J. Electrical Systems 20-7s (2024): 3105-3117

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Digital Media Art Creation and Expression Modelling Based on Virtual Reality Technology

Journal of Electrical Systems

Abstract: **-** Art enthusiasts may now find, learn about, and enjoy more works of many creative genres thanks to the advancement of Internet digital media technology. Different artistic painting styles inspire artists to come up with fresh ideas, which leads to a variety of artistic creation styles combined with various artistic creation approaches. In this manuscript, Dual-path Multi-scale Attention Guided network based on Media Creation using Virtual Reality technology (MCVR- DPMSAGN- EHOA) is proposed. The input data are collected from MNIST dataset. Then the data are pre-processing using Fast Resampled Iterative Filtering (FRIF) to remove noise data. The pre-processed data are given into Quadratic Phase Wavelet Packet Transform (QPWPT) for extracting the features such as Human Gesture and Posture image to enhance the image pixel sorting of the filter window. The features are given into DPMSAGN for classification of textures, lighting, object details, and visual styles. In general, the DPMSAGN does no express adapting optimization strategies to determine optimal parameters to ensure accurate classification. Therefore, the Elk Herd Optimization Algorithm (EHOA) is introduced for optimizing DPMSAGN. The MCVR- DPMSAGN- EHOA proposed is implemented in Python working platform. Performance parameters including precision, accuracy, F-score, computing time, specificity, and sensitivity are measured and evaluated in the proposed technique. The proposed method attains 25% accuracy, 18.77sec for lower Computation time, 21.87% for higher F1 score and 19% for higher specificity than the existing methods like enhanced Media Creation using Virtual Reality through Artificial Neural Network (MCVR-ANN), Media Creation using Virtual Reality through Circle Search Algorithm (MCVR-CSA) and Media Creation using Virtual Reality through Skill Optimization Algorithm (MCVR-SOA) respectively.

Keywords: Fast Resampled Iterative Filtering, Dual-Path Multi-Scale Attention Guided Network, MNIST Dataset, Elk Herd Optimization Algorithm, Quadratic Phase Wavelet Packet Transform.

I. INTRODUCTION

The field of digital media art is new. A single duplicate or digital file is usually not worth as much as an original work of art, incredibly efficient and easy to begin using, with many creative possibilities and room for further exploration [1]. Art is interpretive; it expresses what the creators usually think and aims to evoke feelings, thoughts, and intellect in the viewer. Excellent art never ceases to astound [2]. Appealing imagery may support a visual identity and entice consumers to make a purchase when used in advertising. These have made electronic art more widely available to artists and other creative's who want to investigate the potential of the medium [3]. It is the primary training programme for technical talent with a strong background in science and art, and it uses design tools and computer-related software to develop and produce artwork [4]. When paired with digital media art, virtual reality technology may now be used as an interactive medium, a vehicle for artistic expression, and a means of communication [5]. Using virtual reality technology, digital media art allows users to finish this interactive experience [6].This combination allows the user to better comprehend the information that artists wish to express via their work and reduces the gap among the experience and the artwork. The artworks we encounter in digital media frequently have something to do with dynamic visuals [7]. To enable genuine participation in the interaction process, the sensing device records data signals during interaction, including the experience's behaviour, gestures, head movement, and even ocular rotation. It then reacts promptly to these signals [8]. Data may be gathered using sensor systems that concentrate on different measurement techniques, such as hybrid, optical, inertial, auditory, hydraulic, or electromagnetic sensors [9]. Multiple categorization methods are employed by wearable sensor-based systems to differentiate between autistic movements. The proposed system classifies, characterises, and keeps track of specific gestures. They simplify language, highlight our point of view, manage the conversation's flow, and maintain the viewer's focus on the subject [10].

Digital media artists have pushed the boundaries of expression using tools like computers and software. However, these tools often confine creation to a two-dimensional space or require manipulating physical

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materials. Virtual Reality (VR) technology disrupts this paradigm by offering a fully immersive, three-dimensional canvas. Artists can now sculpt, paint, and compose within virtual worlds, interacting with their creations in real-time and from any perspective. This newfound freedom promises to revolutionize digital media art, fostering entirely new forms of expression and audience engagement.

A. Contribution Statement

This work's primary contribution is,

- The study utilizes data from the MNIST database, which is a benchmark dataset frequently employed to educate different image processing system.
- The manuscript employs preprocessing techniques such as FRIF to remove noise data from the input images. Feature selection is performed using the Quadratic Phase Wavelet Packet Transform (QPWPT).
- The classification task is carried out using DPMSAGN
- The manuscript introduces the Elk Herd Optimization Algorithm (EHOA) for optimizing the DPMSAGN model.

The remainder of the paper is organised as: part 2 examines a survey of the literature; part 3 explains the proposed approach; the results and discussion are presented in part 4; and Part 5 conclusion.

II. LITERATURE SURVEY

Several research on the use of virtual reality technology in the development of digital media art have already been published in literature, a certain recent works were divulged here,

Rivaset al. [11] has presented an array of self-learning techniques, including tree-based models and several types of ANNs, to a publicly available dataset. After these methodologies were applied to the dataset, it was discovered that a key factor impacting student success was the frequency with which the contents posted on VLE platforms were accessible to students.

Qais, et al. [12] have presented the geometrical characteristics of circles served as the inspiration for the ground-breaking metaheuristic optimization method known as the CSA. The most famous geometric object was the circle, with its diameter, centre, perimeter, and tangent lines. The orthogonal function of the angle opposite the orthogonal radius was the ratio of the radius to the tangent line segment. The CSA's exploration and exploitation plans relied heavily on this point of view.

