Computer Monitoring and Estimation of Biological Growth Rates

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Introduction

Monitoring growth and activity of *in vitro* living tissues and organisms is an important step that helps in controlling growth performance and drawing up future conclusions regarding subculture and utilization. Traditional methods of estimating growth rate like measuring fresh weight and area dimensions are harmful to the tissue and inaccurate because of media residues and irregular tissue shape (Figure 1). This project is aimed at recording and calculating growth and growth rate for in vitro growing tissues and organisms in their life cycle without any interference. It is based on consecutive recording of the growth area within a defined time frame then a computer vision system is built to analyze the images and estimates the growth parameters by calculating difference in the surface area.

Figure 1. Petri-dishes with growing callus tissues illustrating irregular shape

Proposed project

This project is aimed at recording and calculating the growth parameters and rate for *in vitro* growing tissues. It is based on consecutive recording of the growth area within a defined time frame. A computer vision system is build that captures images of the growing tissues and calculating the area of each organisms and displaying it

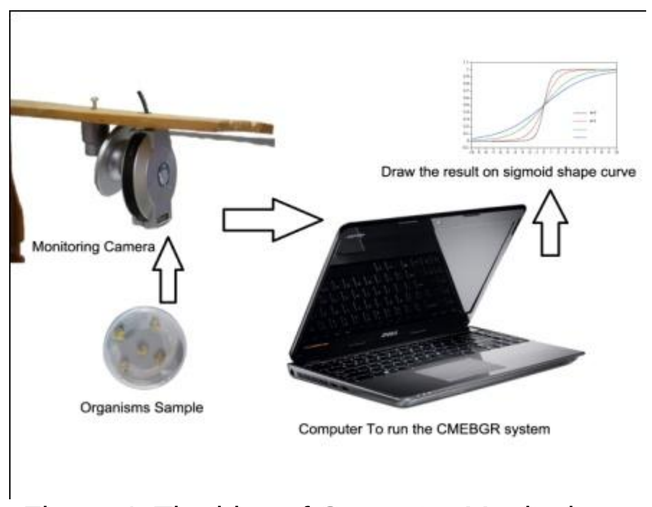


Figure 4. The idea of Computer Monitoring and Estimation of Biological Growth Rates

Project Objectives:

1.Recording and calculating the growth parameters of in vitro growing tissues within a defined time frame
2. Monitoring growth and activity of organisms for long time spans.

Results:

A computer vision system is build that captures images of the growing tissues and calculating the area of each organisms and displaying it. Using slide bars, the user can change the hue and saturation of the images in order to adjust the segments of each tissue. (Figure 2).

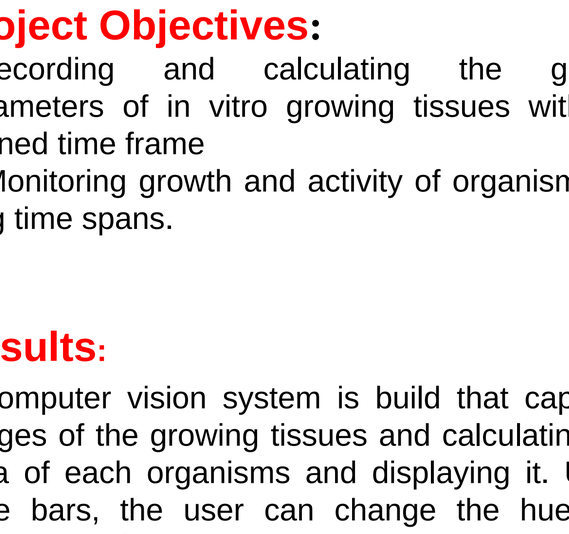


Figure 2: Graphical user interface of the system

System flowchart:

The general flowchart that controls the flow of information between system components is shown in Figure 3.

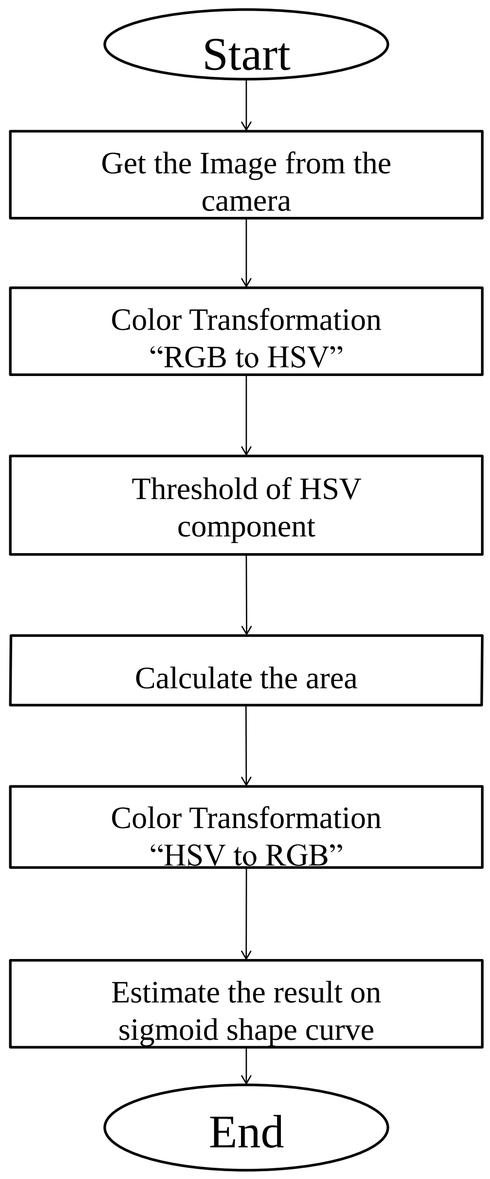
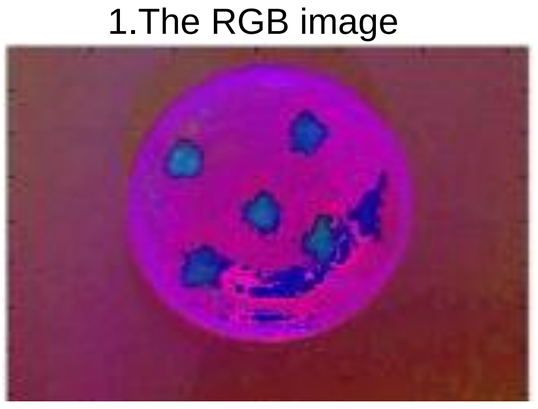


Figure 3: System Design Options

Example:

the following figures show an example of how the propose system works:

1.The RGB image



2. The image after converting it to HSV

3. The image after thresholding and the area in pixels