



HEMN324 – IMAGE PROCESSING & COMPUTER VISION

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I. Introduction

The MATLAB GUI application was created with 'guide' it is designed to be as easy to use and as comfortable as possible for the user. The application contains the following features:

- Upload an image while handling all errors that might come up (corrupt image, colored image and so on.....)
- Calculate its histogram and display it
- Apply histogram equalization and display both equalized image and its histogram
- Apply filtering (Sobel, Laplace) + user types parameters and display it
- Apply Fourier Transform of image and display it
- Add noise (Salt and pepper, Periodic) + user types parameters and display noisy image
- Remove S&P using median + user types parameters and display clean image
- Remove periodic noise (user selects method: Notch/Band-reject/Mask), for mask method user is allowed to select 2 pixels on Fourier Transform of noisy image display
- Notch/band reject: the application detects and removes noise AUTOMATICALLY. User will NOT give any coordinates and the application removes the noise
- Mask: user only SELECTS 2 pixels. User will NOT give any coordinates. Just SELECTS with a MOUSE CLICK. Then, the application removes the noise

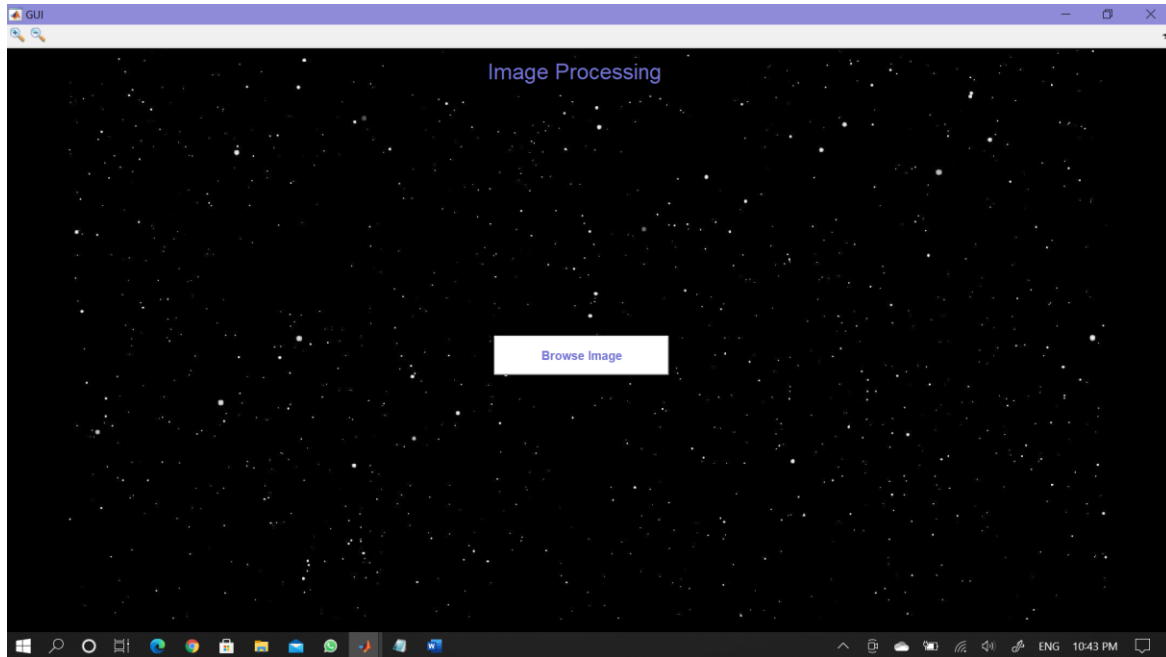
How to Run:

