Review of Image Analysis Based on Aura Images

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Abstract-The human body consists of a lot of mysteries. The research in this direction helps to bring out various interesting issues and characteristics that can be further used towards the extension of research work in this direction on individual based on human bio-field. The research in this direction promises to understand about the individual state of mind, health conditions and other related factors. Several advancements in this direction have been coined with very intuition to understand and interpret the human bio-field to underline the human life more effectively. This article presents some of the interesting works that have been carried out by eminent researcher in this state-of -art to give a better insight for further development of works in this direction.

Keywords-Aura, Bio-field, human life, electromagnetic wave, acquisition system

I. INTRODUCTION

Every individual has its own symbolic feature through which the identity can be expressed effectively, together with this symbolic feature biometric impression are also significant to an individual in order to have his/her identity. With these factors many articles have been thus depicted in the literature based on biometric traits such as fingerprint, voice, speech, face, retina etc[1][2][3][4][6]. However, each of these biometric systems in spite of representing the uniqueness of an individual are mostly considered as a key factor in establishing the identity or to verify the individual. There is no other significant contributions that are associated using these biometric traits.

As an advancement different mechanism are still further devoted by combining these biometric traits and thereby formulating effective hybrid [7][8][9][10] approaches and these approaches are also limited in the effective identification of the individual. There is very little work that is coined based on the other signature of the human which is in particular called human aura [11].Scientifically this aura is identified or considered as human bio-field[12]. This field assumed to include several biological entities. Through this aura it is assumed that one can more significantly identify the individual behaviour and

thought of mind [13]. This bio-signal can be assumed to be having thermal, electromagnetic and magnetic components. The main limitations in this regard is that the aura is associated with the human cannot be directly visualized by the naked eyes. Therefore much of the research in this area is still infant stage. In order to visualize these auras, the individual need to have specially training. To capture the Aura images, devices such as Fundas or Kirlian are mostly considered. These cameras capture the distribution of energy radiation around each organ and maps them into energy distribution various organs of our body. Once the auras identified and these patterns analyzed effectively, the life path of the individual can be very well understood.

During the process, the acquired images will be divided into two groups, inner aura and outer aura. The human aura is linked with several organs. Therefore, to interpret the diseases, practically, it is observed by many researchers, that the part which is affected will generally consider higher concentration of energy field and therefore these images are used diagnosis of diseases. Higher accumulation of energy field in the aura indicates the possibility of defect in that region or corresponding organ.

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In present day experts claim that the treatment of an individual is feasible once the aura is understood. Treatment like Rekhi, Pranic healing accounts these types of treatment. However the effectiveness of this treatment are not fully validated. The present article helps to present a brief literature review about the various works undergone in this area of research to highlight this area in the right perspective.

II. RELATED WORK

Lot of researches have presented several contributions in this state of art of the bio-field. The contributions made by some of the authors are presented here under to give the better insight about the understanding of the process and associated technologies

Xanadu C. Halkias et.al[1] in 2004 studied the importance of bio-photon imaging in medical diagnosis. They proposed an algorithm to process the image to get an accurate image of biophoton emission by applying the image processing technique. The proposed algorithm extracts ROI from aura biophoton image based on size and geometrical structure. They applied morphological operations, dilation, erosion, opening, and closing to extract the ROI. To enhance and smoothen the edge they used Alternating Sequential Filter. Extracted the edges by a morphological gradient and extracted areas of interest by using the morphological Top-Hat transformation. Approximated texture complexity by dilation and erosion method. ROI from the original image is extracted by using a watershed transformation. They captured the image of the real time subject and implemented the algorithm to get the accurate biophoton image of subject.

Roeland Van et.al[15] in 2005 studied the historical aspects of biophoton research, present research on biophoton and its relation to health, aspects of colors and methods used for analysis of biophoton signal ,the device used for capturing biophoton(2D photomultiplier) and the various fields research on biophoton emission. They identified the need of human biophoton imaging in upcoming medical diagnoses. Based on their study of Electronic searches of Medline, PsychLit, PubMed and related review articles and books, established the literature database. They used these databases for analyzing real-time subject of biophoton using their

experimental setup. They evaluated the aspect of color intensity and its relation to health and disease.

