CLASSIFICATION OF ARRHYTHMIA BY USING DEEP LEARNING WITH 2-D ECG SPECTRAL IMAGE REPRESENTATION

LITERATURE SURVEY

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S.NO	PAPER	AUTHOR	YEAR	SHORT DESCRIPTION	RESULT	FUTURE WORK AND ANALYSIS
1.	Classification	Amin Ullah,	2020	Proposal of	We achieved	The proposed
	of Arrhythmia	Syed Anwar,		two-dimensional (2-D)	a state-of-the-	model has
	by Using Deep	Muhammad		convolutional neural	art average	attained the
	Learning with	Bilal, Raja		network (CNN) model	classification	highest sensitivity
	2-D ECG	Majid		for the classification of	accuracy	among all the
	Spectral	Mehmood		ECG	of 99.11%,	compared CNN
	Image			signals into eight classes;	which is	algorithms.
	Representation			namely, normal beat,	better than	It is pertinent to
				premature ventricular	those of	note that
				contraction beat, paced	recently	detecting these
				beat,	reported	cardiac
				right bundle branch block	results in	arrhythmias is a
				beat, left bundle branch	classifying	labor intensive
				block beat, atrial	similar types	task, where a
				premature contraction	of	clinical
				beat, ventricular flutter wave	arrhythmias. The	expert needs to
				beat, and ventricular	performance	carefully observe recordings that
				escape beat. The one-	is significant	can go for up to
				dimensional ECG time	in other	hours. With such
				series	indices as	automated
				signals are transformed	well,	methods,
				into 2-D spectrograms	including	the artificially
				through short-time	sensitivity	intelligent system
				Fourier transform. The 2-	and	could augment
				D CNN		the performance

				model consisting of four convolutional layers and four pooling layers is designed for extracting robust features from the input spectrograms.	specificity, which indicates the success of the proposed method.	of clinical experts by detecting these patterns and directing the observer to look more closely at regions of more significance. This would ultimately improve the clinical diagnosis and treatment of some of the major CVDs.
1	Cardiac arrhythmia detection using deep learning	Ali Isina, Selen Ozdalili	2017	An electrocardiogram is an important diagnostic tool for the assessment of cardiac arrhythmias in clinical routine. A deep learning framework previously trained on a general image data set is transferred to carry out automatic ECG arrhythmia diagnostics by classifying patient ECG's into corresponding cardiac conditions. Transferred deep convolutional neural network is used as a feature extractor and the extracted features are fed into a simple back propagation neural network to carry out the final classification.	We observed that ECG Data obtained from MIT-BIH database are pre-processed, QRS complexes are detected and features in R-T intervals are extracted. When all of the tested networks are evaluated it is found that networks based on transferred deep learning feature extraction obtained almost 100% recognition rates and accuracies above 96% in training phase.	It won't be too surprising to see state-of-the-art performances from deep learning applications not only in medical signals and imaging diagnostics but also in other popular sub-fields of biomedical imaging and signals.

3.	Arrhythmia Classification Techniques Using Deep Neural Network	Ali Haider Khan,Muzam mi 1 Hussain ,and Muhammad Kamran Malik	2021	The automated screening of arrhythmia classification using ECG beats is developed for ages. The deep learning based automated arrhythmia classification techniques are developed with high accuracy. The primary concerns that affect the success of the developed arrhythmia detection systems are (i) manual features selection, (ii) techniques used for features extraction, and (iii) algorithm used for classification and the most important is the	The major concerns that affect the success of the developed arrhythmia detection systems are (i) manual features selection, (ii) techniques used for features extraction, and (iii) algorithm used for classification and the most important is the use of imbalanced data for classification	The automated arrhythmia detection required the feature extraction of ECG images that required domain knowledge. Further, the balanced dataset used for classification methods is required to avoid overfitting.
4.	A deep convolutional	U. Rajendra Acharya, Shu	2017	data for classification. The basis of arrhythmia diagnosis is the	This set was artificially	In the future studies, the
	neural network model to classify heartbeats	Lih Oh, Yuki Hagiwara, Jen Hong Tan, Muhammad Adam		identification of normal versus abnormal individual heart beats, and their correct classification into different diagnoses, based on ECG morphology. Heartbeats can be sub-divided into five categories namely non-ectopic, supraventricular ectopic, ventricular ectopic, fusion, and un-	augmented to even out the number of instances the 5 classes of heartbeats and filtered to remove high- frequency noise. The CNN was trained using the augmented	authors would like to extend the proposed model by training a CNN to recognize temporal sequences of ECG heartbeat signals. The occurrence, sequential patterns and persistence of

khown beats. It is challenging and time-consuming to distinguish these heartbeats on LGC as these signals are typically corupted by noise. We developed a 9-layer deep convolutional neural network (CKN) to automatically identify 5 different categories of heartbeats in ECG signals. Our experiment was conducted in original and noise attenuated sets of ECG signals derived from a publicly available database. Example 1					Irmovym hoota It :-	doto and	the five election
consuming to distinguish these hearbeats on ECG as these signals are typically corrupted by noise. We developed a 9-layer deep convolutional neural network (CNN) to automatically identity 5 different categories of heartbeats in ECG signals. Our experiment was conducted in original and noise attenuated sets of ECG signals derived from a publicly available database. 5. Classification of Arrhythmia in Heartbeat Detection of Arrhythmia in Heartbeat Sin Heartbeat Siddique . Classification of Arrhythmia in Heartbeat Sin Clease at the state of Arrhythmia in Heartbeat Siddique . Aims to apply deep learning techniques on the publicly available character of the CNN reduced to the publicly available character of the CNN reduced to the publicly available character of the CNN reduced to a sport of the CNN model can serve as a tool for screening of ECG to quickly with the publicly available character of the CNN reduced to a sport of the CNN model can serve as a tool for screening of ECG to quickly different types and frequency of arrhythmic heartbeats. 5. Classification of Arrhythmia in Heartbeat Siddique . Classification of Arrhythmia in Heartbeat Siddique . Detection Rana Arms distanced and solve the special service and noise free ECGs. ECG to quickly with the proposed CNN model at a with added different types and frequency of arrhythmic heartbeats. This study should be conducted in bioxing deep solve the considered in this diagnostic on fleartbeats in original and noise free ECGs, sespectively. When the CNN was categories of serven, vellow, and red, with highly the categories of serven, vellow, and red, with highly and lataset, he accuracy of the CNN model attaset, the accuracy of the CNN model activity, respectively. The authors plan to discuss the performance of the CNN model activity, respectively. The authors plan to discuss the performance of the CNN model activity, respectively. The authors plan to discuss the performance of the CNN model activity and the publicly and the publicly and the publicly and the pub					known beats. It is	data and	the five classes
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Detection Rana dataset to classify accurate like cloud and		in Heartbeat	Siddique,		the publicly available	produce very	binding domains
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Using Deep	Zulqarnain,	combines three different	with a 99.12	is also vital to
Learning.	Mohammad	types of information: RR	percent	develop wearable
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		successful in the analysis	the CNN +	technologies.
		of computerized ECG but	LSTM model,	
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			percent	
			accuracy for	
			CNN +	
			LSTM +	
			Attention	
			Model.	