1. Open the GUI.m file on matlab
2. Press RUN button **or** f5 **or** fn+f5

II. Application screenshots

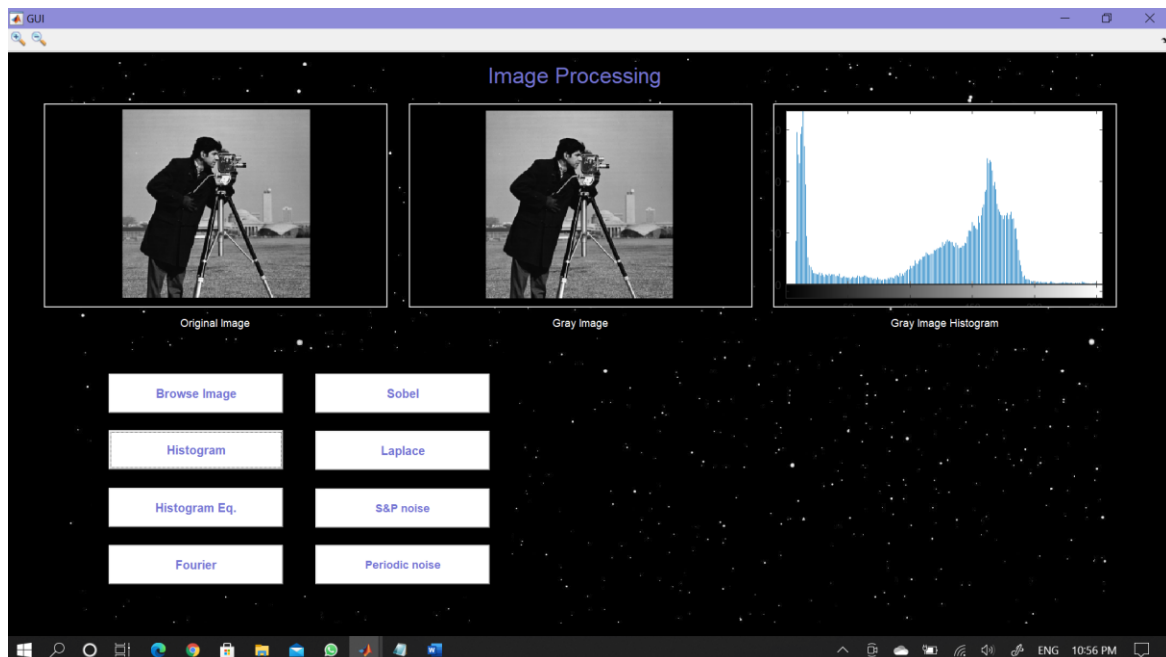
i. Starting

The user has limited access to the features unless he/she chooses an image.