Givi et al. [13] have presented The Skill Optimization technique (SOA) was a novel metaheuristic approach that was proposed to handle optimization problems. The design of SOA was primarily inspired by the advancement and augmentation of human capacities. The two phases of (i) exploration, which includes learning from experts, and (ii) exploitation, which requires honing abilities by practice and independent effort, were utilized to statistically describe the various stages of SOA. A collection of 23-typical benchmark functions of various unimodal, high-dimensional multimodal, and fixed-dimensional multimodal kinds were used to examine the effectiveness of SOA in optimisation applications.

Niu et al. [14] have presented All disciplines were being impacted by technology innovation, which also makes works more accessible. In the arts and crafts, they have also made progress. Digital technology may breathe fresh vitality into age-old arts and crafts. By determining the frequency of the picture and keeping the information in a database, three-dimensional digital technology combined with artificial intelligence transforms art images into 3-D image art. The picture data was sent over wireless sensor networks to complete this operation.

Wang et al. [15] have presented this computer-aided interaction study of visual communication technology and art in the new media scene covered the main techniques of visual expression, auditory expression, and audio-visual integration in the creation of digital media art, as well as the role of digital technology in promoting fields related to digital media art practice. Lastly, he goes into further detail on the potential uses of digital technology going forward as well as the trajectory of its development for the field of digital media art, with a focus on the latter.

III. PROPOSED METHODOLOGY

In this section describes the proposed methodology for MCVR-DPMSAGN-EHOA. This study leverages the data from MNIST database and employs pre-processing technique which is Fast Resampled Iterative Filtering (FRIF). Its goal is to improve the filter window's picture pixel sorting. Feature selection is performed utilizing

Quadratic Phase Wavelet Packet Transform (QPWPT) followed by classification using a DPMSAGN. The Elk Herd Optimization Algorithm (EHOA) is introduced for optimizing DPMSAGN for improving the film playing effect. Figure 1 displays Block diagram of proposed Methodology.

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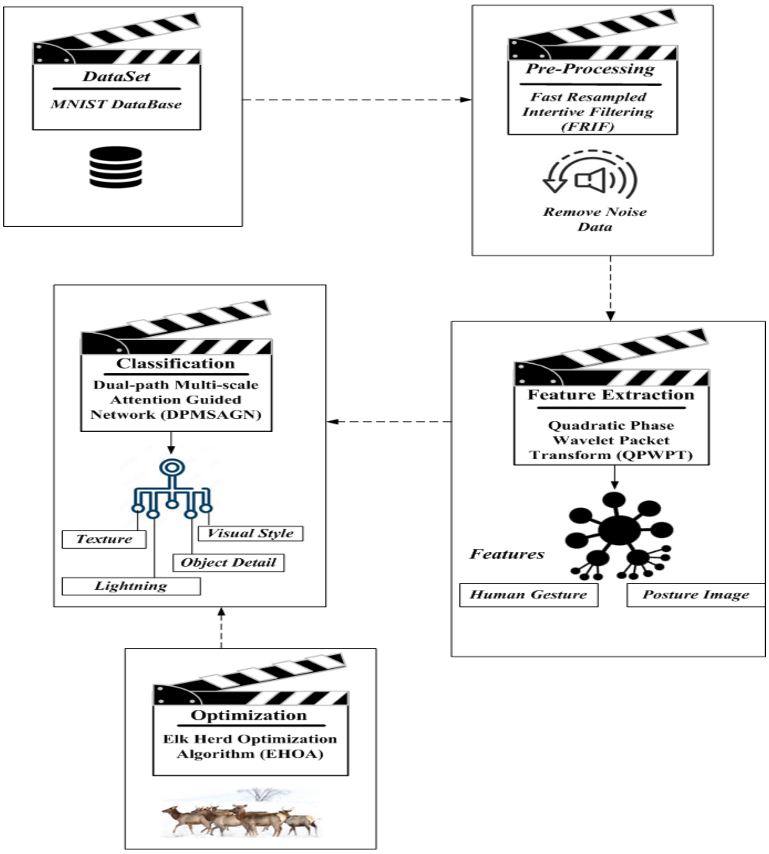

Fig 1: Block diagram of proposed Methodology

A. Data acquisition

There are 10,000 testing photos and 60,000 training images in the MNIST [16] database. NIST's testing dataset contained the remaining half of the test set and the remaining half of the training set, whereas the training dataset contained the remaining half of the test set and the remaining half of the training set. A list of some of the methods tried on the database is maintained by the original developers. In the first publication, they get an error rate of 0.8% by using a support-vector machine.

B. Pre-processing using Fast Resampled Iterative Filtering

In this section, image pre-processing using Fast Resampled Iterative Filtering (FRIF) [17] is discussed. The purpose of the proposed FRIF is to improve the filter window's picture pixel sorting. Fast Resampled Iterative Filtering is intended to be a quick and efficient way for processing images, resulting in quicker processing times than previous filtering methods. This filter is intended to maintain the borders of objects in the picture, assuring that critical details are not lost during the pre-processing stage. The FRIF increases the brightness of the images, making it more visually attractive and simpler to analyse. It operates as continuously performing a set of filtering operations to the picture and reproducing it at each stage in order to reduce the amount of computing and enhance performance. The Fast Resampled function is given in equation (1),

$$h_{n+1}(H(y)) = h_n(H(y)) - \int_S h_n(H(y)) l(y-z) dz \tag{1}$$

Where, h_{n+1} represents pixel in image, $H(y)$ represents an integer, h_n represents variable for removing the noise, l represents filter weight, z represents inverse of weight matrix and dz represents the differentiation matrix. FRIF is especially beneficial when analysing big or high-resolution images, as typical approaches to filtering can be computationally costly. The recurring nature of the method allows for fine-tuning of filtering parameters to produce the best results. The quadrature rule is given in equation (2),

$$i_{n+1}(y_j) \approx i_n(y_j) - \frac{N}{n}\sum i_n(y_k)\, l(y_j - y_k) \quad (2)$$

