

University of Bahrain

College of Information Technology

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Heart Analysis

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# Objectives

* Implement Heart Analysis Algorithm
* Make an GUI for the Heart Analysis
* Utilize what you learned in class to solve problems

# 1.Introduction :

We have chosen to do this project since it relates to our daily life and it’s important thing that a human being should know what is heart beat at since it will inform you a lot about your body and this project could help us in the future if we want to design a gadget for to capture the heart sound then turn it into real data that you can benefit from and data could be sent to the cloud to be processed and give the information back to the user and tell what they should be looking for

# 2. Tools

## 2.1Vscode

We use it as code editor since have very useful extension that help you code and many shortcuts that let you work much faster and efficiently and some it’s have some AI that suggest code biased on your style of coding also you can use MATLAB terminal inside

## 2.2Matlab App designer

We use MATLAB App designer since it’s the fastest way we can design an app for a MATLAB and since it’s object-oriented programming we didn’t have a problem understanding the code

# 3. Code discussion

Text

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#### Figure class of the app

This the class of app and it’ have all of it’s properties and each explain in as comments .

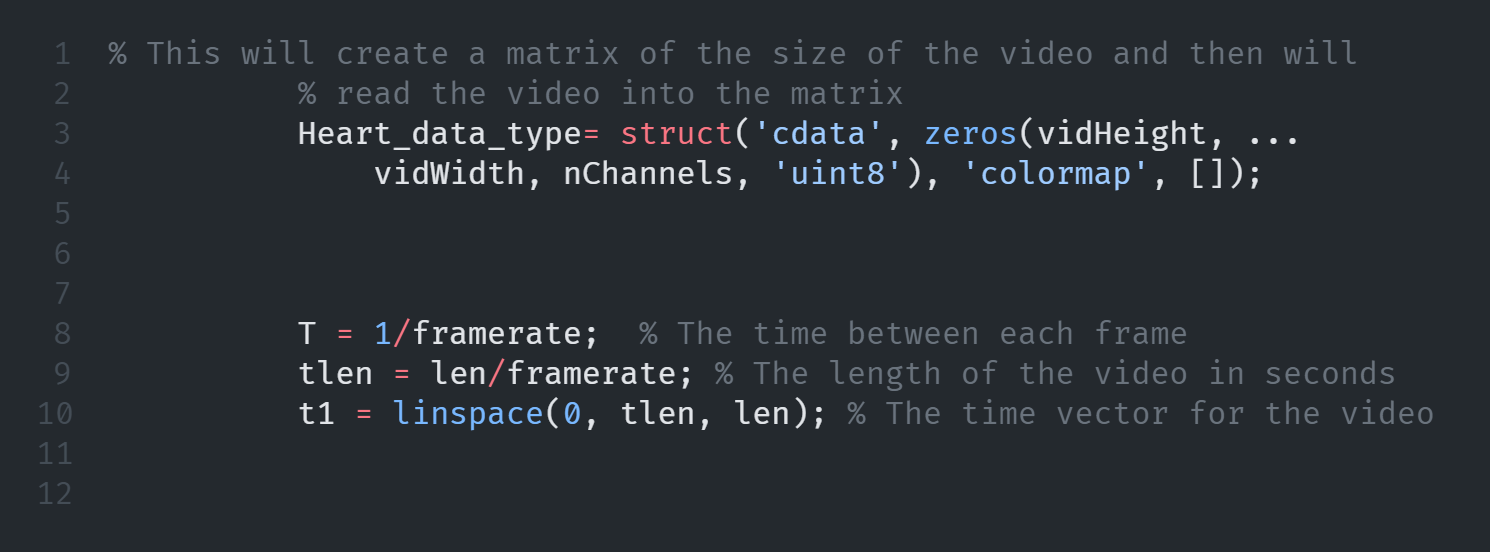
Text

Description automatically generated

#### Figure Callback main function

This the main fucntion where the user is required to choose the video format that is supported by matlab then fileName and pathname will be storted to be but in the fucntion of VideoReader that is natively by matlab then it calculates the information needed for caluclation, such as the height, width, and number of channels of the video, as well as the frame rate.

Figure matrix of size of the video



#### Figure 3 fucntion video size

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#### Figure 4 frame rate

In this function, a matrix of the size of the video is generated based on the height, width, and channel of the video. After that, the function calculates the time period and time of the signal.

This function calculates f, and then moves the struct preallocated by its prototype based on the video's height, width, and channel. If we insert a video, the button will change to processing and be repositioned at the bottom.

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#### Figure 5 Signal sample size

The function prepares a matrix of sample horizontal size and sample vertical size according to maximum horizontal and vertical lines and minimum horizontal and vertical lines based on the number of frequencies of the horizontal and vertical lines.

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#### Figure 6 Button installation

The function creates a loading button and gives it a black frame, then it loads the frame to the button, then a for loop is used to save all readable frames and add them to the struct.