SitiZura A et.al[16] in 2005 studied the different characteristics of aura frequency emitted by the human body and also identified that male and females have unique biofield frequency. They used this frequency radiation to classify the gender. They measured biofield frequency using radiation wave detector at 23 points on chakras (energy centers/focal point where human body transmits radiation wave to and from the body), left and right-hand side of the body. These frequencies are analyzed using statistical techniques of multivariate analysis to identify the unique feature in the frequencies of males and females. They classified their analysis based on the k-nearest neighbor(KNN) method. They obtained the accuracy 99.3%. They validated the use of biophoton emission to classify the gender.

F ABIJANSKA A et. al[17] in 2007 identified that aura is connected with edges of the samples. They presented an algorithm to remove aura accurately by an image segmentation process. They extracted the aura by using Sobel gradient masks. Gradient masks are used to find the areas of constant intensity value approximately. Areas of high gradients are considered as an aura and left unchanged. After the aura is extracted mask is subtracted from the analyzed image and then image is applied to segmentation process. By their experimental set up captured the biofield image of real time subject and converted into digital form and applied the proposed algorithm to perform detailed image analysis. The proposed algorithm is useful in high-temperature image quantitative analysis system.

Loo Chu Kiong et.al[18] in 2008 presented a model for recognition of 2D brain aura of the human body and implemented using system-on-a-chip in Field-programmable gate array (FPGA). They captured and digitized 2D aura of the brain using their proposed model. Digitized image is applied for log polar transformation to transform scale and rotation of image in log-polar plane. Then the image is filtered with Gaussian filter. Filtered image is applied for 2D Fourier transform to generate translation-invariant spectrum of the log-polar plane to get the size and rotation invariant. The spectrum will be multiplied by frequency responses of Gabor filter. The resultant spectrum will be converted back to spatial domain samples using inverse Fourier transform. To generate

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the final spatial domain the maximum value is chosen from every pixel of samples domain template. The template will be stored for future retrieval.

Masaki Kobayashi et.al[19] in 2009 studied that biophoton emission from human body is due to energy metabolism. They identified existing Biophoton imaging takes more time for image acquisition and it delays analysis of biophoton emission. To reduce the time for image acquisition, they captured biophoton emission using Charge Coupled Device (CCD) camera with improved lens system and produced it in the form of image with less time. They identified that biophoton emission from the body during the day varies. They conducted experiment on real time subject and recorded the temporal variation of biophoton emission with a 3 hrs interval and found that Biophoton emission high at late afternoon, weak in morning and increased in the afternoon. They proved that a biophoton emission from human body is not constant and it varies due to energy metabolism.

Chao-Hui HUANG et.al [20] in 2010 proposed a system for visualization of human aura by using Graphical Processing Unit (GPU) called bio-inspired computer visual system to simulate human visual system in biological way. This system extracts visual feature from input image and coverts into artificial neural activity signal which are classified using machine learning algorithm. As a result image content which related to some concepts are identified. To visualize the complex visual features such as invasive area on a digitized biopsy, they proposed a new language called Visual Pattern Assessment Language (ViPAL). They proposed this system to use in breast cancer prognosis as a computer-aided prognosis tool to identify the invasive area to support pathologists in order to avoid unnecessary biopsies.

Konstantin G. Korotkov [21] in 2010 conducted a systematic study to validate the scope of biophoton capture analysis by Gas discharge visualization (GDV) technique on the various medical applications. GDV camera capture biophoton emission from human body and these biophoton is converted into digital image form by the Bio-well software. Authors listed the various applications of biophoton analysis in the medical field for assessment of health condition of a person. From their study GDV used as a tool for monitoring the reactions of a person to

various treatment procedures, homeopathic and allopathic medicine, assessment of anxiety and stress, monitoring the psycho physiologic state of a person. In Russia given permission to use GDV camera as medical diagnosis tool. They studied the peer review article published in various journals on biophoton usage in health assessment. They found that application of GDV in various fields such as medical, psychological, and physiology shows the result as either excellent or very good. From the various articles they investigated that there is no any undesirable character in GDV method and no any counter position to application of the biophoton imaging technique. They investigated various advantages of GDV technique to validate as a diagnostic tool in the medical field.