Where, $i_{n+1}(y_j)$ represents the quadrature rule, n represents the parameter, N represents the maximal window value, i_n represents the feasible parameter, y_k represents the low pass filter, y_j represents the covariance matrix, and integrated value y_k represents size of images. The Hermitian circular matrix is given in equation (3),

$$l_1 = \frac{N}{n}\left[l(0), l\left(\frac{N}{n}\right), ..., l\left(t\frac{N}{n}\right)\right] \quad (3)$$

Where, l_1 represents the Hermitian matrix, $l(0)$ represents symmetrical shape of images, and t represents the time-bandwidth. It makes it ideal for applications that work in real time that demand rapid picture processing. To determine an objective assessment of i_{n+1}, use balanced least squares estimation with the weighting matrix equal to the inverse of $f(i_n)$ is given in equation (4),

$$i_{n+1} = jf(1 - f(l_1)) \bullet f(i_n) \quad (4)$$

Where, j represents inverse matrix, f represents the lighting, $\bullet$ represents the product factor. In this case, the minimum time-bandwidth combination longer represents the area of the window. The deviation to Fast Resampled Iterative Filtering curve may be removed, and the shortened window can be estimated to have the shortest time-bandwidth product if the discarded points are sufficiently tiny. The mathematical formula for the edge shaping is given in equation (5),

$$f(i_{n+1}) = (1 - f(l_1)) \circ f(i_n) \quad (5)$$

Where, $f(i_{n+1})$ represents the edge of the images, and $\circ$ represents the product matrix of fast resampled iterative. Thus reduce of noise, lighting effects and sharpen the edges of images from the image has been done by using the Fast Resampled Iterative Filtering method. Then, the pre-processed image is fed into the feature extractionphase.

C. Feature Extraction using QPWPT

This step, Feature Extraction using QPWPT [18] is discussed.QPWPT is used for extracting features such as Images of human posture and gestures. The quadratic phase wavelet packet transform represents the image more efficiently than typical wavelet transformations. By doing this, VR controlling hardware can receive signals and react to them faster and more precisely, giving viewers a customised interactive experience that offers strong control and deep involvement. Quadratic Phase algorithm to estimate group delay is given in equation (6),

$$X_g^{\eta}(\vartheta, \alpha, \varphi) = \int_S g(u) L_{\eta}(u, \vartheta) \quad (6)$$

Where, X_n^{η} represents the Quadratic Phase algorithm, ϑ represents frequency varying linear chirp signal, α represents constant variables, φ represents the extracting relevant images, g represents time reassignment operator, u represents sequence of the scalar product, and L_{η} represents the time axis of the ridge curve. It divides the image pixel for feature extraction. Reassignment operator of the image is given in equation (7),

$$X_g^{\eta}(\vartheta, \alpha, \varphi) = \int_S f^{\,j\cot\gamma(u^2 - \alpha^2)} du \quad (7)$$

Where, f represents the reassignment operator, j represents the constant value, γ represents the impulsive value, and du represents the differentiation curve of the time axis. It integrates the ideas of wavelet transform with multi-resolution analysis. Time axis of the ridge curves is given in equation (8),

$$g_{\vartheta,\eta} = \sqrt{\frac{c}{2\prod j}} f^{\,j\left(bu^2+cu\vartheta+d\vartheta^2\right)} g(u) \tag{8}$$

Where, $g_{\vartheta,\eta}$ represents the time axis curve, c represents potential density, bu represents thetime varying of reconstruction of images, and $cu\vartheta$ represents the combination of potential density of the time ridge point. The QPWPT is given in equation (9),

$$R_\eta\left[g_{\vartheta,\eta}\right] = \int L(x,u)\, g_{\vartheta,\eta}(u)\, du \tag{9}$$

Where, $R\eta$ represents wavelet transform function, L represents first order features, and x represents the total available features. To extract the features from the input picture, it is synthesised in this transform. The features such as human gestures and posture imageswere extracted.

Human Gestures:VR systems can track your hand and body movements in real-time. By incorporating "Human Gestures" data, the software can translate your hand movements into sculpting tools.To compute the human gesture, add all hand and body movements are divide by the number of pixels which is given in equation (10),

$$n = \sum_{u=0}^{M-1}\left(\frac{J(u)}{O}\right) \tag{10}$$

Where, n represents the average density, J represents the possible movements, O indicates the count of pixel, and M indicates the value of possible intensity level.

Posture Images: Captured "Posture Images" can act as reference points for animating characters. Imagine posing yourself in a VR environment to create keyframes for animation, allowing for more realistic and expressive character movements.Posture images may be calculated by utilizing the same movement value in a single region which is given in equation (11),

$$V = \sum_{M=0}^{M-1}\left(\frac{I(0)}{O}\right)^2 \tag{11}$$

Where, I represents the probability histogram, O indicates the count of pixels in the key frame, V represents measure of the posture image, and M represents the value of possible intensity. The features such as human gestures and posture images were extracted by using Quadratic Phase Wavelet Packet Transform.Then the selected features are transferred in to classification phase.