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#### Figure 7 loading animation

In this function, the progress loading button is set and its color is changed. Next, a sample is created based on the vertical index, the horizontal index, and the frequency number. The average of the sample is calculated based on the sample frequency number.

Text

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#### Figure 8 plot FFT signal

This function sets the button to null, removing the label and then changing it to Browse. Next, use Fast Fourier transform to calculate the average signal. Give the signal a title and label on the graph and set the axis to autoscale. Next, plot the signal in continuous and discrete form

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#### Figure 9 display the bpm

This function sets the axis of the discrete signal to tight scale, then finds the maximum real part of magnitude signal FFT and uses it to display the BPM value

Text

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#### Figure 10 The creation of UI figures

In this function, the access will be changed to private call then will create UI-figure for user and load the picture from specific path then will create Ui-figure and display it until all other components are set to visible. The UI-axis will be created by aligning the x, y, and z axes and changing their color and position as shown in the UI-axis 2 by setting the font to Times Roman.

Text

Description automatically generated

#### Figure 11 BPM label and creation button

In this function, first we will create a push button and modify its function by changing its icon, alignment and background color. Then we will set the text to null, create a GIF image by aligning its position and selecting its path, create the label for the BPM field by aligning its position and name and selecting its font and color, and finally make the figure visible upon completion of the creation of all other components.

Text

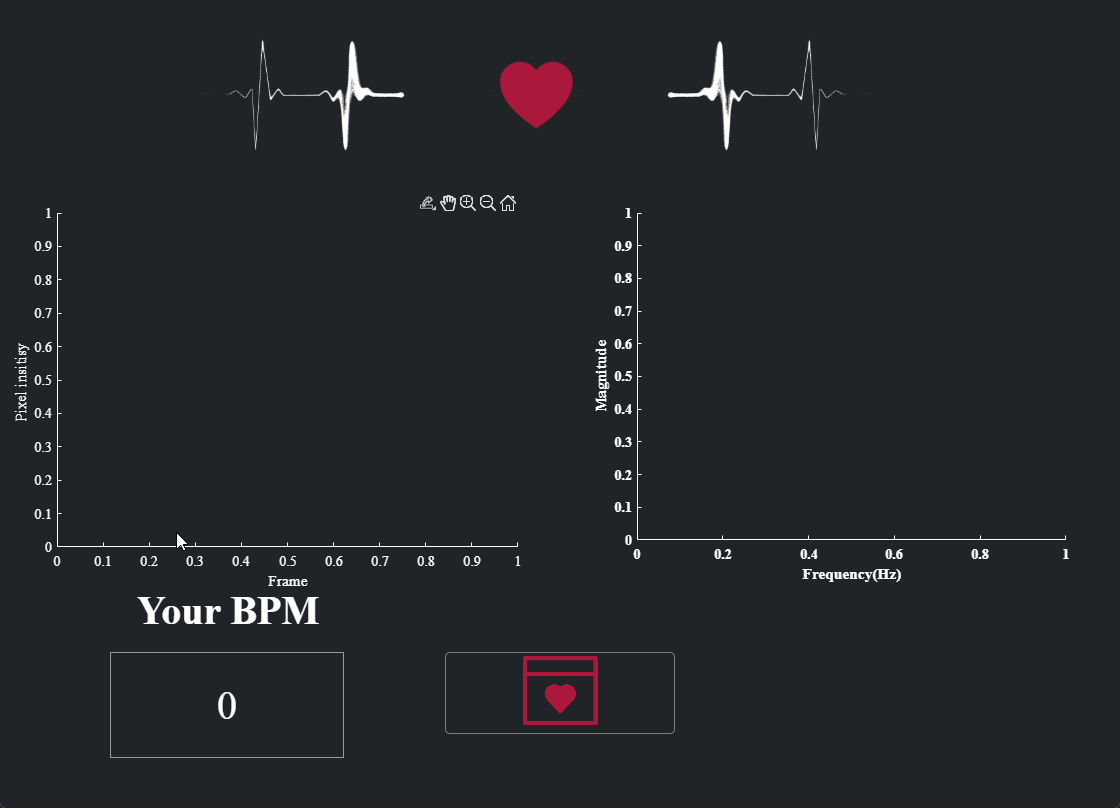
Description automatically generated

#### Figure 12 Creation of the app's GUI

This the creation of app it’s self so we can call the function as an objects

And this defualt of configuration done by matlab

# 4. GUI



#### Figure 13 GUI without data loading

This and overlook of the GUI without loading the data

# 5. Implementation

#### Figure 14 GUI with data loading

Test the loading of the data with real data and the GUI while loading it

# 5.Conclusion

As a result of the implementation of the algorithm and the development of the GUI, we have achieved our objectives and have learned how we can apply our knowledge to solve problems. The next step in implementing this project will be to use hardware to collect data directly from users and analyze it.

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