

A Survey on Image Segmentation by using Artificial Intelligence with Hybridized technique of PSO-BBO

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ABSTRACT- Segmentation of 3D image is an important research issue in image processing. This paper surveys the implementation of Artificial intelligence with PSO-BBO technique for better image segmentation and higher equality of sufficiency and emphasize on reduction of computational complexity and time. The hybridized technique of PSO-BBO will segment the image and artificial intelligence scheme will improve the quality and minimize the complexities.

KEYWORDS: Segmentation, PSO, BBO, Artificial Intelligence.

1. INTRODUCTION

Image segmentation is used to recognize the each segment of the image more clearly. The aim of image segmentation is to partition the image into vital regions with respect to the appropriate locations. Image segmentation plays imperative role in segmentation of medical images. For the medical images, segmentation is crucial as a follows by first step in Medical Image Analysis. Several techniques of it has been developed by Bell Labs, University of Maryland and few other places in 1960. Concept of image segmentation is applicable to medical imaging, video phone, photo enhancement, satellite imagery etc. in the field of medical imaging, is difficult to implement proper segmentation because of facing some problems like size of brain, head, leg, type of disease etc. so, to solve these problems, we need different algorithm to segment these image to acquire accurate results. The concept of artificial intelligence combined with hybridized technique PSO-BBO will give better segmented image in reduced time. PSO and BBO algorithms come under the category of swarm optimization. The concept of swarm optimization has arrived from the behavior of social insects and birds. Social birds are

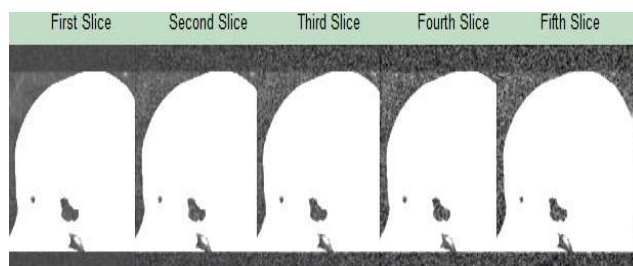


Fig.1: Slices of face obtained from MRI image.



ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 6, Issue 5, May 2019

characterized from their self organizing behavior and by finding the optimum paths through minimum communication. They can get information about surroundings and can interact with other birds indirectly through stigmergy. These all features characterize swarm intelligence. The two widely used swarm intelligence techniques are Particle Swarm Optimization and Biogeography Based Optimization.

II. PARTICLE SWARM OPTIMIZATION

PSO is a computational optimization method developed by Kennedy and Eberhart in 1995. The concept of Particle Swarm Optimization has been originated from the behavior of particles of swarm and the social interaction between particles. While finding for the food, the birds get scattered here and there for searching of food or they move together to find for the food. When the birds search for food from one place to another, there is a bird which can smell the food. The basic algorithm of particle swarm optimization consists of “n” swarm particles, and the position of each of the particle stands for the potential solution. The swarm particles may change its position according to the three principles: (1) keep its inertia (2) to update the condition with respect to its optimal position (3) to update the condition with respect to the most optimal position of swarm. The position of each of the particle presented in the swarm is affected by the optimal position during the movement of individual and the most optimist particle position in the surrounding near to it. Thus it is called PSO when the entire swarm is surrounding the particle then the optimum position of the individual is equal to the whole optimum particle.

III. BIOGEOGRAPHY BASED OPTIMIZATION

BBO is a new and advance biological – inspired and optimizes the population based technique developed by the Dan Simon in year2008. and it is inspired by the mathematical models of the biogeography developed by Robert and Edward [7]. The Biogeography-based optimization is one of the main and evolutionary technique which mainly optimizes a function by the stochastically and repeatedly improving the candidate solutions with the regard to a given quality measurement. BBO is the study which relates to the concept of distribution of species in the nature. Island is referring to as each possible solution and its feature that adds up to a habitat is known as Suitability Index variables. BBO basically works on migration and mutation. Migration means moving of species into some different habitat that is better to survive than already existing [8]. The place where these species is moving is referred to as immigrating. Mutation issued to upgrade diversity. In BBO, habitat H is initialized randomly vector of SIV. While the migration the information is passed between different habitats that depend upon the emigration rates and immigration rates of every solution. A problem is given and away to find the possible solution to that exits in the firm of HIS value.