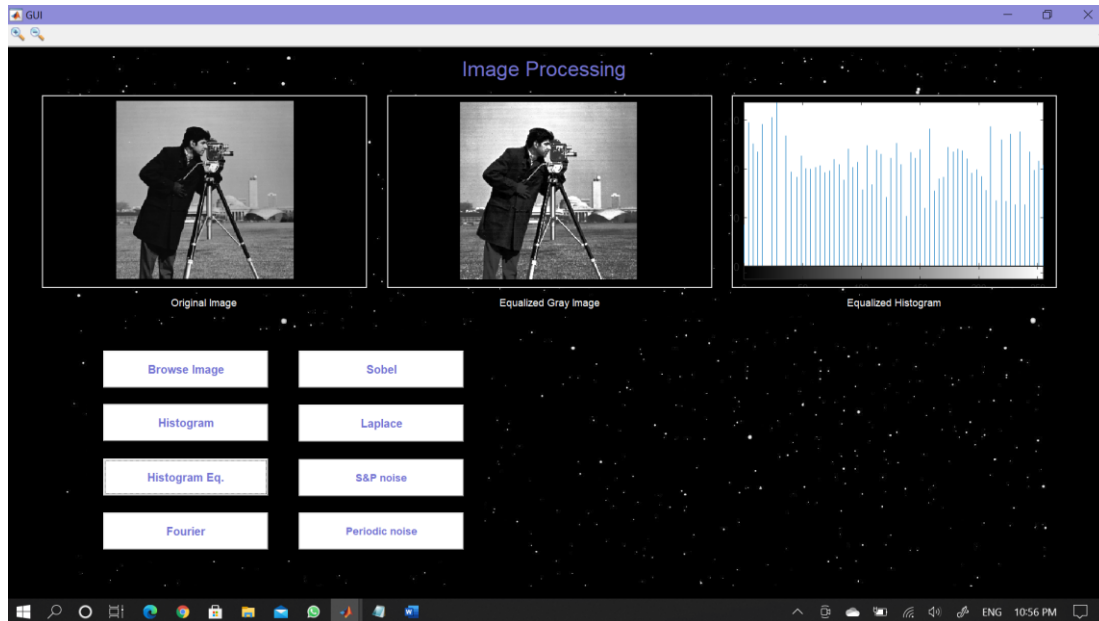
ii. Histogram

Displays the histogram of the gray image and the gray image



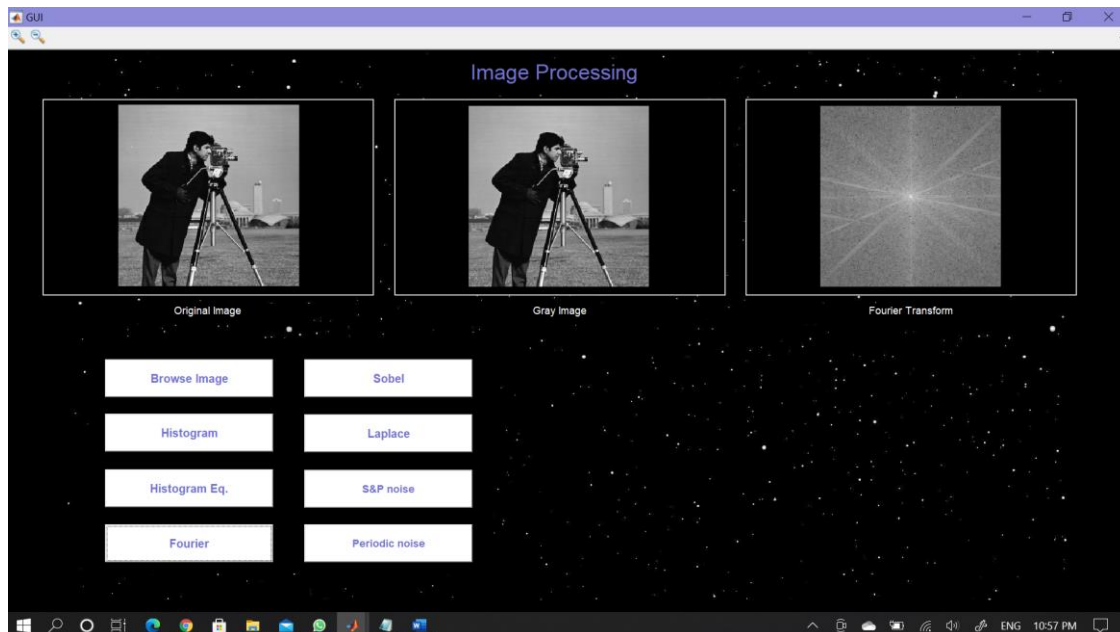
iii. Histogram Equalization

Displays the equalized histogram of the gray image and the equalized gray image



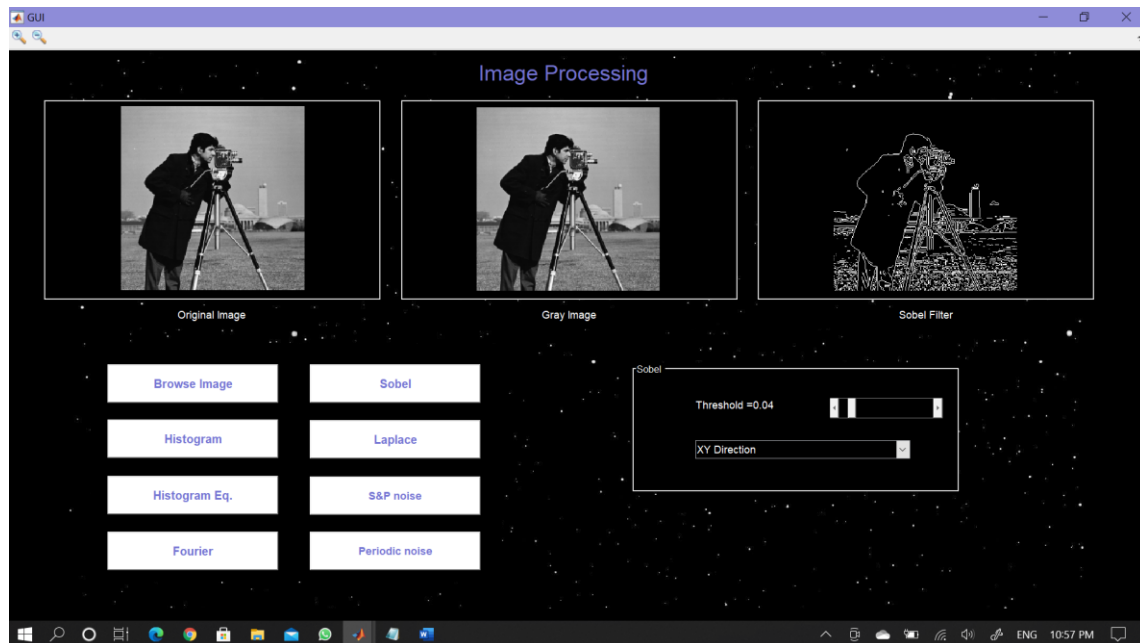
iv. Fourier

