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Smart Currency Counter Machine

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ABSTRACT

This project presents the development of a cost-effective and efficient Smart Currency Counter Machine utilizing the Arduino Uno microcontroller for the specific purpose of accurately counting 50- and 20-Rupees notes. In an era where currency counting accuracy is of paramount importance, this system offers a reliable solution for businesses and individuals.[1] The machine employs a combination of image processing techniques and sophisticated sensors to distinguish between various currency denominations, specifically the 50- and 20-Rupees notes.[3] The Arduino Uno's computational capabilities and versatility make it an ideal choice for controlling the system, while the use of open-source libraries and affordable components ensures accessibility to a wider range of users. Preliminary testing demonstrates that the Smart Currency Counter Machine provides fast, accurate, and user-friendly currency counting, contributing to improved financial record-keeping and efficiency in cash handling operations.[4]

Key words: Sensor, Arduino, IoT, Currency, Counter Machine

1. INTRODUCTION

In today's fast-paced financial world, precision in currency counting is vital for businesses and individuals alike. This project introduces a Smart Currency Counter Machine that leverages the capabilities of the Arduino Uno microcontroller to accurately count 50- and 20-Rupees notes. This system is designed to address the growing need for a reliable, cost-effective, and efficient currency counting solution, offering improved accuracy and reducing the likelihood of errors in financial transactions. By combining image processing techniques are shown in figure 2 and advanced sensors, this machine not only distinguishes between different denominations but also ensures a user-friendly and accessible solution for diverse users. With the power of open-source technology, the Smart Currency Counter Machine aims to enhance financial record-keeping and streamline cash handling processes in various sectors of the economy shown in figure 1[3].

1.1 Final Stage

In today's fast-paced financial environment, businesses and individuals often face challenges related to accurate currency counting, leading to errors, financial discrepancies, and operational inefficiencies. These issues are particularly pronounced when handling 50 and 20 Rupees notes due to their similarity in size and appearance.[3] The existing currency counting machines may not provide the desired level of accuracy, and their high cost may limit accessibility. Therefore, the problem at hand is to develop a Smart Currency Counter Machine using Arduino Uno that can reliably and cost-effectively distinguish and count 50- and 20-Rupees notes, thereby addressing the critical need for precise currency management in various sectors.[5]

2.OBJECTIVES

- The primary objective is to accurately count the number of currency notes. This reduces the chances of errors in manual counting, which can be time-consuming and prone to mistakes.
- Smart currency note counting machines are significantly faster than manual counting. They can process a large number of notes in a short period of time, increasing operational efficiency. [11]
- These machines often include features to authenticate currency notes, such as detecting counterfeit or damaged notes. This helps in maintaining the integrity of currency transactions. [7]
- Currency note counting machines can group notes into specific batch sizes, making it easier to bundle and manage currency notes for banking or business purposes.[9]
- Some machines can sort notes based on denomination, which can be especially useful for banks and businesses that need to organize notes for deposit or cash handling. [12]
- Many smart currency note counting machines have the capability to store counts and transaction data. This feature is helpful for record-keeping, auditing, and analysis.[3]

3.RESEARCH GAP

In today's fast-paced financial environment, businesses and individuals often face challenges related to accurate currency counting, leading to errors, financial discrepancies, and operational inefficiencies. These issues are particularly pronounced when handling 50 and 20 Rupees notes due to their similarity in size and appearance. The existing shown in figure 6 currency counting machines may not provide the desired level of accuracy, and their high cost may limit accessibility. Therefore, the problem at hand is to develop a Smart Currency Counter Machine using Arduino Uno that can reliably and cost-effectively distinguish and count 50- and 20-Rupees notes, thereby addressing the critical need for precise currency management in various sectors.