D. Classification using DPMSAGN

In this section, the Classification using DPMSAGN [19] is discussed. In digital media art creation and modelling using virtual reality (VR), the classification of the DPMSAGN plays a crucial role in enhancing the immersive experience and realism of virtual environments. DMAGN used to classify textures, lighting, object details, and visual stylesto enhance the quality, efficiency, and interactivity of digital media art creation and modelling within virtual reality environments. Then the output of convolution operation is calculated in equation (12).

$$CJT_{out} = E_{in} + \sum_{c=1,2,3} CJTconv^c(E_{in}) \tag{12}$$

Where, CJT_{out} denotes the output of the residual multi-scale strategy module, E_{in} is the represents the dilation rate. In image classification, the convolution operation generates a feature map, which is a multi-channel representation of the input image. Then the image is calculated as normal and mild in equation (13),

$$SIW_{out} = bs(CJT_{out}) \times \lambda \frac{CJT_{out} - \vartheta_\alpha}{\sqrt{\varphi_\alpha^2 + \xi}} + \alpha \tag{13}$$

Where, SIW_{out} denotes the significant feature weight information in the classified image, bs is the artistic creation classification, λ is then multiplied to enforce dependencies of image, ϑ_α is the classified input image, φ_α^2 is the prediction probability, ξ is the set of target surface points in image, α is the insignificant weights. This feature map encapsulates essential patterns and features extracted by the convolutional layer. Subsequently, this feature map undergoes further processing through successive layers within the neural network. Then convolutional layeris calculated in equation (14).

$$E_{out} = sig((\psi_g)(SIW_{out})) * sig[(\frac{\gamma_a}{\sum_{i=0} \lambda_b})(\frac{CJT_{out} - \vartheta_\alpha}{\sqrt{\varphi_\alpha^2 + \xi}} + \alpha)] \quad (14)$$

Where, E_{out} denotes the output feature of network, ψ_g is the weight of each image, γ_a represents the depth wise convolution, λ_b represents the normalisation layer. These subsequent layers contribute to the holistic task of image classification, refining and combining the extracted features to make more informed predictions about the content of the input image. Then image classify as severe is calculated in equation (15).

$$W = \sum_a^S R^2 (h * a) \log(\sum_a^S q^2 (h * a) \quad (15)$$

Where, W is the size of images, $\sum_a^S$ is the segmented image value, R^2 represents the learnable parameter, $h*a$ is the multiple calculation of input and output images, $q^2(h*a)$ is the quality calculation of input and output images. Then the images classify as unknown is calculated in equation (16),

$$E_d = -\sum_{\tau}^{h} (w + s) \quad (16)$$

Where, E_d is the standard convolution, $\sum_{\tau}^{h}$ is the classified image calculation, $w+s$ represents the input and output image. Finally, the DPMSAGN network for the media artcreation has been done. Because of its convenience, the artificial intelligence-based optimization strategy is taken into account in the DPMSAGNclassifier. In this work, EHOA is employed to optimize the DPMSAGN optimum parameters E_d & R^2. Here, EHOA is employed for tuning the bias and weight parameters of DPMSAGN.

E. Optimizing using Elk Herd Optimization Algorithm

The weight parameter E_d & R^2 of DPMSAGN is optimized using the EHOA [20] is discussed. First, the number of bulls in each herd divides the population of elk into several families. A bull leads each elk family throughout the rutting season, whose power dictates how many cows or harems the family possesses. Bulls compete in domination competitions as a way to show off their power. Then, each family produces calves with the same number of relatives during the calving season. In the end, the entire family is reunited during the selected season, and the best individuals are invited to return for the rutting season. To make sure the resulting elk herd can handle the difficulties in the surrounding environment, this process is repeated. Here, step by step procedure for obtaining appropriate DPMSAGN values using EHOA is described here. To creates a uniformly distributed population for optimizing the ideal DPMSAGN parameters. The entire step method is then presented in below,

1) Stepwise Procedure OF EHOA

Here, a stepwise process is established to determine the optimal DPMSAGN value based on EHOA. To optimise the DPMSAGN parameter, EHOA first distributes the population evenly. The EHOA method is used to promote the best solution; a corresponding flowchart is shown in Figure 2.

***Step 1:* Initialization**

Initial population of EHOA is, initially generated by randomness. Then the initialization is derived in equation (17),

$$B = \begin{bmatrix} b_1^1 & b_2^1 & \cdots & b_N^1 \\ b_1^2 & b_2^2 & \cdots & b_N^2 \\ \vdots & \vdots & \cdots & \vdots \\ b_1^{ehs} & b_2^{ehs} & \cdots & b_N^{ehs} \end{bmatrix} \quad (17)$$

Where, B are denoted as bulls; N is the total amount of characteristics or solution dimensionality in each Elk solution and b establishes the elk herd's initial bull rate.

***Step 2*: Random generation**

The input parameters generated after setup at arbitrary. The selection of ideal fitness values was contingent upon a clear hyper parameter scenario.

***Step 3:* Fitness function**

Initialised evaluations are used to generate a random solution. The weight parameter $E_d \,\&\, R^2$ is optimised by evaluating the fitness function using the parameter optimisation value. This may be found in equation (18) below.

$$Fitness\ Function = optimizing\ \ [E_d\ \ \&\, R^2] \tag{18}$$

***Step4:* Rutting season**

During the rutting season, the bull rate (Br) is used to generate the families using the EHOA model. First, the total count of families is determined. The bulls in group B are next selected from EH according to their fitness values, and these are the elks with the highest fitness values at the top of EH. This is meant to mimic the battling dominance contests, in which the strongest elks will be given greater responsibility over harems using equation (19).

$$S_j = \frac{E\left(a^j\right)}{\sum_{l=1}^{Y} e\left(a^l\right)} \tag{19}$$

Where, S_j indicates the allocating harems to their bulls and their roulette-wheel selection; Y stands for the bulls in the group that are battling with one another to establish families;; $E\left(a^j\right)$denotes the absolute fitness value; a^j denotes the selection probability of EHOA; a establishes the elk herd's initial bull rate and $e\left(a^l\right)$ represents the continuous domain in bulls.