Displays the Fourier transform of the gray image and the gray image



v. Sobel

Sobel filter on gray image user can choose threshold from slider and choose direction from dropdown menu.



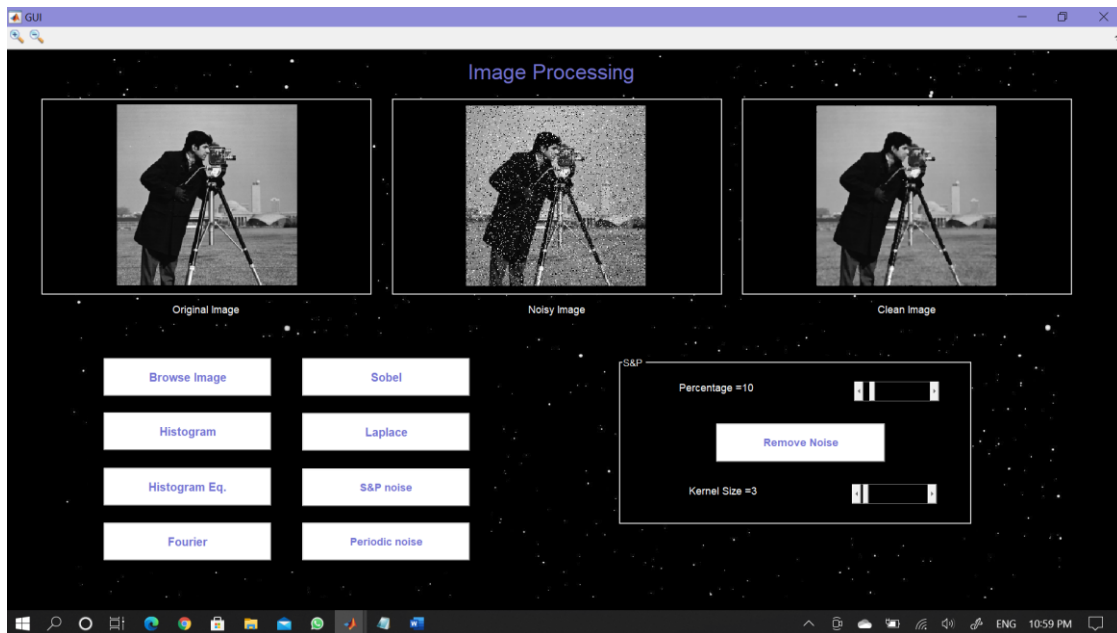
vi. Laplace

Laplace filter on gray image user can choose alpha and scaling value from sliders