Vinitha Sree Subbhuraam et.al [22]in 2010 identified the need of non-invasive diagnostic technique in cancer predictions to eliminate the unwanted biopsies. They proposed Human Biofield based diagnostic system (BDS), developed by Biofield Corporation, USA provides an immediate objective assessment of the nature of the breast tissue by measuring skin surface electro-potentials. This device received market approval from the European Union (CE mark).They used different classifier algorithm to predict the accuracy of proposed system. They tested clinically 180 people and results were compared with mammography and proved the accuracy of the Biofield diagnostic system.

B. Shanmuga Priya[23] in 2011 published an article "understanding abnormal energy level in aura images". They studied the characteristics of kirlian image which are used in health assessment.They used Kirlian camera to capture a biophoton image of finger tips of a real time subject and used image processing technique to assess the health condition. Illness is identified based on characteristic defects in ROI. ROI characterized by inner aura(flame around the object) and outer aura(flame around object and inner aura) and computation of ROI involves size, area, number of pixel that surrounds both inner and outer aura and whole body, number of connected components, texture and curvature. Texture of ROI computed by fractal dimension computation. Zero crossings of the curvature functions gives information of the symmetry of Kirlian images. Captured original image converted into gray scale image by morphological transformations such as

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dilation, erosion, opening and closing to smoothen and enhance edge. To extract regional maxima and minima of the image markers used based on morphological reconstruction. Health condition is identified based on segmentation, texture analysis, geometrical structures, zero crossings, edge features and the contours of ROI. They conducted an experiment on real time subject and identified the health issues based on the biophoton image and proved to be GDV can be utilized in medical diagnosis to help the doctors.

R.Rajesh et.al[24] in 2011 studied about the nature and structure of aura and its role in human health, mental condition , emotions, thought process. They identified the importance of aura imaging in medical diagnosis. Using kirlian camera (GDV) they captured frequency level (energy level) of a 40 subjects by mapping the energy of five meridian points in the hand. Captured frequency level is converted into in the form of colour spectrum. They proved the effectiveness of aura imaging in medical diagnosis by conducting the experiments on 40 subjects. Measured the energy levels of each subject, identified the abnormal energy level of the subject and proved that abnormal energy level in a person is due to the subject is prone to get diseases. The subject is further studied using traditional medicine and proved that subject is found to have 90% of the diseases as predicted by biophoton image images. Finally they proved that aura images possess properties of medical issues similar to medical images and emotional and physical problems can be easily classified using biophoton images without taking blood samples and injecting any medicine.

Nataliya Kostyuk et.al[25] in 2011 studied the historical background of aura image of person which carry various information regarding one's health condition. They identified the need of Belfield imaging in medical diagnosis .They introduced a machine called discharge visualization (GDV) for capturing the invisible boiled. GDV is a non-invasive technique to capture human boiled and GDV is computerized biometric, non-invasive technique to capture human bio-field based on fingertips. Later this information used for early detection of the disease in various parts of the body. They also discussed about human biofield can be used as biometric trait in various fields such as security biometric to detect fraud and control the access to restricted area, forensic biometric for criminal identification, convenience biometric to maintain the convenience level while using computer network, medical biometric to provide high performance service in the medical field.

Priyadarshini k et.al [26] in 2014 published an article on Kirlian images in medical diagnosis and mentioned that Kirlian photography captures energy levels of the human body based on five meridian points in hands. They captured the aura image 10 finger tips using Kirlian photography(GDV). They evaluated energy levels of aura and showed that abnormal energy level in aura indicates the symptoms of disease. Illness may be represented by characteristic defects in the finger based aura images which correspond to the main organs of the body. To identify these abnormalities, the image is processed using morphological filter, dilation, erosion, opening and closing method. They conducted experiments on 25 subjects (both normal and abnormal) and concluded that state of imbalanced energy in the concerned organs which may lead to cause diseases. They also mentioned that aura images can also be utilized in telemedicine system.

