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False Currency Detection using Image Processing

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Abstract: ***This project addresses the necessity and remote implementation of a false currency detection system using minimal resources. Considering the current times we live in—the global pandemic—the False Currency Detection system is designed in a way that social distancing is maintained between the team members and work is done remotely by using MATLAB Online which doesn't require any heavy download or installation for it to work. The process begins with first feeding the system with any one of the new Indian paper currencies from the given database or by clicking a photo of the note itself and uploading it on to the MATLAB Drive Online. Once the note is selected, the algorithm detects, and extracts features of the note by implementing grayscale conversion and edge detection techniques before presenting the output of whether the selected note is fake or not.***
Keywords: Fake currency, MATLAB Online, minimal resources.

I. INTRODUCTION

Fake currency has been one of the most problematic issues in the world of economics and politics. 'Demonetization' which happened back in 2016 in India, not only created havoc in the lives of middle-class people but also failed to serve its purpose of reducing the production of fake currency. In fact, the production of fake currency doubled after a few months of demonetization. Fortunately, India is slowly progressing towards adoption of digital means of transferring and receiving money, but the progress is still slow. And, during the COVID-19 lockdown that was imposed since March 2020, the problem of fake currency only got worse. Hence, we decided to design a prototype of a light-weight fake currency detection system by taking all COVID-19 precautions and working remotely.

II. DESIGN

We chose MATLAB Online as our computing environment considering its industry reputation for high precision and accuracy. The Online version helped us to work remotely as it does not require a computer with higher specifications or heavy computational power. It does not even require any sort of downloading or installing which not only saved a lot of space on our computers but also saved our time in download them on our personal machines.

For this project, we targeted three main features of Indian paper currency:

A. Mahatma Gandhi Portrait

All the Indian paper currencies have got a Mahatma Gandhi portrait at the centre which is made up of unique patterns.

B. Security Thread

The windowed security thread is present to the left of the Mahatma Gandhi portrait. All currency notes have a security thread. When notes are held against the bright object or a source of light, the security thread can be seen as one continuous strip.

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C. Denomination

A relatively big numerical denomination of the respective currency value is printed on the lower left side of the note after the rupee sign (₹) which is made up of unique patterns.

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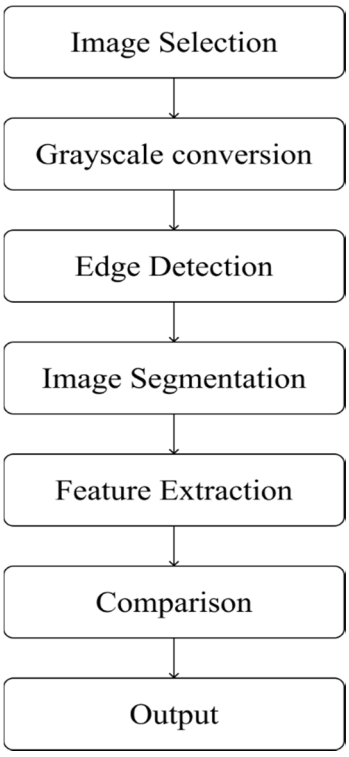
III.FLOWCHART

The following flow-chart shows the step-by-step process of fake currency detection system:



