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Detection of Ovarian Follicle Cell Growth Based on Detection of Surf Features

Asha.L.Wankhede

Assistant Professor, Dept. of Computer Science, Govt. First Grade College, Sedam, Kalaburagi., Karnataka, India.

ABSTRACT: Knowledge of ovarian follicle cell growth is important to many aspects of basic and biomedical research.This paper presents the detection of Overian Follicle cell from fish. This paper considered the various kinds of overian follicle cell of fish images to detect the growth of the follicles. Here the paper worked based on the SURF detection technique and it has given promising detection result. The SURF is one of the good detection technique which is based on Haar wavelet responses and can be calculated efficiently with integral images.

KEYWORDS: Overian Follicle Cell; Biomedical;Features Detection; Detect SURF features; Pattern Recognition; image processing.

I. INTRODUCTION

Ovarian follicle is a roughly spheroid cellular aggregation set found in the ovaries. It also secretes hormones that influence stages of the menstrual cycle. Women begin puberty with about 400,000 follicles, each with the potential to release an egg cell (ovum) at ovulation for fertilization. These eggs are developed only once every menstrual cycle[1].

Ovarian follicles are the basic units of female reproductive biology. Each of them contains a single oocyte (immatureovum or egg cell). These structures are periodically initiated to grow and develop, culminating in ovulation of usually a single competent oocyte in humans. They also consists of granulosa cells and theca of follicle.

Any ovarian follicle that is larger than about two centimetres is termed an ovarian cyst. Ovarian function may be measured by gynecologic ultrasonography of follicular volume. Presently, ovarian follicle volumes can be measured rapidly and automatically from three-dimensionally reconstructed ultrasound images. Rupture of the follicle can result in abdominal pain (mittelschmerz) and is to be considered in the differential diagnosis in women of childbearing age. Cryopreservation and culture tissue after cryopreservation. Cryopreservation of ovarian tissue is of interest to women who want to preserve their reproductive function beyond the natural limit, or whose reproductive potential is threatened by cancer therapy, for example in hematologic malignancies or breast cancer. For *in vitro* culture of follicles, there are various techniques to optimize the growth of follicles, including the use of defined media, growth factors and three-dimensional extracellular matrix supportMolecular methods and immunoassay can evaluate stage of maturation and guide adequate differentiation. Animal studies have generally showed correct imprinted DNA methylation establishment in oocytes resulting from follicle culture[1].

To detect the growth of ovarian follicle cell the surf descriptor is employed, The SURF descriptor is based on Haar wavelet responses and can be calculated efficiently with integral images. SURF feature descriptor with total 64 dimensions. Lower the dimension, higher the speed of computation and matching, but provide better distinctiveness of features.

In computer vision, Speeded Up Robust Features (SURF) is a local feature detector and descriptor that can be used for tasks such as object recognition or registration or classification or 3D reconstruction.

To detect interest points, SURF uses an integer approximation of the determinant of Hessian blob detector, which can be computed with 3 integer operations using a precomputed integral image. Its feature descriptor is based on the sum of the Haar wavelet response around the point of interest. These can also be computed with the aid of the integral image.SURF descriptors can be used to locate and recognize objects, people or faces, to make 3D scenes, to track objects and to extract points of interest[2].

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The SURF detector focuses its attention on blob-like structures in the image. These structures can be found at corners of objects, but also at locations where the reflection of light on specular surfaces is maximal (i.e. light speckles).

II. LITERATURE SURVEY

The work mentioned in [11], the follicle cell-oocyte interaction is shown , and from a theoretical standpoint each of the two structural differentiations present at the follicle cell/oocyte interface—gap junctions and follicle cell microvilli—could potentially trigger inception of vitellogenesis. Gap junctions might permit the passage of a regulatory molecule, transferring from follicle cells to oocyte, which would control the assembly of coated pits on the oocyte plasma membrane. The proposed work carried out in [12], is patterning the follicle cell epithelium along the anterior-posterior axis during Drosophila oogenesis , the methods used for this patterining is, Fly stocks, Staining procedures, Generation of clones, Cell lineage analysis and results are the terminal follicle cell populations are equivalent prior to gurken signalling. The paper written in [13], are during development, the oocytes of Xenopus laevis establish junctional contact with the follicle cells enveloping them. These junctions have alternatively been described as desmosomes and as gap junctions. By these literature survey this work is motivated to experiment the detection of the follicle cells using the Digital Image Processing Techniques.

III. PROPOSED ALGORITHM

The dataset contains 6 images of ovarian follicle cell images of fish. Following are the input images.

INPUT IMAGES

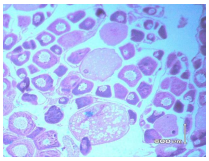

Fig 1 Input image1.

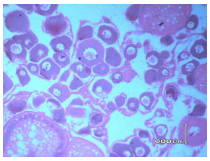

Fig 2 Input image2.