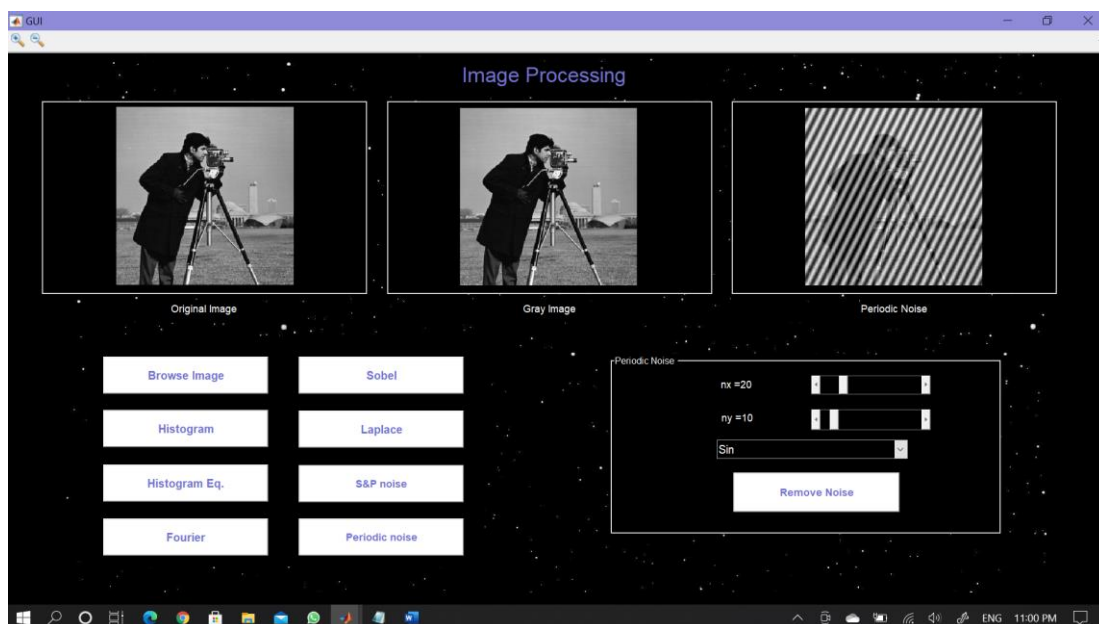
vii. Adding and Removing Salt and Pepper Noise

Adds salt and pepper noise with percentage user chooses noise percentage from percentage slider. Then, removes it by kernel size of the user choice from kernel slider