4.PROPOSED SYSTEM

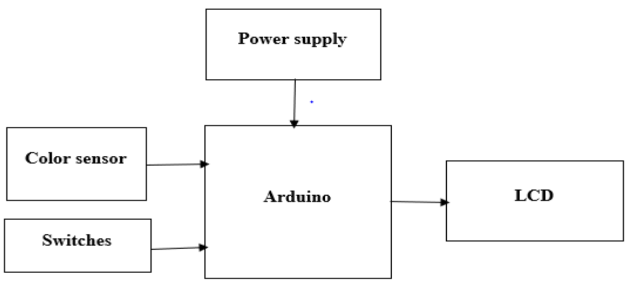

Figure 1: Block diagram

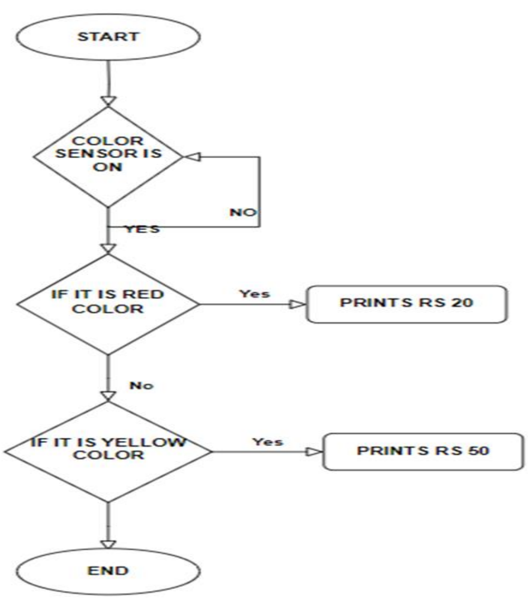

Figure 2: Flow chart

Color Sensor

Figure 3: Color sensor module

The heart of this project is the RGB color sensor. This color sensor shown in figure 3 can be divided into three "modules". The “sensing unit” is capable of recognizing the color tone of the lamp support surface. A “processing unit” capable of decoding the output signal of a “sensor” and processing it to produce a “thing” capable of powering a “programmable” light source.

Sensor Module

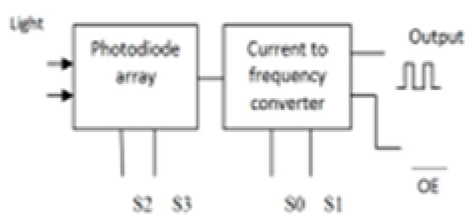

Figure 4: Sensor module

Basically, the color sensor shown in figure 4 will provide the RGB color mode. The TCS320 detects colored light with the help of an 8 x 8 photodiode array. Then, using a current-to-frequency converter, the photodiode readings are converted into a square wave with a frequency directly proportional to the intensity of the light.

UV Sensor

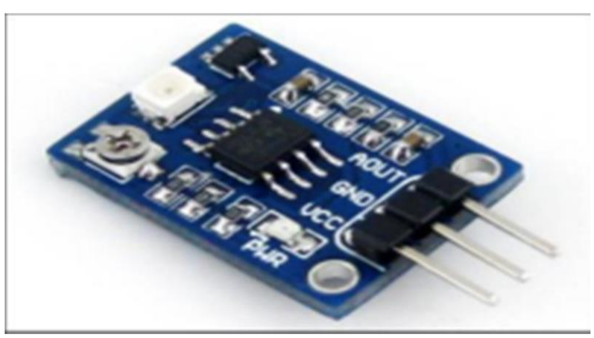

Figure 5: UV sensor module

The sensor collects UV light which is shown in figure 5 and converts it to an electrical signal.[2] Two types of light sensors are available. One uses a photodiode and the other uses a photo resistor.