IV.SETUP

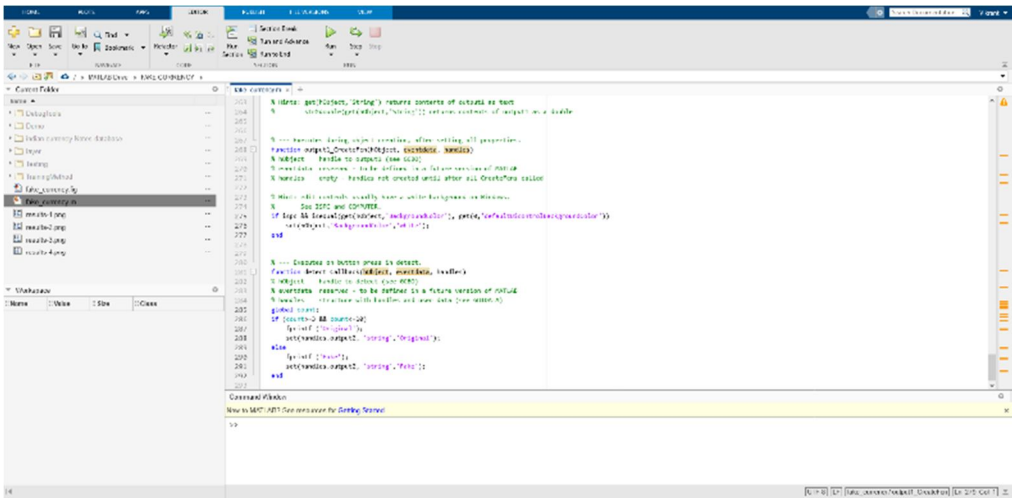


Figure 1: MATLAB Online window

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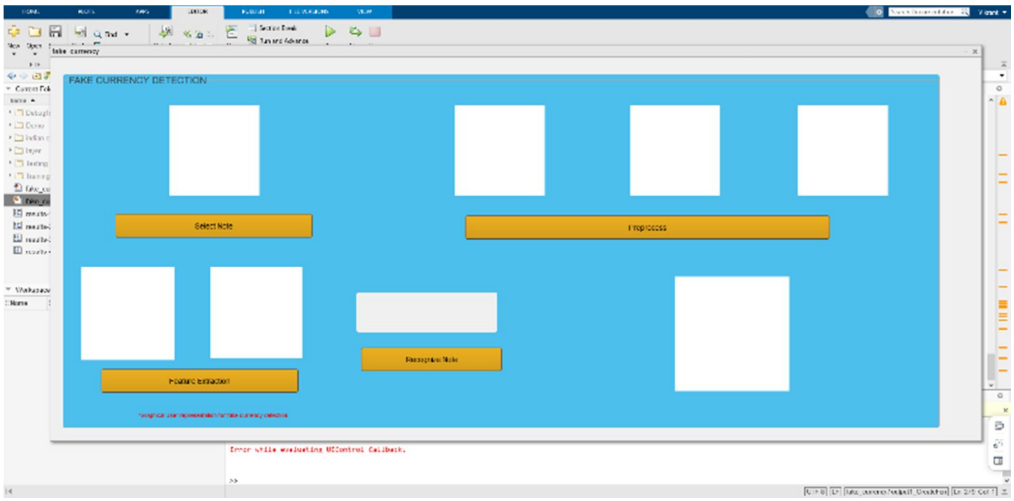

Figure 2: Graphical User Interface

V. RESULTS

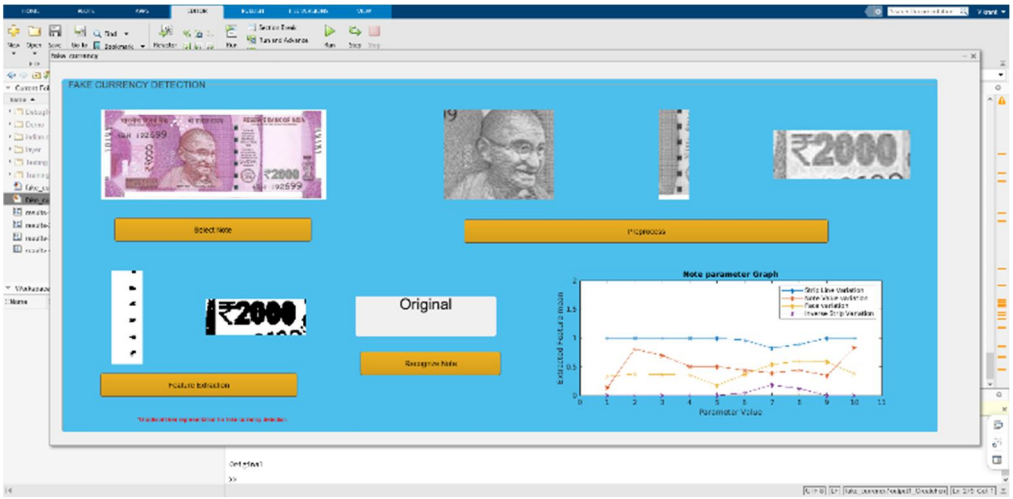

Figure 3: Output screen for an original note

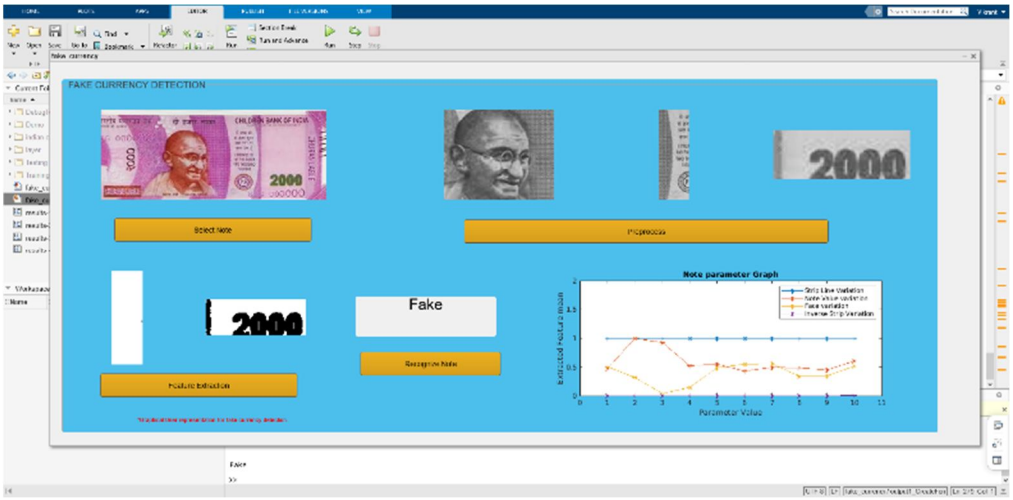

Figure 4: Output screen for a fake note

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VI. CONCLUSIONS

The primary motivation to develop this project was to design a system that detects fake currency notes using minimal resources. A system that does not require any heavy computational power or higher specifications to make it work. The discovery of MATLAB Online was a boon in the pandemic where remote work was the key. Hence, we were able to remotely implement fake currency detection system using techniques like grayscale conversion, edge detection and feature extraction.