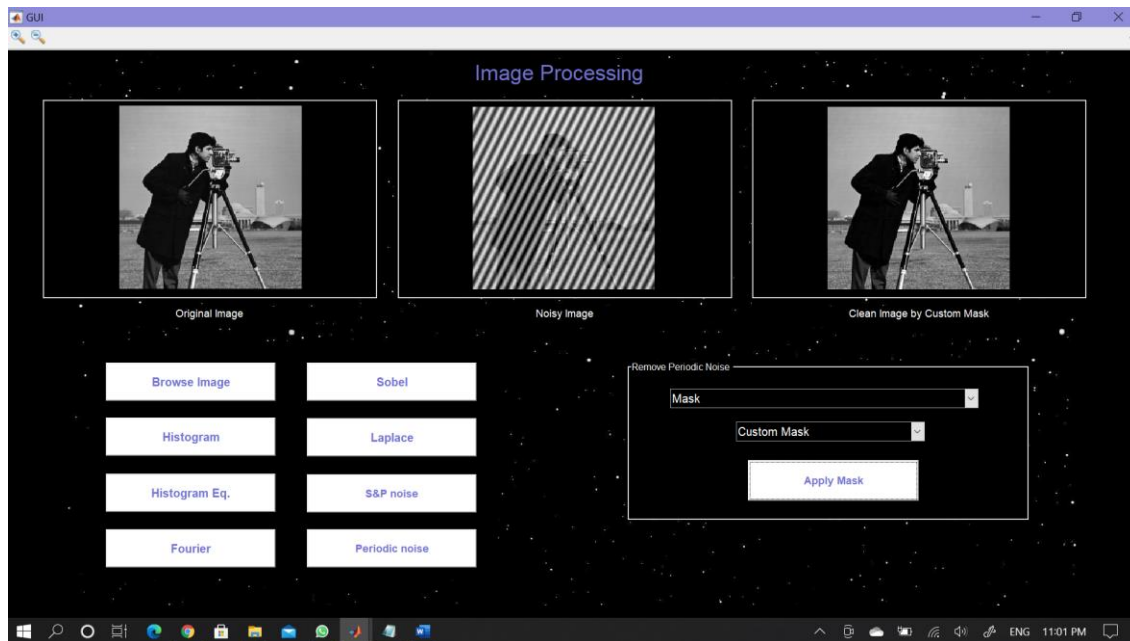
viii. Adding Periodic Noise

Adds Periodic noise with percentage user chooses nx, ny values from sliders and whether it's a sin or cos noise



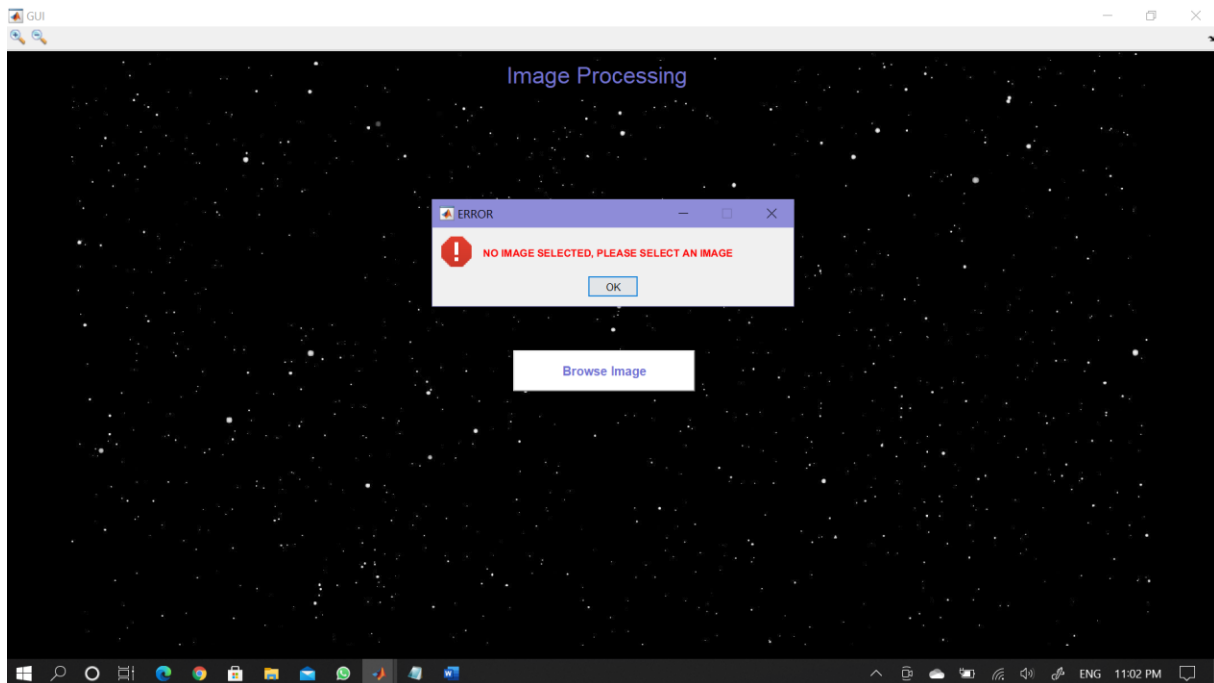
ix. Removing Periodic Noise

User chooses the method from dropdown menu; if the method is mask he/she chooses it as custom or default/automatic