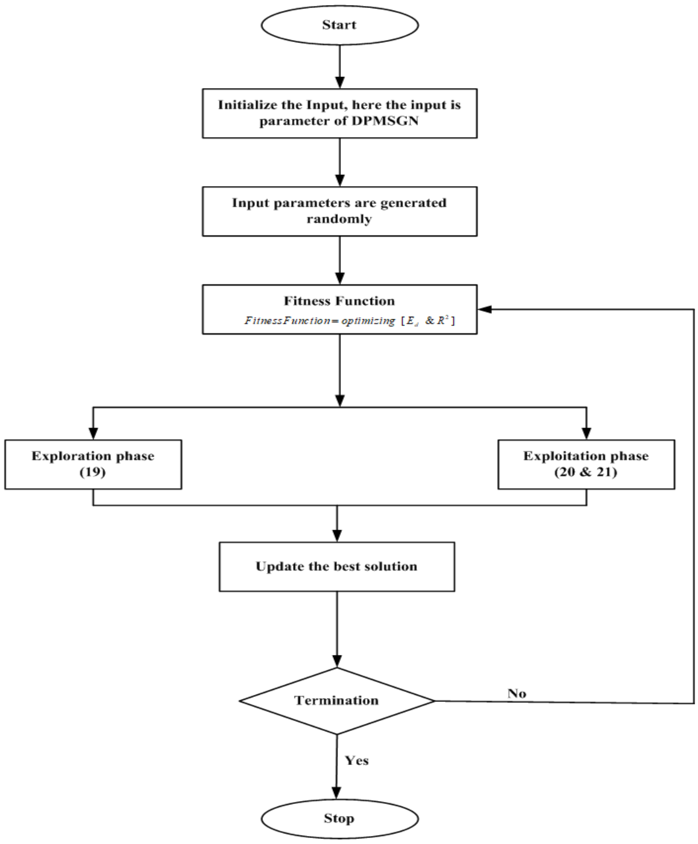

Fig 2: Flow chart of EHOA for Optimizing DPMSGN

***Step5:* Selection season**

Every family's bulls, calves, and harems have united. Technically speaking, one matrix EH temp is created by combining the EHs that held the calves' solutions with the bulls' and harem's solutions. The elks in the EH temperature will be ranked in ascending order according to their fitness ratings. In the end, the top elks of the

EHS numbers in EH temperature will be retained for the following generation, which will take the position of the elks in EH using equation (20).

$$a_i^j(T+1) = a_i^j(T) + \alpha.\left(a_i^l(T) - a_i^j(T)c_l^{(k)}\right) \quad (20)$$

Where, $a_i^j(T+1)$ is the calf's j^{th} attribute i at iteration $T+1$ that will be kept in EHOA; α is an arbitrary number falling between 0 and 1; $a_i^l(T)$ indicates the characteristics inherited from the herd's randomly chosen elk; $c_l^{(k)}$ indicates the forward parameter of DPMSAGN network with one hidden layer and $a_i^j(T)$ represents the components involved in the new calf of EHOA. The process of getting pregnant and giving birth to new calves begins when cows and bulls mate; cows only mate with their bulls. Typically, these regions are covered in trees and undergrowth to provide cover from predators. The breeding season will thereafter come to an end when cows breed calves that may turn out to be bulls or cows using equation (21).

$$a_i^i(T+1) = a_i^j(T) + E_d\left(a_i^{gj}(T) - a_i^j(T)\right) + R^2\left(a_i^R(T) - a_i^T(T)\right) \quad (21)$$

Where, $a_i^j(T+1)$ is the calf's j^{th} attribute i at iteration $T+1$ that will be kept in EHOA; $a_i^j(T)$ represents the components involved in the new calf of EHOA; E_d denotes the standard convolution; $a_i^{g_j}(T)$ indicates EHOA reaching a reasonable level within the given range; $a_i^R(T)$ indicates the process of cows and bulls mating $a_i^T(T)$ identify the bugle sound is used to locate the bull in the large herd.

Step 6: **Termination**

The generator's weight parameter value E_d & R^2 Dual-path Multi-scale Attention Guided Network is optimized by utilizing EHOA; and Until it reaches its halting criterion $B = B + 1$, it will perform step 3 again.. Then, the DPMSAGN has accurately predicted and classified with MNIST Dataset with higher tracking accuracy and low computational time**.**

IV. RESULT & DISCUSSION

The result of proposed Media Creation on Virtual Reality technology using MCVR- DPMSAGN- EHOA is discussed. The proposed technique performance is assessed using the MATLAB platform and contrasted with other techniques currently in use. The obtained results of the proposed with MCVR- DPMSAGN- EHOA technique are evaluated with existing techniques like MCVR -ANN, MCVR -CNN and MCVR -SOA methods.

- TP: True positive occurs when classification method correctly forecasts positive class as positive.
- TN: True negative occurs when classification method correctly forecasts negative class as negative.
- FP: False positive occurs when classification method incorrectly forecastsnegative class as positive
- FN : False negative occurs when classification method incorrectly forecastspositive class as negative.

A. Performance Measures

To evaluate the performance, the performance metrics as, precision, Error rate, accuracy, recall, ROC, specificity, F1-score, and sensitivity are determined.

