department of Computer Science in SoGang University in Korea, and PhD at Numerical Analysis and Computing Science, Stockholm University in Sweden in 2001. He is Professor at Department of Computer Engineering and Head of the Institute of. Digital Anti-aging Healthcare, Inje University in Korea. His research interests include Machine learning, Text mining, Bio Informatics