

fails to consider the b-value regions where both the perfusion parameters have significance. The proposed work explores the possibility of finding minimal and optimal set of b-values using the images corresponding to a set of 21 b-values, using random sampling-based tri-partition method, by varying b-value counts from 10 to 4. Experimental results demonstrate that appropriate selection of b-values from the three partitions generate quality parametric maps.

Keywords: *intravoxel incoherent motion; IVIM; diffusion weighted imaging; b-value optimisation; random subsampling.*

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- **Early-stage leukaemia detection using sophisticated machine learning algorithms** 

by Pawan Whig, Anant Aggarwal, Dhaya Sindhu Battina, Srinivas Venkata, Shama Kouser, Ashima Bhatnagar Bhatia

Abstract: This paper investigates the efficacy of convolutional neural networks (CNNs), a deep learning technique, in early-stage leukaemia detection - a crucial task for improving outcomes. Comparing support vector machines, random forests, artificial neural networks, and CNNs, we assess performance on a dataset of blood samples from leukaemia patients and healthy subjects. Results reveal high accuracy across models, with CNN outperforming other methods in both accuracy and efficiency. CNNs capacity to learn complex patterns from raw data, such as blood samples, sets it apart from traditional algorithms. This study underscores CNNs potential to revolutionise early-stage leukaemia detection, demonstrating its significance in advancing cancer diagnosis.

Keywords: *early-stage leukaemia; machine learning; deep learning; convolutional neural network; CNN; classification; feature extraction; diagnosis.*

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- **Solution for I-RFID-based smart infrastructure health monitorings security and privacy** 

by A. Rajasekar, K. Vidya, G. Adharsh, C. Sivakumaran

Abstract: The idea of a smart city and smart infrastructure is a relatively recent one, and it refers to the management and control of the various infrastructures of a city via the integration of internet and cellular networks. The addition of internet of things functionality to cellular networks results in an increase in both the scalability and dependability of the whole system. The most current innovation in integrated radio frequency identification (I-RFID) sensor technology allows for the data collected by the sensor to be sent over greater distances in a more secure manner using access point and base station. We constructed a network of intelligent nodes, each of which will consist of a radio-frequency identification tag, a reduced function RFID reader and sensors. The proposed method exhibits minimal data delivery losses and a considerable reduction in the amount of time spent on transmission delays.

Keywords: *radio frequency identification; RFID; healthcare monitor; security; smart infrastructure.*

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- **A novel hybrid-based approach for detection of skin lesion using machine learning techniques** 

by Nikhil Singh, Sachin Kumar, Shriram K. Vasudevan

Abstract: As a result of medical sector treatment strategies, the incidence of skin cancer has increased globally over the past few decades. It is essential to develop automatic detection systems to aid doctors in the early diagnosis of skin cancer. The automated identification of skin lesions using dermoscopic pictures remains a difficult and complex endeavour. This proposal describes a unique method for detecting skin cancer using dermoscopy pictures. In order to enhance the performance, we combined the segmentation and classification techniques with the innovative hybrid methodology fuzzy brain storming optimisation (FBSO). In two steps, we performed lesion segmentation, noise reduction, and feature extraction before submitting our dataset to machine learning algorithms for optimisation and analysis. Many characteristics, including accuracy, sensitivity, precision, F1-score, and AUROC, have been used to validate the performance of the suggested model. The experiment demonstrates that random forest's accuracy [91.0% for dataset 1 (ISIC) and 92.5% for dataset 2 (HAM10000)] and AUROC [96.1% for dataset 1 (ISIC) and 97% for dataset 2 (HAM10000)] are superior to those of traditional models.

Keywords: *machine learning; AI; healthcare; skin cancer; medicine; melanoma.*

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- **A machine learning-based methodology for stratifying patients into obstructive sleep apnea risk** 

by Christos Bellos, Konstantinos Stefanou, Georgios Stergios, Dafni Patelou, Thomas Katsantas, Konstantinos P. Exarchos, Apostolis Nikolopoulos, Agni Sioutkou, Georgios Siopis, Konstantinos Kostikas, Chara Tselepi, Athanasios Konstantinidis

Abstract: Obstructive sleep apnoea (OSA) is a common and chronic disorder that leads to increased day-time sleepiness, is associated with accidents, emerging of cardiovascular and metabolic disorders as well as depression. Almost 20% of the population suffers from OSA while a large portion of people are undiagnosed. The objectives of the current work are: 1) the development of a platform to keep a record of home sleep studies and monitor patients; 2) its use for screening tool for the detection of undiagnosed cases in the general population; 3) the design of a machine learning-based methodology for stratifying patients into high and low risk of OSA based on a series of clinical findings and questionnaires. The proposed methodology showed overall accuracy 87.4%, sensitivity 92.1% and specificity 77.1%.

Keywords: *obstructive sleep apnea; machine learning; web-based system; visualisation platform; data analysis.*

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- **Prediction of COVID-19 cases with epidemiological and time series models** 

by Aman Shakya, Anita Sharma, Sanjeeb Prasad Panday, Rom Kant Pandey

Abstract: This work analyses the official data of coronavirus and predicts the evolution of the epidemic in Nepal. The generalised SEIR model has been applied with hybrid of ETS-ARIMA time series model for the time series analysis and predictions of evolution of COVID-19 cases. The prediction has been made for 30 days using the past data of thirteen months. The prediction made by generalised SEIR model has been corrected using two time series models, ETS and ARIMA model. The predicted error by ARIMA model is added to the prediction made by generalised SEIR model. Use of generalised SEIR model along with ETS and ARIMA model improves the time series prediction of coronavirus spread in case of Nepal as compared to the generalised SEIR model. Also, the SEIR-ETS-ARIMA model reduces the estimation error as compared to SEIRD-ARIMA model. Improvement in all quality measures, MAE, MSE, RMSE and MAPE has been observed.

Keywords: *corona; SEIR; ETS; ARIMA; SEIRD-ARIMA.*