IV. ARTIFICIAL INTELLIGENCE

AI Algorithms is a Natural Language Processing. Artificial Intelligence Programs which enable computers to achieve human-level performance in cognitive tasks. They are designed to assist in tasks that rely on the manipulation of data and knowledge. Artificial Neural Networks (ANNs) Fuzzy Expert Systems Evolutionary Computation Hybrid Intelligent Systems ANN Ability to classify and recognize patterns ANNs have been used to find Plain radiographs , Ultrasounds, CT, MRI , Radioisotope scans.

In radiology both Human observations and Direct digitized images are possible as inputs

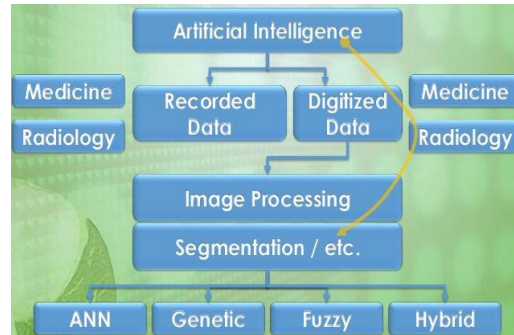


Fig.2: Applications of Artificial Intelligence

V. PROPOSED METHODOLOGY

The purpose work will develop the implementation of Artificial Intelligence method with hybridized technique of PSO-BBO. A investigate the applications and improvements in the field of image segmentation. The following proposals can be taken forward during the research work:

- The paper proposed a new algorithm for image segmentation using artificial intelligence which can directly be applied to segmentation of medical images with better quality.
- The proposed algorithm will reduce the time complexity of segmenting an image into different portions.
- The proposed algorithm will work a manner like firstly the image will be segmented with the hybridization of PSO-BBO and Artificial intelligence technique will be applied to reduce time complexity and to improve the segment image so that every portion is easily visible.
- The paper discusses the various applications of proposed algorithm.

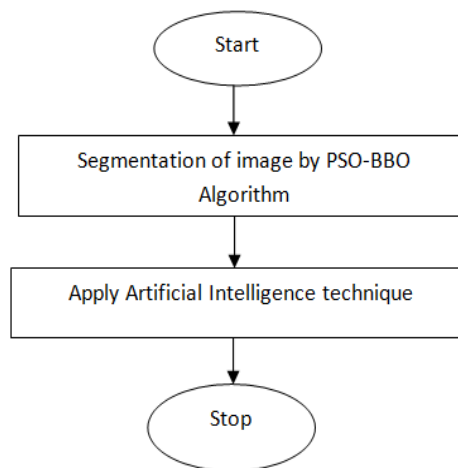


Fig.3: Flowchart of Proposed algorithm

VI. EXPECTED OUTCOME OF THE PROPOSED RESEARCH WORK

Using the proposed methodology following outcomes is expected in suitable course of research work. They include collection of MRI Images; some images are selected and segmented from the original image. The processed images are posted as follows:

- Images are blurred can be segmented with nice quality.
- Images with clear boundary would be extracted.
- Minimize the time complexity in image segmentation.

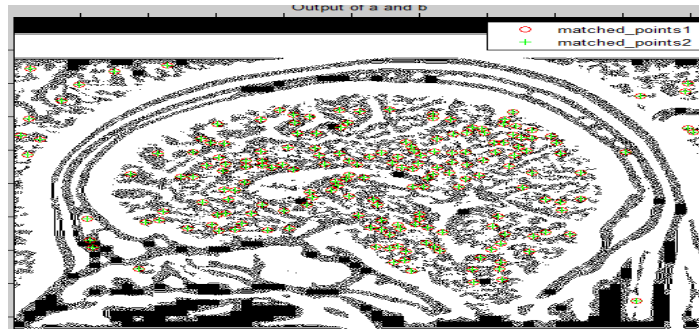


Fig.4: Segmented image by Hybrid of PSO-BBO algorithm.

CONCLUSION

In image analysis, Segmentation is an important pre-processing step in the areas of image analysis and image compression. It is a critical and essential component of image recognition system and usually determines the quality of the final result. Segmentation is the partitioning of a digital image into multiple regions (sets of pixels). From the analysis, a new segmentation technique has been made to improve the quality of segmented image by introducing artificial intelligence technique with PSO-BBO hybrid algorithm. The results analyzed from proposed algorithm will help in obtaining a better segmented image in minimal time. The future work can be also done as increasing the EPI and SSIM parameters to more extent for better segmented image.

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The International Daily journal ISSN 2278 – 5469 EISSN 2278 – 5450