1) Accuracy

The ratio of a precise prediction to the overall count of proceedings in the dataset is called accuracy. Accuracy is measured by the following equation (22)

$$Accuracy = \frac{(T_P + T_N)}{(T_P + F_P + T_N + F_N)} \quad (22)$$

2) Error Rate

The proportion of misclassification is assessed using error. Error rate is calculated using equation (23)

$$Error = 100 - accuracy \quad (23)$$

3) F1-Score

It evaluates the precision of the model on the dataset. It is determined by equation (24)

$$F1Score = \frac{T_P}{\left(T_P + \frac{1}{2}[F_P + F_N]\right)} \quad (24)$$

4) Precision

Precision is the positive predict value. Precision is compute by following equation (25)

$$\Pr ecison = \frac{T_P}{T_P + F_P} \quad (25)$$

5) Recall

The ratio of actual positive samples (including those that were correctly and wrongly forecasted as positive) to true positive predictions is known as recall. The formula of recall is shown in equation (26)

$$\text{Re}call = \frac{T_P}{T_P + F_N} \quad (26)$$

6) ROC

ROC provides an overall performance indicator for the whole probable Classification. ROC is expressed in equation (27)

$$ROC = 0.5 \times \left(\frac{T_p}{T_P + F_N} + \frac{T_N}{T_N + F_P}\right) \quad (27)$$

7) Sensitivity

Sensitivity is calculated using the following equation (28)

$$Sensitivity = \frac{T_P}{T_P + F_N} \quad (28)$$

8) Specificity

A metric called specificity is used to assess the percentage of real negatives that are accurately detected. Specificity is calculated using the Following equation (29)

$$Specificity = \frac{T_N}{T_N + F_P} \quad (29)$$

4.2. Performance Analyses

The simulation result of the proposed MCVR-DPMSAGN-EHOA method shows in fig 3-9. Then the proposed MCVR-DPMSAGN-EHOA method is linked with existing system like MCVR-ANN, MCVR-CNN and MCVR-SOA correspondingly. An evaluation experiment was conducted, and the findings demonstrated the efficacy of the proposed DPMSAGN classifier with optimization EHOA method.

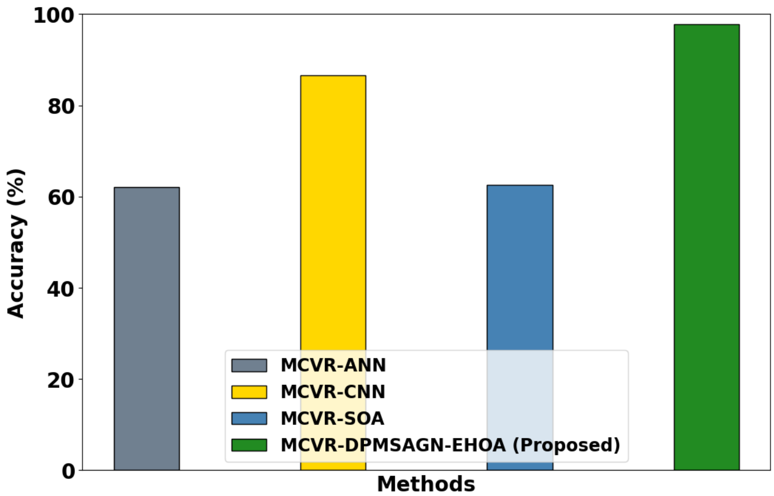

Fig 3: Performance Analysis of Accuracy

The performance analysis of accuracy for digital media art creation using virtual reality technology is displayed in figure 3. Here, the proposed MCVR-DPMSAGN-EHOA attains the higher accuracy of 22.3%, 25.5% and 27.7% % whereas the other existing methods MCVR-ANN, MCVR-CNN and MCVR-SOA attains the accuracy of 62%, 85% and 62% respectively.

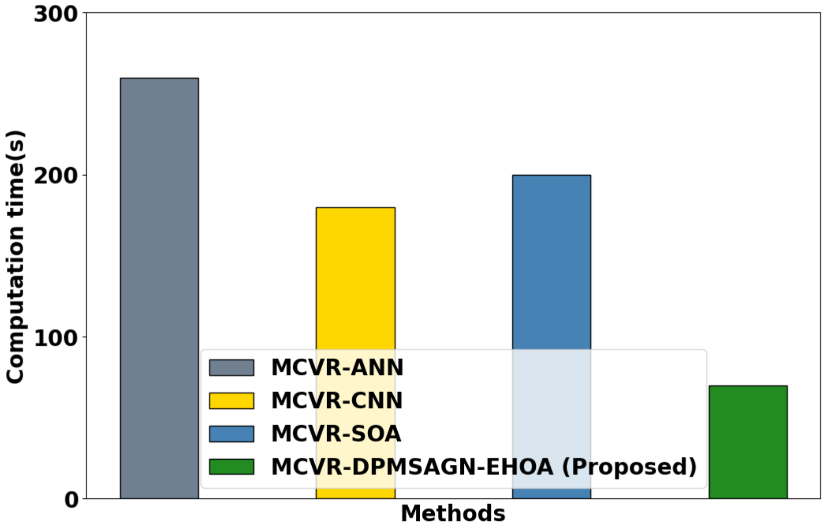

Fig 4: Comparative analyses of computation time

The comparative analyses of computation time for digital media art creation using virtual reality technology is displayed in figure 4. Here, the proposed MCVR-DPMSAGN-EHOA attains the lower computation time of 50sec whereas the other existing methods MCVR-ANN, MCVR-CNN and MCVR-SOA attains the computation time of 30sec, 25sec and 20sec respectively.