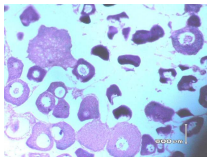

Fig 3 Input image3.

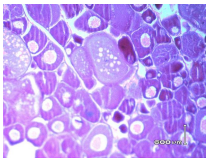

Fig. 4. Input image4

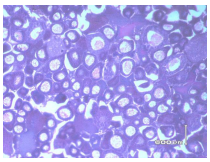

Fig 5. Input image5.

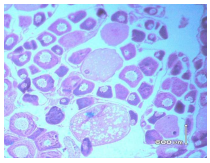

Fig 6. Input image 6.

The proposed algorithm is very simple to implement and use. Following is the proposed algorithm.
Input : Original colour image of ovarian follicle cell of fish.
Output : Surf feature detected image.

Step 1: Read the Original colour image of ovarian follicle cell of fish.
Step 2: Resize the image to 512x512.
Step 3: Apply the colour to greyscale image conversion technique.
Step 4: Apply the Surf feature detection method
Step 5: Plot the strongest point of Surf.
Step 6: Repeat the steps 1 to 5 for all images.

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IV. SIMULATION RESULTS

The proposed algorithm is implement using MATLAB R2014a. The resulting images showing the surf features detected on the images.

OUTPUT IMAGES

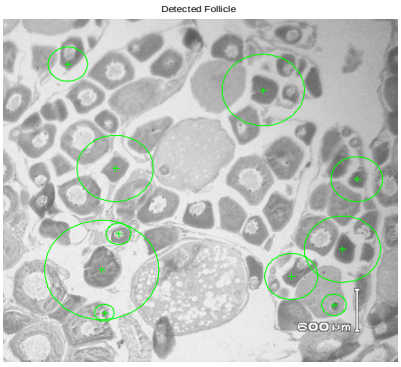

Fig 7. SURF points detected image1

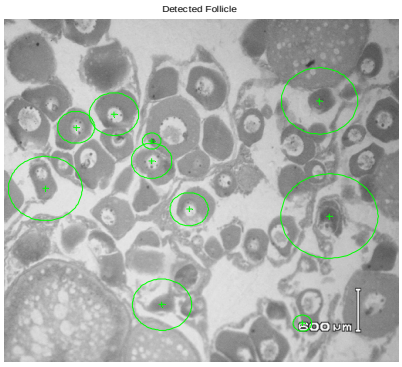

Fig 8. SURF points detected image2

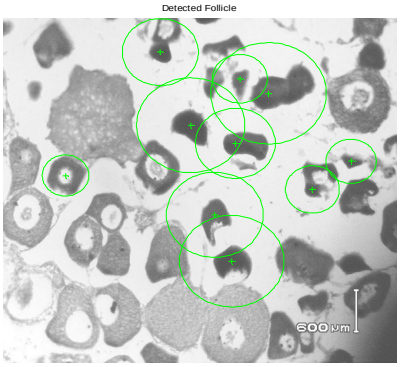

Fig 9. SURF points detected image3

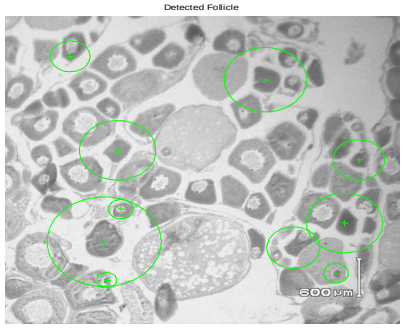

Fig 10. SURF points detected image4

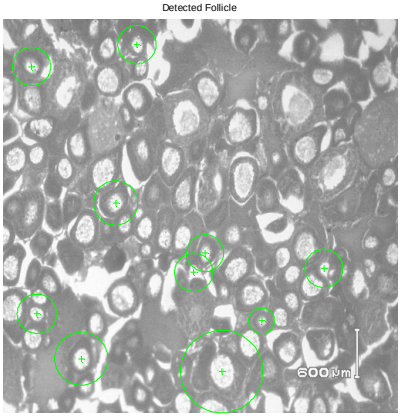

Fig 11. SURF points detected image5

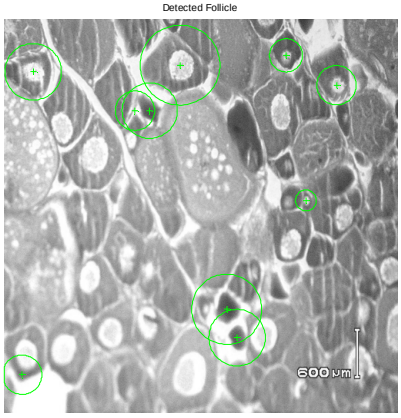

Fig 12. SURF points detected image6

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V. CONCLUSION AND FUTURE WORK

The algorithm given good detection results as we can observe the surf features on images.Hence, as per my knowledge this is the initial work has been done these images using surf features. In future more number of images may take for further processing of the ovarian follicle cell image of fish and other detection techniques may employed.

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