VII. ACKNOWLEDGMENT

We would like to thank our project guide Prof. Hemalata Mote for her precious guidance in these difficult times of the global pandemic. We would also like to thank our college for their constant support and the folks at MathWorks for shifting the entire MATLAB ecosystem to the cloud which not only helped us save time but also enabled us to work remotely from our homes.

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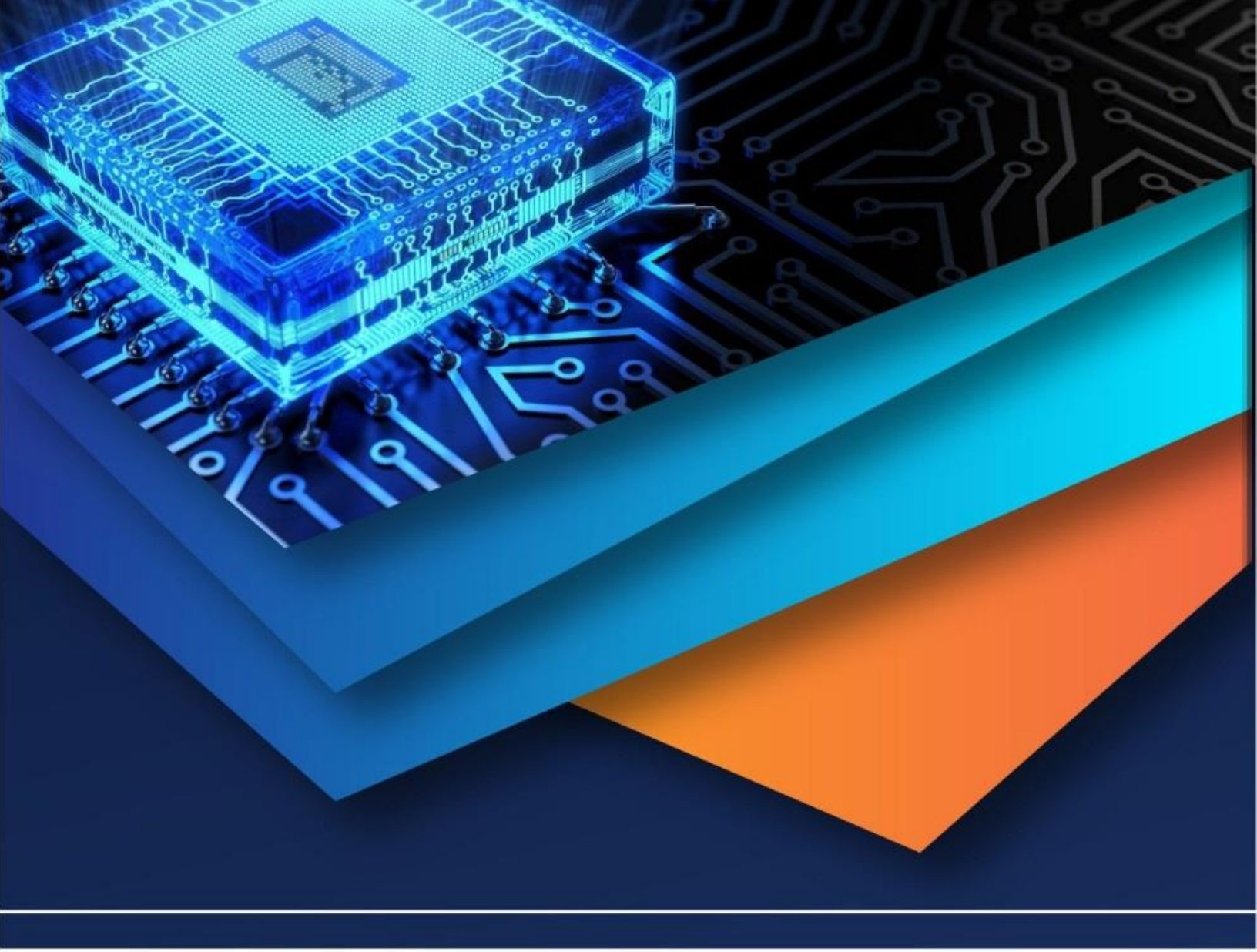

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