



## Guest Editorial: Recent Advances, Challenges and Future Trends in EHealth Informatics

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### Abstract

The Special Issue on “Recent Advances, Challenges and Future Trends in eHealth Informatics” of Journal of Information Technology Management (JITM) presents advancing research, technologies, and applications in this rapidly developing field of eHealth care. Focusing on a collection of key topics such as health wireless devices; hardware and body sensors and software sensing technologies, Internet of Medical Things (IoMT), Trending health analysis with social networking mobile/cellular networks and body area networks; health information technology, Bigdata analytics; genomics, personal genetic information and much more. Recent Advances, Challenges and Future Trends in eHealth Informatics section has provided a platform for authors, reviewers, researcher around world to present their discoveries and innovations in modernizing the eHealth informatics field. This Special Issue aims to address diverse topics that require new scientific contributions such as healthcare methods and digital devices use in social and health care, influence of the use of the internet/social networks, specific interventions in health and social care using digital health to

change clinical and social status, Healthcare Internet of Things (HIoT), digital applications for public health, or patient empowerment and participatory care through digital technologies.

**Keywords:** EHealth Informatics, Recent Medical Advancements, Internet of Medical Things (Iomt), Public Health, Biomedical Data Processing

### **Overview of Submissions**

The special issue entitled “Recent Advances, Challenges and Future Trends in eHealth Informatics” contains a collection of eHealth advancement techniques and frameworks under machine learning and artificial intelligence domain. The special issue is customized with most recent development in informatics and data management field such as Electronics Health Records (EHR), Internet of Medical Things (IoMT), chronic diseases and much more.

### **The details of selected papers are as follows**

The first article, “Comparative Study on Different Machine Learning Algorithms for Neonatal Diabetes Detection” discusses on various dynamic risk variables influencing the risk of diabetic using machine learning models and algorithm. The authors have considered Random Forest, Logistic Regression, Gradient Boosting, Support Vector Machines, and Artificial Neural Networks in the research study to compare and compute effective results. The article is developed on the methodology of medical data informatics and information attribute based decision making. The article is concluding by proposing “Voting Meta-classification” approach's capacity to increase the model's resilience and stability in classifying the risk of occurrence in diabetics.

The second article, “An Accurate Prediction Framework for Cardiovascular Disease Using Convolutional Neural Networks”. The article proposes a Convolutional-Neural-Network (CNN) for early cardio disease prediction using 14 primary characteristics of the dataset for analysis and validation. Accuracy and confusion matrix are utilized to verify several encouraging outcomes. Irrelevant features in the dataset are eliminated utilizing Isolation Forest, and the data is also standardized to enhance accuracy. Accuracy of 98% is achieved by employing a deep learning technique (CNN) from this article.

The third article, “Brain Tumor Image Prediction from MR Images Using CNN Based Deep Learning Networks” has reported valuable findings of automatically segmenting and detecting brain tumor in 2D MRI datasets using Convolutional Neural Network (CNN). The article has further considered features such as type and tumor sizes, locations, forms, and image intensities. The MRI 2D image dataset has generated massive informatics and data dependencies for validation and the article has reported the accuracy of 99.83% in CNN based decision making support.

The fourth article, “Breast Cancer Classification through Meta-Learning Ensemble Model based on Deep Neural Networks” has designed and developed a CNN based model for efficiently categorizing breast cancer. The methods included meta-learning, ensemble methodology, transfer-learning, and data-augmentation for decision making. The article claims, the use of meta-learning and ensemble approaches, the suggested method for breast cancer classification has shown encouraging results on various medical imaging datasets.

The fifth article, “The Moroccan Health Data Bank: A Proposal for a National Electronic Health System Based on Big Data” has conducted an exhaustive survey on the scope and requirement of establishing a dedicated Health Information System (HIS) in Morocco. The study is focused on the control, analysis and management of healthcare data under Morocco Health Bank Data (MHBD). Further, the manuscript has included a proposal of including a healthcare architecture and components required for effective data management.

The sixth article, “EfficientNetB3 for Enhanced Lung Cancer Detection: Histopathological Image Study with Augmentation” has discussed a Simple Convolutional Neural Network (Simple CNN) and EfficientNetB3 architecture that is both straightforward and efficient for accurately classifying lung cancer from medical images. The manuscript is dedicated to provide a reliable detection and decision making on Lung Cancer (LC). The technique has secured a higher accuracy and stability on the dataset based decision making.

The seventh article, “Chronic Kidney Disease Risk Prediction Using Machine Learning Techniques” has proposed an effective and efficient approach of Chronical Kidney Diseases (CKD) classification and prediction. In this study, multiple machine learning models such as Random-Forest (RF), Support-Vector-Machine (SVM), and Decision-Tree (DT) are employed for decision making. The technique has a dedicated feature selection and scrutinizing process for cross-validation of decision support. The article has recorded higher (99.8%) accuracies and reliable performance matrix from the multiple machine learning model comparisons.

The eighth article, “Performance Comparison of Different Digital and Analog Filters Used for Biomedical Signal and Image Processing” has discussed on the factor and role of appending filters in the biomedical data processing. The data informatics from filters is compared and analyzed with respect to filters like, Mean, Median, Weighted Average, Gaussian, and Bilateral and implemented in Python to verify their performance and reliability matrix and provide a reliable decision support for the selection of filters over the biomedical datasets.

The ninth article, “Clinical Healthcare Applications: Efficient Techniques for Heart Failure Prediction Using Novel Ensemble Model” has discussed on the recent trends on cardio vascular diseases (CVD) i.e., heart-failures or cardiac-arrest. In this article, the prediction rate of heart failures is computed and processed using ensemble techniques of

bagging and random forest (RF). The proposed technique has demonstrated reliable predicted accuracy of 90.54% while the Area under the ROC Curve (AUC) was another metric to assess the model's discriminative ability, and our model achieved 94% AUC.

The tenth and last article in this special issue is “An Intelligent Heart Disease Prediction by Machine Learning Using Optimization Algorithm”, this article discusses on another technique of CVD prediction and decision making via optimization algorithms. Optimization is the process of evaluating a number of potential answers to a problem and selecting the best one, in this research Support-Machine-Vector(SVM), K-Nearest-Neighbor(KNN), Naïve-Bayes(NB), Artificial-Neural-Network(ANN), Random-Forest (RF), and Gradient-Descent-Optimization(GDO) are deployed and comparative study is conducted to provide an optimized prediction model of CVD under machine learning algorithms.

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