Segmentation and Optimization of Blebs In Human Embryonic Stem Cell Videos.

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ABSTRACT

The important role of indicating and determining the health and growth of a human embryonic stem cell (HESC) is taken by blebbing. There are two types of blebbing, they are dynamic and apoptotic. This paper analyses segemtation methods for bleb extraction in HESC videos and introduces a bio-inspired score function to improve the performance in bleb extraction. Full bleb formation consists of bleb expansion and retraction. The size of the bleb changes dynamically in each frame and process. Therefore, adaptive parameters are needed for each segmentation method .consecutive frames provides adaptive parameters for bleb extraction in videos as the change of area and orientation between consecutive frames helps us derive the score function of blebbing.

**Keywords:** segmentation, optimization, blebs, embryonic, stem cells

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INTRODUCTION

Blebs are part of the human embryonic stem cell , and stem cell are the unspecialized cells which are found in human body . As we know that blebbing is an indicator which helps in determining the helath of the human embryonic stem cell. It is important to know the condition of the bleb which is present in the stem cell and therefore to know the condition of the bleb we segment the bleb, optimize, analyse all these can be done by recording the human embryonic stem cell video through a microscope. Blebs can also be used to find new medicine for a particular unidentified parasite which is present in a human body. Learning and acquiring the condition of the bleb can be useful in developing the human embryonic stem cell without any disorder.

RELATIVE WORK AND CONTRIBUTION

Proposed paper is a bio-inspired optimization method for the segmentation of dynamic blebs. The proposed approach adapts parameters for images in the bleb formation process expansion and retraction. The parameters to analyse the bleb are derived directly from the distributions of change in area and orientation between consecutive blebs.

Block Diagram
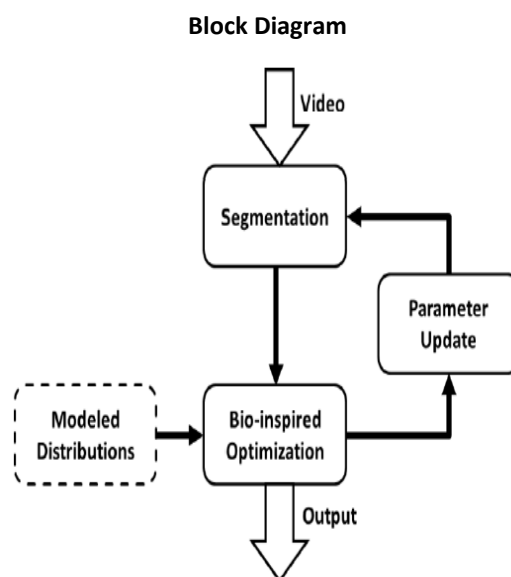
TECHNIQUES USED

The technique that has been used in this paper is that we used three modules in order to optimize, segment and analyse. Those modules are :

1. Cuckoo search
2. Active contour
3. Neural network

Cuckoo search

Cuckoo search is an algorithm which was developed in the year 2009 by xinshenyeang and suash deb. Cuckoo search algorithm was inspired by the cuckoo bird. As we know that the cuckoo bird lays its eggs in the nests of the other birds , if the host bird finds that there is another bird's egg in the nest it will either abandon the nest and make new nest or the host bird will push the cuckoo eggs out of the nest . as such in algorithm.

Active contour

To indicate the exact position of a border or boundary of an object in a possible 2D image Active contour model is used. Active contour model framework is also called as snake. This snake technique matches

a deformable model to an image by energy minimization. A discrete approach of this technique is active shape model or active contour.

Neural network

Neural network is used for video classification regression , clustering , dimensionality time-series forecasting and dynamic system modelling and control. In this particular paper we are using neural network as classifier to compare the parameters of the blebs present in the human stem cell video with the parameters that is derived from the cytoplasmic properties of the blebs that has been studied

Simulation:

The simulation has been done in Matlab that is matrix laboratory which is a widely known software tool for processing of images and videos using programming
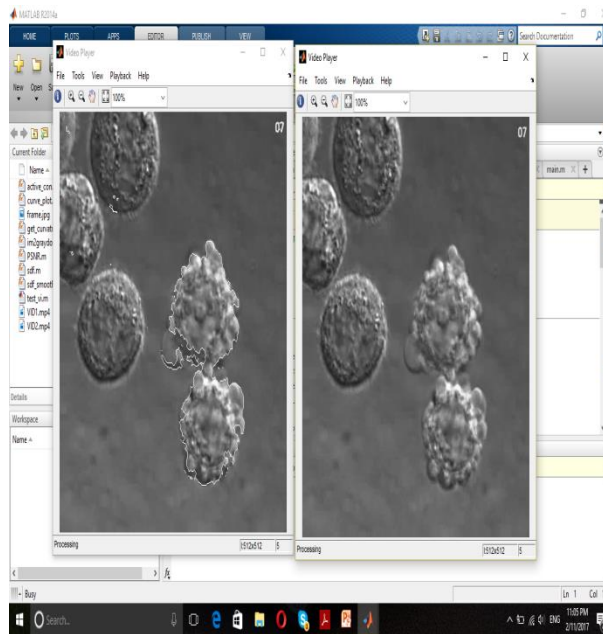
**Active contour and cuckoo search:**