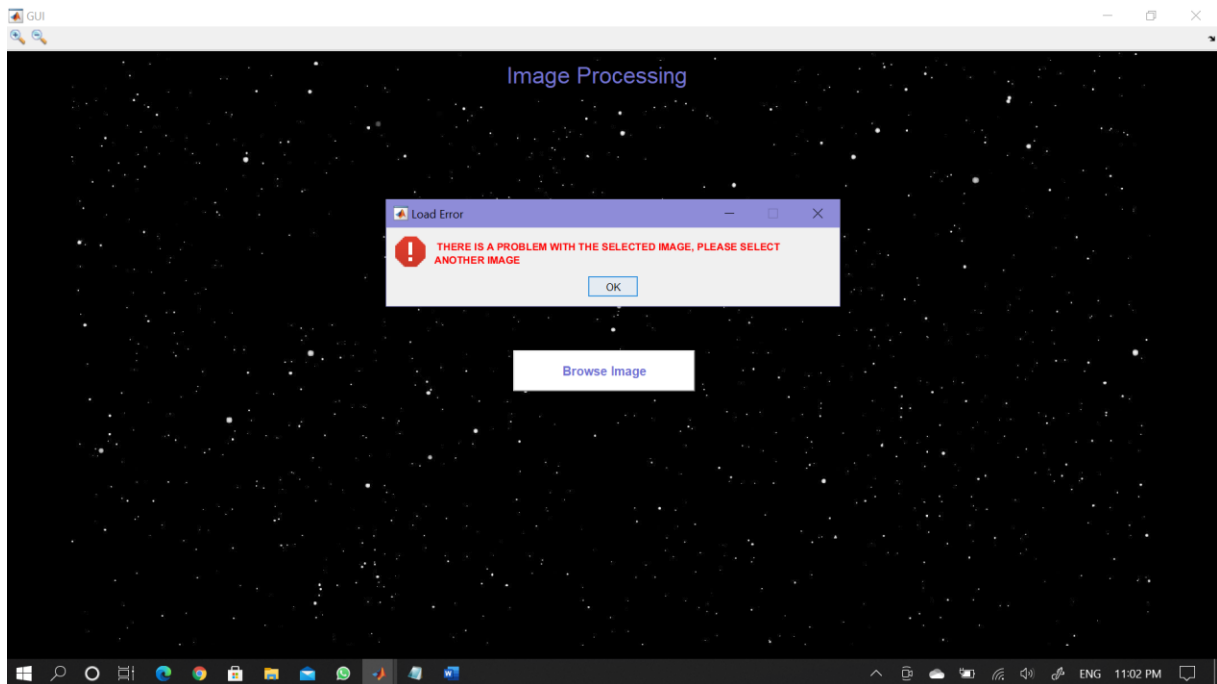


x. Error Messages

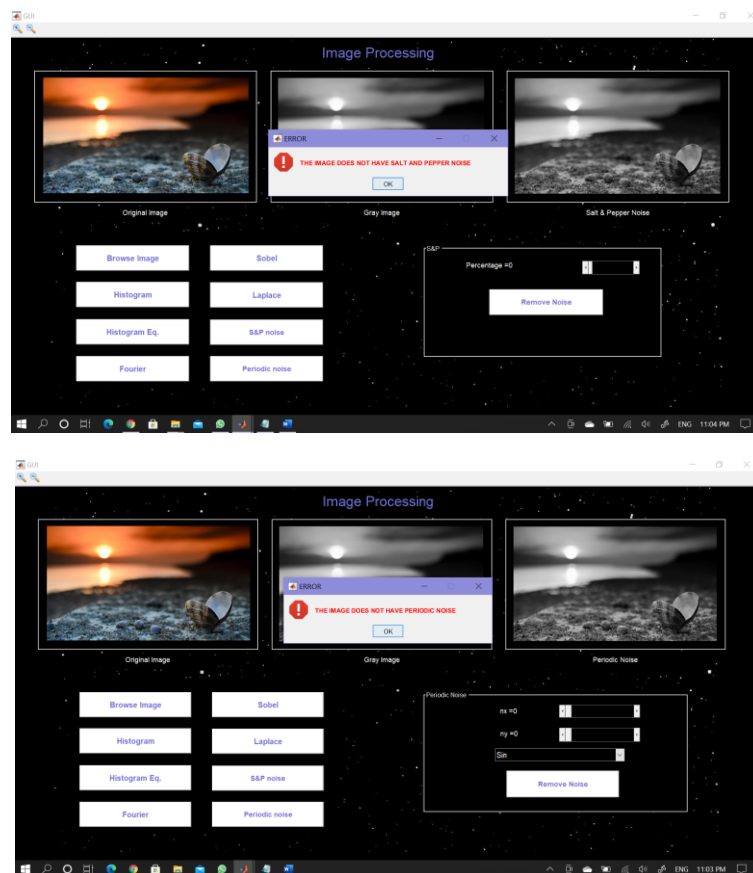
For not choosing an Image



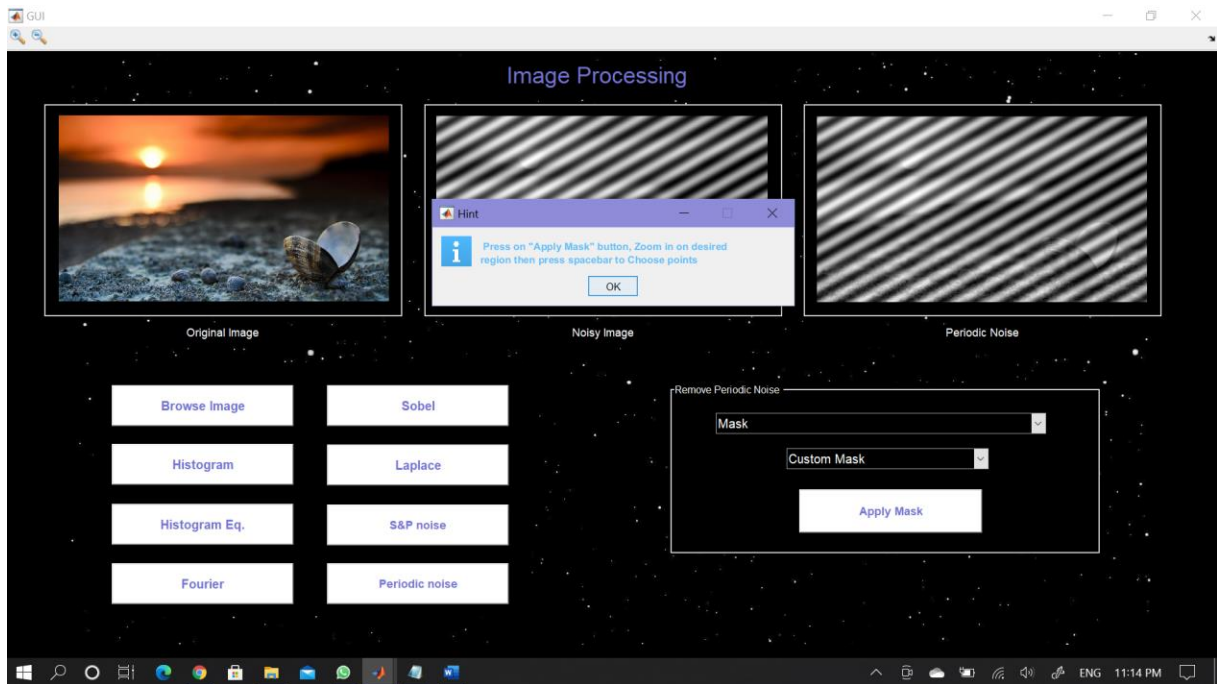
For choosing a corrupt Image



For trying to remove noise when no noise is added



Hint for using the custom mask



If user doesn't choose a method for removing periodic noise