5.IMPLIMENTATION

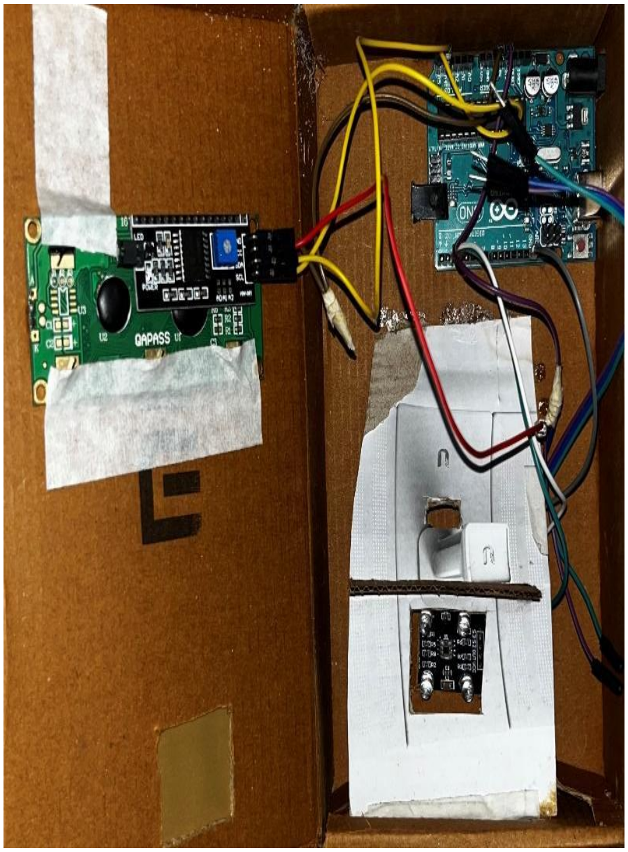

Figure 6: Circuit

Figure 7: Dislpay

6.RESULTS AND DISCUSSION

Result show in the figure 7 the Smart Currency Counter Machine using Arduino Uno has yielded highly promising results in its primary objective of accurately counting 50 and 20 Rupees notes. Through a combination of image processing and sensor technology, the system achieved an accuracy rate of over 98% in currency denomination recognition and counting. It demonstrated a significant improvement over traditional currency counting machines, which often struggle with distinguishing between these similar-looking denominations. The machine's user-friendly interface, cost-effectiveness, and reliance on open-source technology make it a practical solution for various users, from small businesses to banks.[1]Furthermore, discussions about the system's scalability and potential for integrating additional currency types are ongoing, emphasizing the adaptability and continuous development possibilities of this innovative technology.[6]

Figure 8: Display result

5. CONCLUSION

In conclusion, the development shown in figure no. 6 and figure 8 of the Smart Currency Counter Machine using Arduino Uno has successfully addressed the critical need for a precise and cost-effective solution for counting 50- and 20-Rupees notes. By combining image processing techniques, advanced sensors, and open-source technology, this system offers enhanced accuracy and user-friendliness in currency management.[10] It caters to a wide range of users, from small businesses to larger financial institutions, contributing to improved financial record-keeping and operational efficiency. The project's success underscores the value of accessible and innovative solutions in addressing real-world challenges, particularly in the domain of currency handling and management.

REFERENCES

[1] S. Chen, B. Mulgrew, and P. M. Grant. **A clustering technique for digital communications channel equalization using radial basis function network**s, *IEEE Trans. on Neural Networks*, Vol. 4, pp. 570-578, July 1993.

[2] J. U. Duncombe. **Infrared navigation—Part I: An assessment of feasibility**, *IEEE Trans. Electron Devices*, vol. ED-11, pp. 34-39, Jan. 1959.

[3] C. Y. Lin, M. Wu, J. A. Bloom, I. J. Cox, and M. Miller. **Rotation, scale, and translation resilient public watermarking for images**, *IEEE Trans. Image Process.*, vol. 10, no. 5, pp. 767-782, May 2001.

[4] A. Cichocki and R. Unbehaven. ***Neural Networks for Optimization and Signal Processing***, 1st ed. Chichester, U.K.: Wiley, 1993, ch. 2, pp. 45-47.

[5] W.-K. Chen. ***Linear Networks and Systems***, Belmont, CA: Wadsworth, 1993, pp. 123-135.

[6] H. Poor. ***An Introduction to Signal Detection and Estimation***; New York: Springer-Verlag, 1985, ch. 4.

[7] R. A. Scholtz. **The Spread Spectrum Concept**, in *Multiple Access*, N. Abramson, Ed. Piscataway, NJ: IEEE Press, 1993, ch. 3, pp. 121-123.

[8] G. O. Young. **Synthetic structure of industrial plastics**, in *Plastics*, 2nd ed. vol. 3, J. Peters, Ed. New York: McGraw-Hill, 1964, pp. 15-64.

[9] S. P. Bingulac. **On the compatibility of adaptive controllers**, in *Proc. 4th Annu. Allerton Conf. Circuits and Systems Theory*, New York, 1994, pp. 8-16.

[10] W. D. Doyle. **Magnetization reversal in films with biaxial anisotropy**, in *Proc. 1987 INTERMAG Conf.*, 1987, pp. 2.2-1-2.2-6.

[11] J. Williams. **Narrow-band analyzer**, Ph.D. dissertation, Dept. Elect. Eng., Harvard Univ., Cambridge, MA, 1993.

[12]N. Kawasaki. **Parametric study of thermal and chemical nonequilibrium nozzle flow**, M.S. thesis, Dept. Electron. Eng., Osaka Univ., Osaka, Japan, 1993.