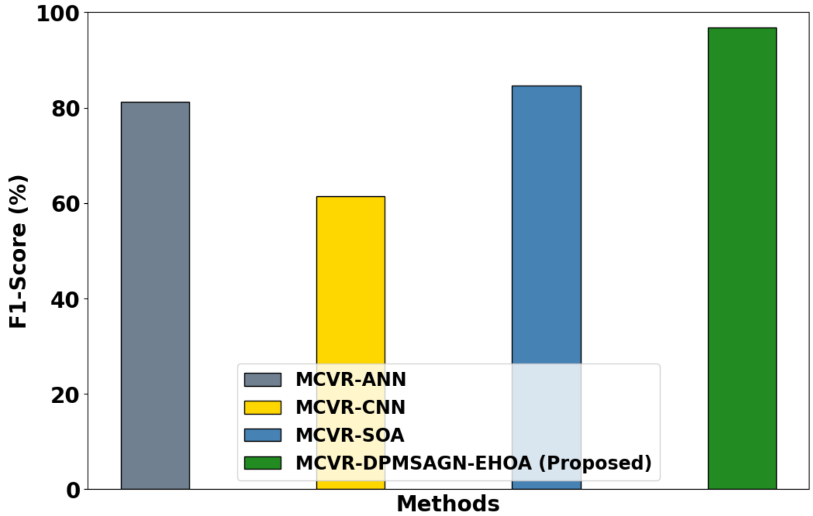

Fig 5: Analyses of F1-score with proposed and existing methods

The analyses of F1-score with proposed and existing methods for digital media art creation using virtual reality technology are displayed in figure 5. Here, the proposed MCVR-DPMSAGN-EHOA attains the higher F1-score of 38% whereas the other existing methods MCVR-ANN, MCVR-CNN and MCVR-SOA attains the F1-score of 45%, 52% and 65% respectively.

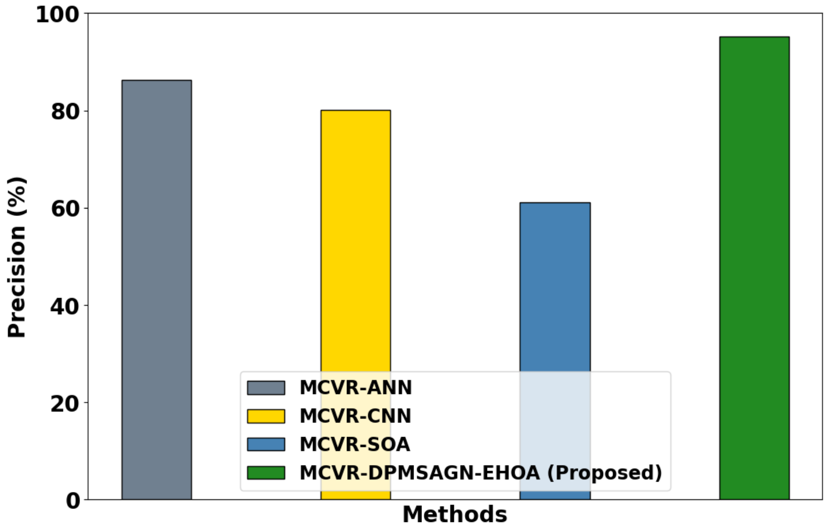

Fig 6: Performance analyses of precision with proposed and existing methods

The performance analyses of precision with proposed and existing methods for digital media art creation using virtual reality technology is displayed in figure 6. Here, the proposed MCVR-DPMSAGN-EHOA attains the higher precision of 26% whereas the other existing methods MCVR-ANN, MCVR-CNN and MCVR-SOA attains the precision of 35%, 30% and 40% respectively.

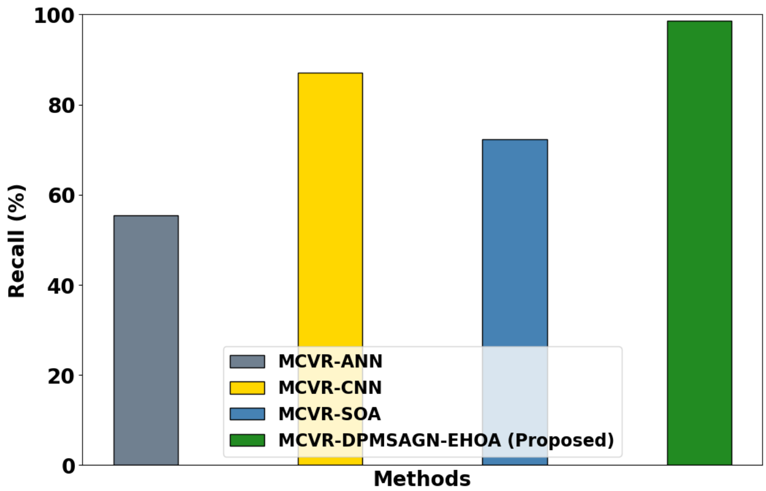

Fig 7: Recall analysis using proposed and existing techniques

The recall analysis using proposed and existing techniques for digital media art creation using virtual reality technology is displayed in figure 7. Here, the proposed MCVR-DPMSAGN-EHOA attains the higher recall of 25% whereas the other existing methods MCVR-ANN, MCVR-CNN and MCVR-SOA attains the recall of 38%, 45% and 50% respectively.