In this step we can clearly see that active contour and cuckoo search has been applied in the output video. The window on the right is the input video of the human embryonic stem cell and the window on the left is the output video. The visible outline around the edges of the human embryonic stem cell is the application of of active and contour and cuckoo search.
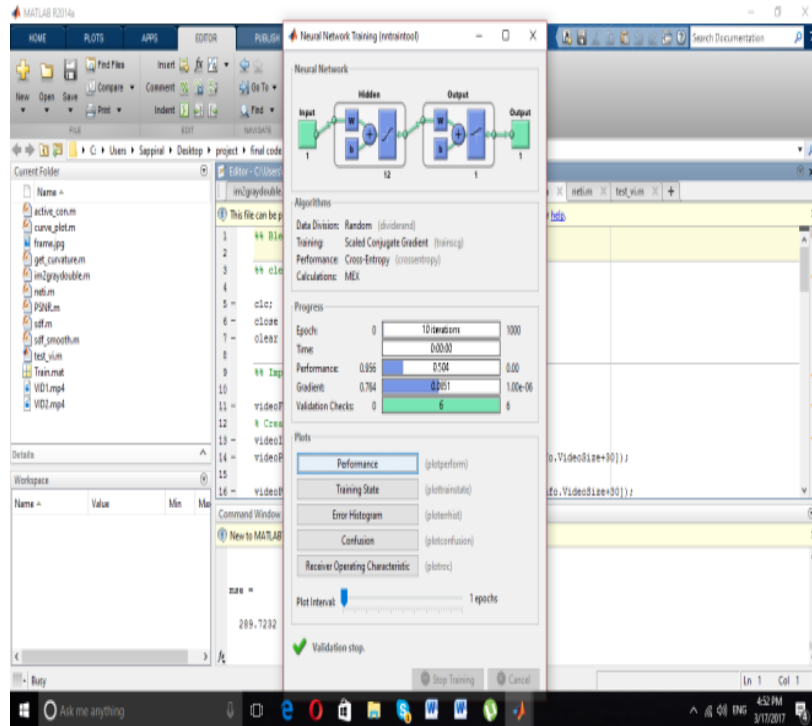
Neural Network

In this step we can see that the classification and the comparison is being done by the Neural Network. As in the window there are various parameters displayed after the comparison with the input parameters that is being obtained from active contour and cuckoo search

Block Diagram
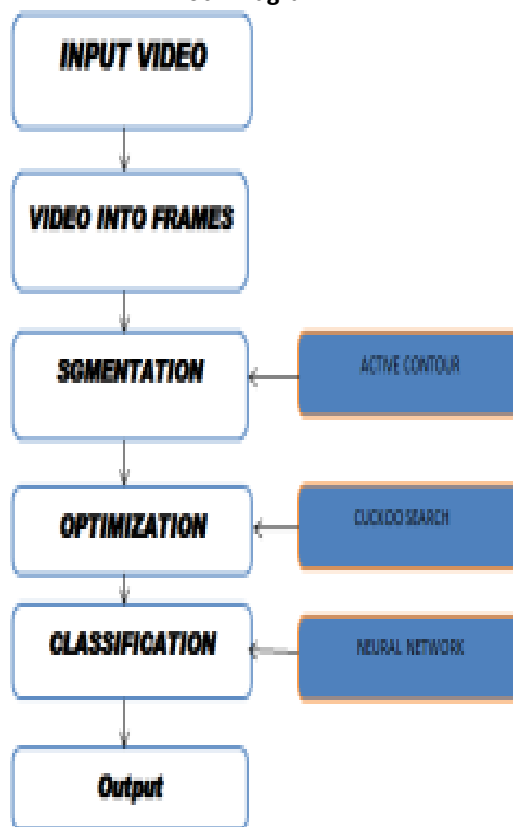
CONCLUSION

The growth of technology has enabled the entire human race to reach a new level of potentiality and possibility and this paper proves us that with the use of software development we can use it in the medical field. Therefore we have segmented the bleb from human embryonic stem cell to help find researchers new medicines.

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