|  |  |  |  |
| --- | --- | --- | --- |
| Title | Deep Learning-Based IoT System for Remote Monitoring and Early Detection of Health Issues in Real-Time | | |
| Author(s) Name | Md Reazul Islam, Md Mohsin Kabir, Muhammad Firoz Mridha, Sultan Alfarhood, Mejdl Safran, Dunren Che | | |
| Contact Email(s) | firoz.mridha@aiub.edu | | |
| Published Journal Name | Sensors | | |
| Type of Publication | Journal | | |
| Volume | 23 | Issue | 11 |
| Publisher | MDPI | | |
| Publication Date | 2023/5/30 | | |
| ISSN | 1424-8220 | | |
| DOI | [**https://doi.org/10.3390/s23115204**](https://doi.org/10.3390/s23115204) | | |
| URL | <https://www.mdpi.com/1424-8220/23/11/5204> | | |
| Other Related Info. |  | | |
|  | | | |

|  |  |
| --- | --- |
| Abstract |  |
| With an aging population and increased chronic diseases, remote health monitoring has become critical to improving patient care and reducing healthcare costs. The Internet of Things (IoT) has recently drawn much interest as a potential remote health monitoring remedy. IoT-based systems can gather and analyze a wide range of physiological data, including blood oxygen levels, heart rates, body temperatures, and ECG signals, and then provide real-time feedback to medical professionals so they may take appropriate action. This paper proposes an IoT-based system for remote monitoring and early detection of health problems in home clinical settings. The system comprises three sensor types: MAX30100 for measuring blood oxygen level and heart rate; AD8232 ECG sensor module for ECG signal data; and MLX90614 non-contact infrared sensor for body temperature. The collected data is transmitted to a server using the MQTT protocol. A pre-trained deep learning model based on a convolutional neural network with an attention layer is used on the server to classify potential diseases. The system can detect five different categories of heartbeats: Normal Beat, Supraventricular premature beat, Premature ventricular contraction, Fusion of ventricular, and Unclassifiable beat from ECG sensor data and fever or non-fever from body temperature. Furthermore, the system provides a report on the patient’s heart rate and oxygen level, indicating whether they are within normal ranges or not. The system automatically connects the user to the nearest doctor for further diagnosis if any critical abnormalities are detected. | |