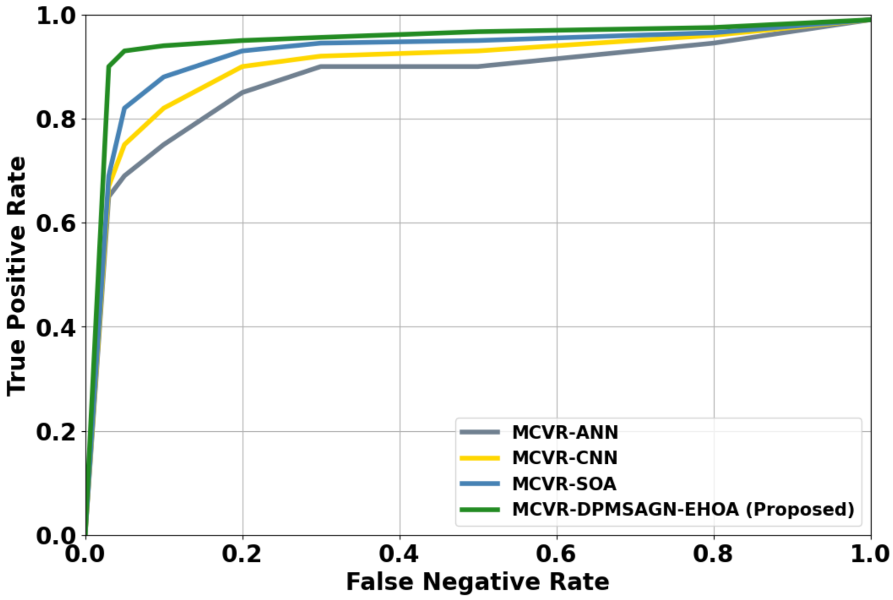

Fig 8: Performance Analysis of ROC

The performance analysis of ROC for digital media art creation using virtual reality technology is shown in figure 8. Each point on the curve represents a different threshold value, and the curve is created by connecting these points. The closer the curve is to the graph's top -left corner, the better the prediction system performs. The higher ROC indicates better performance in distinguishing between positive and negative instances. The proposed MCVR-DPMSAGN-EHOA method of ROC provides the higher analysis in media art creation compared with other existing methods. The existing methods like MCVR-ANN, MCVR-CNN and MCVR-SOA of the ROC become lower compared with the proposed MCVR-DPMSAGN-EHOA technique.

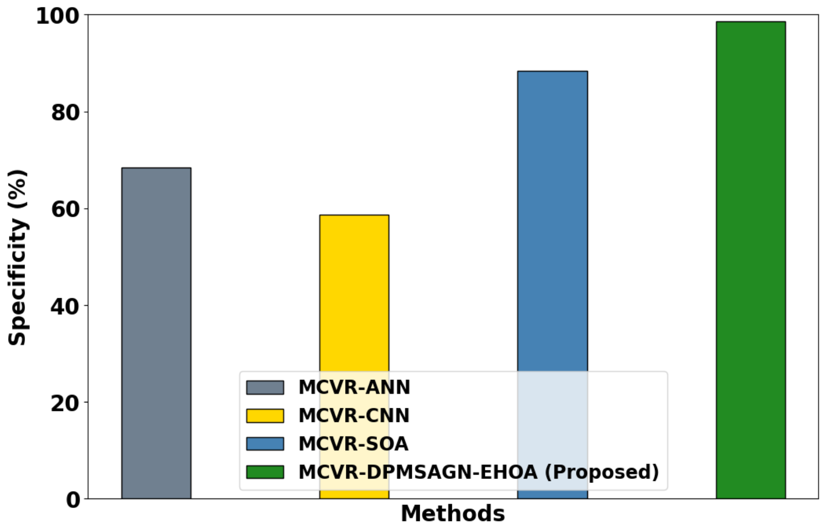

Fig 9: Performance analysis of specificity

The performance analysis of specificity for digital media art creation using virtual reality technology is displayed in figure 9. Here, the proposed MCVR-DPMSAGN-EHOA attains the higher specificity of 18% whereas the other existing methods MCVR-ANN, MCVR-CNN and MCVR-SOA attains the specificity of 28%, 38% and 25% respectively.

4.3. Discussion

The “Enhanced MCVR Classification Utilizing Dual-path Multi-scale Attention Guided Network” addresses the critical need for accurate and efficient classification of DVR utilizing advanced deep learning techniques. The enhanced method's performance is assessed utilizing standard metrics likes accuracy, precision, recall. Comparisons with baseline models or previous approaches may also be included to demonstrate the improvement achieved through optimization. The proposed method MCVR-DPMSAGN-EHOA is comparing with existing methods like MCVR-ANN, MCVR-CNN and MCVR-SOA with higher accuracy.

5. CONCLUSION

In this manuscript, Dual-path Multi-scale Attention Guided network based on Media Creation using Virtual Reality technology is successfully implemented. Through the optimization of DPMSAGN and utilization of multi scale generative information helps in the significant improvements of classification performance have been achieved. The performance of the MCVR- DPMSAGN- EHOA method contains precision, accuracy, F-score, computational time, recall, specificity and sensitivity. The proposed MCVR- DPMSAGN- EHOA method attains 25%higher accuracy, 18.77sec for lower Computation time, 21.87% for higher F1 score and 19% for higher specificity. The proposed MCVR- DPMSAGN- EHOA method's performance is compared with that of existing approaches, including MCVR -ANN, MCVR -CSA, and MCVR -SOA.

Acknowledgement

（This work was supported by the Department of Social Sciences of the Ministry of Education of China, and research on the current situation and innovative development of applied animation talents in colleges and universities in the Guangdong-Hong Kong-Macao Greater Bay Area. (Project No. 21YJC760030)

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