John A. Ives[27] in 2014 conducted a survey on biophoton emission and its use in medical diagnosis as a health assessment tool based on various research articles published. For their survey used the various databases such as such as PubMed/MEDLINE, BIOSIS, CINAHL, PSYCHINFO, GIDEON, DoD etc.They used various keywords for biophoton(photon, external bioenergy, spontaneous photon emission, ultraweak photon emission, ultraweakchemilumines-cence, low level light emission, spontaneous chemiluminescence, ultraweak photons, ultra-weak photon emission, ultra-weak photons, ultra-weak chemiluminescence) to search the article. Performed analysis based on study design called controlled clinical trial (CCT) and randomized control trial (RCT). Studies were conducted to check whether the photon emission used as health assessment tool and to study the various methods used for measuring the biophoton emission. They found that the research article published on biophoton emission over the last 50 years illustrates the use of technologies and well described methodologies for the detection of human photon emissions and its use in medical diagnosis. But there is no tool to assess the quality of biophoton emission and no technological

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development to measure whole body biophoton emission.

Shreya Prakash et.al [28] in 2015 studied the uniqueness of bio field related to the human physiological and mental activity. They discussed the three techniques to identify the biofield frequency of human namely Kirlian photography, Polycentrism Interference Photography, Resonance Field Imaging. They identified the various features of physiological and psychological conditions in bio field. They conducted test by capturing biophoton image of a real time subject using above motioned technique and results are compared. Proved that among these three techniques RFI is least cost and most promising one.

Gunjan Chhabra et.al[29] in 2015 studied the Vedic aspects of biofield. They identified that aura is made up of several things such as neural thoughts, various color patterns, spiritual energy of the surroundings. It has spin, shape and dimension. They found that features of aura (shape, energy pattern, sound) which is used for matching purpose leads to a new path in the field of image processing and pattern recognition. It also encouraged for new research to develop cost effective device and software for capturing and processing the aura in the field of IT and security

Erminia Guarneri[30] in 2015 published an article "challenges and opportunities faced by Biofield practitioners in Global Health and medicine: a White paper". In this article the authors presented the issues faced by the practitioners to use Biofield in Medical diagnosis. They identified the various challenges for further research in biofield therapy. They proposed various courses to train the people to treat the biofield in health care unit. They discussed the role of integrative Health and medicine in advancing Biofield Therapies, current Status of Selected Biofield Therapies, and current academic resources in Biofield Therapies. They also discussed about the future requirement of training programs in modalities and therapeutic approaches, degree programs in disciplines and systems and cross disciplinary education.

KorotkovKonstantin[31] in 2015 published an article "Recent advances in Electro photonic Image Processing" . They presented the latest development in Gas Discharge Visualization imaging technique. Biophoton imaging became useful tool in medical

diagnosis due to digital image processing technique.GDV device captures biophoton emission in the analog form and transfers this to digital computer. The Biowell software processes these biophoton and produces in the image form. Latest development is processing of image is done inside server. Users of twww.Bio-Well.com can capture image using the GDV device and send the information to the server. The image will be processed by the software inside the server and sends the data to the users in the form of graphs and images and provides safety by protecting the data from viruses and hackers. It allows the users to update information on a regular basis. Bio-Well software works in Windows and Mac OS platform. Author also discussed various patents dedicated to application of biophoton effect. He investigated that usage of the device in the worldwide increased and large number of research articles published and showed that usage of GDV device opens up many practical application and scientific research.

HimanshuKharadi et.al[32] in 2016 studied the Vedic and scientific aspects of existence of aura and its structure ,shape, colour, sound and other information which is unique to an individual .They identified the different areas of research based on aura such as development of cost effective device for capturing the aura, Image processing and pattern recognition to process the Aura based on shape, energy pattern and quality of the sound, AI and Soft computing for the development of new Biometric technique for authenticate aura as signature in security, verification purposes in the IT field. They also discussed the development of Health restoration technique in order to record human radiation scientifically based on luminance, interference and resonance to identify the physiological and psychological conditions.

Rai sachindra Prasad et.al [33] in 2016 published an article " A Look into the future of Biofield Applications", Authors briefly reviewed the studies made so far in the bio-field concepts and imaging. They identified that present aura capturing cameras can reliably record only the intensity distribution of the aura but not true colour of aura (because three colour film (RGB or CMYK) cannot record spectral information of light). Authors developed the algorithm for identification of biofield in all possible colours with an environment set up for capturing and storing aura of a real time object. Intensity level of

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each constituent color is identified. Converted into High, Medium, Low levels of intensity of the constituent colors into digital numbers. Added the digital color numbers with the respective digital number of intensity levels. Compared with the templates (total number of digital number of colors plus the digital number of intensity levels of each constituent color in the templates) to display the required colour of biofiled.

Zhuo Wang et.al[34]in 2016 identified that production of biophotone and its transmission in neural circuit is arised due to glutamate (neurotransmitter in brain).Authors developed the hypothesis that human high intelligence is due to spectral red shift of biophotonic activity and transmission in brain. They tested the hypothesis by conducting the experiment on animals to humans and validated the hypothesis.

Rai Sachindra Prasad et.al [35] in 2017 published an article "Patterns Identification in Thought-Form Images". They studied the Theosophical literature about aura image which is captured using power of extra sensory perception, drawn and painted by hand and each image is associated with a comment good or bad thought process of an individual. To provide the scientific proof for Theosophical study they have taken 28 images from theosophical literature, which are in RGB color space and converted into Hue Saturation Value (HSV) color space for image analysis. They conducted sensitivity test to determine which color intensity R, G, B has the greater influence in variation. They considered Hue as single parameter for analysis of the images to identify the image into good and bad category. Then from the results of pattern identification of images against the corresponding comments in theosophical literature are compared. All experiments are performed on MATLAB platform. By their experimentation result provided scientific proof for Theosophical literature.

Rai Sachindra Prasad [36] in 2017 studied the historical background of aura image and meaning associated with these images, which drawn and painted by hand. To prove scientifically authors developed and implemented algorithm using image processing technique. As from their study the aura image is made up of color, shape and outline. They defined aura color space using HSV and they obtained shape of aura by using histogram derivative of intensity of outline in the aura image.

Rai Sachindra Prasad et.al [37] in 2017 studied the aura images and each image descriptions such as good, bad, very bad, very good and mix of all based on its true color, shape, and outline published in Theosophical literature. To provide scientific proof for the Theosophical literature, authors used the HSV color model to analyze the true color aspects of the image. Radon Transform and histogram used for the identification of shape. By using these two aspects they tested the descriptions of the Theosophical literature image and proved the validity of the descriptions.

Rai Sachindra Prasad[38] in 2017 studied the Theosophical literature to study the nature and theosophists and biophysicists views on biofield image. To test the comments associated with Theosophical image, they captured theosophical literature image in RGB format and converted into Hue Saturation Value(HSV) color space for the analysis of spectrum of Biofield. For pattern recognition in spatial domain used only Hue as parameter and also to represent dominant color in RGB space. They conducted an experiment on 28 images of theosophical literature and tested the validity of upper and lower bounds of hue to verify whether the pattern of biofields matches with the name assigned to the images. They obtained the accuracy of 90%. They also proved the validity of choice of threshold applying on the biofield images captured in real time subject.

Rai Sachindra Prasad et.al [39] in 2017 published an article "Pattern Recognition in Thought Form Images Using Chromaticity Parameters". They identified that biofiled image is formed by ultra weak biophoton emission and it has a spectrum of several colors. They used Hue Saturation Value (HSV) color space to produce the true color image of biofield. They analyzed true colored image by using chromaticity parameter in the HSV space.

Rai Sachindra Prasad [40] in 2017 proposed L*a*b* color space for aura visualization and developed an algorithm for pattern recognition and implemented in MATLab. Results were compared with HSV color space to identify the best method among these to recognize the aura. First they Transformed acquired image into RGB color space to L*a*b* space. By using K-mean clustering they classified the colors in a*b*. Result of K-mean used to

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label every pixel in the image. Segmented the image by color. Then segment the blue nuclei' into a separate image. Declared the pattern in the image identified under L*a*b* color space on the basis of blue nuclei, and noted the values of a* and b*. Compared the classified pattern in L*a*b* space with the HSV space and showed that L*a*b* space is better in performance than HSV space.

(L* (lightness) assumed to be values from 0 to 100 i.e. from dark to white, the co- ordinate axes a* and b* run in values from positive to negative. Positive a* values indicate amounts of red, while negative values indicate amounts of green, similarly positive b* values indicate amount of yellow and negative values indicate blue.)

JanifalAlipal et.al [41] (2017) studied the historical background of aura capturing device and image processing techniques used for producing aura image. They identified that existing technique not focused on pre-processing technique which is essential to produce aura image with accurate shape and color. Authors presented pre-processing algorithm by considering the parameters such as the size of the region of interest (ROI), no of closed isolines, mean, standard deviation, form coefficient, and form deviation to produce visual appearances of Kirlian image. They implemented the algorithm by taking the real time image, by applying Gradient morphological process such as dilation, erosion, opening and closing they obtained isolines feature of Kirlian effects on the digital image.

Chandrashekhar S. Janadri et. al[42] in 2017 developed a methodology to classify the disease based on the defects in the diseased kirlian images of head, throat, chest, back and leg. Kirlian images have complex geometrical structure. To extract aura preprocessing technique and feature extraction method is described. They applied image preprocessing technique to enhance and smoothen the edge of Kirlian image by morphological operations dilation, erosion, opening and closing. They extracted the image features such as boundary features (boundary descriptor, regional descriptors and textural descriptors), shape features (area, centroid, major axis and minor axis) and the texture property (Homogeneity).They applied Artificial Neural Network and Multiclass support vector machine (MSVM) techniques for classification of diseased region of the human body.

Nirosha J. Murugan[24] in 2018 studied the nature of biophoton emission. They identified the need of no invasive imaging technique in the early detection of cancer due to drawbacks in the present available techniques which are used for cancer prognosis. They identified that biophoton emission from normal cells and abnormal cells have different intensity. They conducted an experiment to measure the emission of ultraviolet and infrared from biophoton using different wavelength filters to detect normal cells and cancerous cells. The results of experiment proved that biophoton emissions from cancer and non-cancer cells differ fundamentally as a function of wavelength and temporal patterning. By this they classified and characterized malignant and non-malignant cell types based on the biophotonic activity of a cell.

Ioan CURTA et.al [44] in 2017 proposed a methodology to measure the stress level of a person based on biophoton emission captured using Gas Discharge Visualization device and the Rofes device. They conducted an experiment on real time subject and captured biophoton emission. Measured stress level and then stored this information in a file for further testing a candidate to fit for aviation. To measure the stress level they conducted experiment on various conditions. With a flight simulator in the laboratory condition and with condition closer to reality by using ultralight aircraft. They performed analysis on the recorded data to check the level of anxiety. By using this information dangerous activity such as piloting or flight controlling, should be avoided and safety level of people who involved in aviation can be increased.

GunjanChabbra et.al [45] in 2018 studied drawbacks of existing aura capturing technique, which is hardware dependent and high cost. To overcome these, authors designed methodology by utilizing image processing technique to capture aura image, which is software dependent. They demonstrated the environment setup to capture aura image of a real time object .The captured RGB image is converted into gray scale image, noise is eliminated along with contrast and brightness improved. After normalization operation, new color space was created to detect the frequencies and performed pixel manipulation to make it visible to naked eyes. And finally the original RGB image and aura edited image integrated together. Finally they made comparative analysis of different aura

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capturing techniques, proposed techniques by the authors proved to be cost effective and software dependent.

Beverly Rubik et.al[46] in 2018 ,identified that human biofield consists of large number electromagnetic energies such as low frequency heart and brain waves, infrared and optical wavelength emitted from various organs and tissues. Biofield reveals various information about organism's status, health and well-being, stress level, and other parameters. Brain wave and heart wave are explored in clinically but never entire biofield is mapped. Authors proposed AI based project to map the entire body Biofield to display the health issues of a person to assist in telemedicine and to create new biometric trait to authenticate, verify a person in the field of IT for security purpose.

A.A. Shulginov et.al [47] in 2018 has taken aura image of fingers captured by GDV camera for analysing and classifying the plasma clots on fingers, which carry information about the subject. Authors developed and implemented an algorithm for recognizing and classifying the forms of plasma clots. For the experimentation purpose they used more than 500 images and each image is divided into separate element to identify the outer counter. After identification of counter they found the characteristics of each counter (invariant),these invariants do not depend on the position, dimensions and orientation of the elements. Therefore, they can be used to recognize patterns, and to compare the elements. Finally they clustered the data based on k-mean method.

Denitsa et.al [48] in 2018 presented their study on the historical development of GDV device application in medicine, psychology and sports for detecting, diagnosing and prevention of disease. Based on various publications on GDV application, they identified the usage growth of GDV application in homeopathy, yoga and acupuncture medicine from 1950s to till now.

Gunjan Chhabra et al.[49] in 2019 published an article for implementation of aura images in color space in order to identify the human biofield. In this article authors have identified benefits of evaluating aura, historical background, methodology of acquiring aura image together with the set up mechanism. An aura color space visualization

algorithm is presented in which the original RGB color images are considered, preprocessed and enhanced. The corresponding gray scale image extracted, noise is eliminated based on Gaussian filters. Normalization of images together with the enhancement is carried out using color balancing and color contrast. In this article a new color space is defined along with mapping function that maps to the original color. The authors have demonstrated experimentation results by considering real time data set of an individual and the corresponding auras related to the chakras are highlighted and corresponding interpretation based on these chakras are formulated.

Gunjan Chhabra et al, (2019) studied the importance of human biofield information in future medical diagnosis .Authors designed and implemented an algorithm for visualization and interpretation of aura color patterns around a person(which is highly convoluted pattern and dynamic nature)by using Image processing and Artificial Intelligence techniques. They captured the image of the subject using a digital camera and then applied pre-processing technique to remove the noise. They performed image enhancement and normalization to adjust brightness and contrast of an image to improve the quality of image. Next they converted RGB image into grayscale image and applied machine learning technique to identify chakras in the image and defined a new color space to visualize aura pattern around the subject. This new color space is mapped with RGB color model using machine learning methods to assign the color value. Finally by using linear regression, generated predictive report detailing the effects of colors on the organs associated with each chakra.

Evgeniy Bryndin et al., 2019 published an article "Technological Diagnostics of Human Condition According to Spectral Analysis of Biofield", studied the role of chakras in the formation of biofield , the importance of different color aspects of the biofield with regard to person health. They proposed the method for storing, processing ,normalizing the colors of biofield spectrum using spectroscope and later used this information to validate the person's health condition based on the colors of the biofield.

Bryndin EG et.al[52] in 2019 published an article "Aspects of Spectral Analysis of Biofield", the authors studied the aspects color spectrum and its

vibrations of biofield. They identified that human behavior and nature is depends on his/her thought process and it will reflect in their biofield. They measured the frequencies of various negative emotions such as grief, anger, frustration , fear, offence, irritation etc. proved that these negative emotions reflects in their health issues. Based on less power spectral and color frequency, emotions and thoughts are characterised. They measured biofield frequency of positive thoughts and found that the frequency of 8 hertz provides good health condition.

RazakMohd Ali Lee et.al[53] in 2019 studied GDV imaging technique, which captures biophoton emitted by the human body and produces in the form of image. Algorithm integrated with bio-well software removes unwanted pixel from the ROI by area parameter. Use of ASF filter on original image before segmentation process by morphology resulted in poor smoothing effect and does not restore the significant details in the image. Authors proposed the algorithm for processing the biofield by overcoming the mentioned drawback. They applied the algorithm on the image of real time subject, which is captured by GDV camera. Detected edge and segmented the image by using gradient morphology and top-hat filter. Extracted blob by computing the absolute gray level intensity between binary image and its gray-level segmented image. Brightest point on the image highlighted to preserve the outline of objects .Quality of image is measured by performing image analysis is based on the correlation coefficient, Mean Squared Error (MSE) and Peak Signal-to-Noise Ratio (PSNR) amongst images. Correlation coefficient was used to measure the relation between original image and transformed image, MSE and PSNR value used to measure the quality of the reconstructed image after transformation. The proposed algorithm proved to be better compared to the existing algorithm.

III. CONCLUSION

This article presents a brief survey about the various models available with respect to image seghmentation considering AURA images in particular. The work presented in this article formulates a basis for deep understanding about the progress that was carried in this area of work and also helps the budding researchers to plain extensions of the proposed work.

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