AUTOMATIC JUICE VENDING MACHINE

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I. ABSTRACT

This paper presents the designed for automated vending machines has seen a steady rise due to their convenience and efficiency in dispensing various products. In this, we present the design and implementation of an embedded system tailored specifically for a juice vending machine. The system integrates various hardware components such as sensors, actuators, and a microcontroller to automate the process of juice dispensing. A user-friendly interface is developed to enable customers to interact with the vending machine effortlessly.

Additionally, the embedded system incorporates mechanisms for payment processing, ensuring a seamless transaction experience for customers. The implementation of the embedded system involves both hardware and software integration, with careful consideration given to reliability, efficiency, and user experience. Overall, the developed automatic juice vending machine serves as a promising solution for catering to the growing demand for convenient beverage dispensing systems in various settings such as shopping malls, universities, and public spaces.

Keywords: DC motor, 3.5 TFT LCD display, Arduino NANO, IR Sensor, Push button.

II. INTRODUCTION

The juice vending machine typically features a user-friendly interface. The juice vending machine typically features a user-friendly interface, such as a button panel, allowing customers to browse available juice options and make selections. Embedded software controls this interface, displaying relevant information and guiding users through the purchasing process.

Behind the scenes, embedded hardware components, such as microcontrollers

and sensors, manage the machine's operation. These components monitor inventory levels, track sales data, and ensure the proper functioning of mechanical systems for dispensing juice. Payment processing is another critical aspect managed by the embedded system. Whether through cash, credit/debit cards, or digital wallets, embedded software securely handles transactions, authorizing payments and updating inventory accordingly. In button panel, allowing customers to browse available juice options and make selections. Embedded software controls this interface, displaying relevant information and guiding users through the purchasing process.

III. LITURATURE SURVEY

Kamal Nathan proposed microcontroller based automatic paper vending machine. It accepts coins as an input and dispenses sheets as an output. The software used is "embedded". Thus it can be helpful for college and school students.

Qureshi proposed FPGA based vending machine which supports four products and two coins. It accepts coins as input in any sequence and dispenses products when required amount is deposited and returns the change if entered amount is greater than the price of product. It also supports cancel feature through which a user can withdraw the request any time and entered money will be returned back. The algorithm is implemented in Verilog HDL and design is implemented on Xilinx Sparten-3 XC3S400FPGA.

Preetilatha proposed microcontroller based vending machine. It supports cashless payment as the input by scanning of RFID card and dispenses produces like A4 sheets, pencil, pen, etc. Thus it can be helpful to sale stationary items automatic.

IV. EMBEDDED SYSTEM

Embedded systems are specialized computing systems designed to perform specific tasks within larger systems or devices. They are found in a wide range of applications, from consumer electronics like smart phones and digital cameras to industrial machinery, automotive systems, medical devices, and more. What sets embedded systems apart is their integration into a larger system, often with limited resources such as processing power, memory, and energy.

An embedded system-based automatic juice vending machine is an exciting application of technology. Here are some aspects you might want to cover. Explore

papers that discuss the architecture of embedded systems used in automatic juice vending machines. This includes the microcontroller or microprocessor used, sensor integration, and communication protocols. Sensors and actuators the types of sensors used, such as flow sensors to measure juice quantity, temperature sensors for refrigeration control, and actuators for dispensing juice and managing machine operations. Control algorithms Investigate research on control algorithms implemented in these systems. User interface design explore literature on user interface design considerations for embedded systems in juice vending machines. This includes button interfaces, menu structures, and user feedback mechanisms. Power Management especially in the context of vending machines where energy efficiency is crucial. This may include sleep modes, power-saving algorithms, and renewable energy integration. Reliability and fault tolerance investigate papers that focus on ensuring the reliability and fault tolerance of embedded systems in juice vending machines. This includes redundancy mechanisms, error recovery strategies, and system testing methodologies.n, enabling the miniaturization and immense processing power of modern electronic devices.

V.AUTOMATIC JUICE VENDING MACHINE
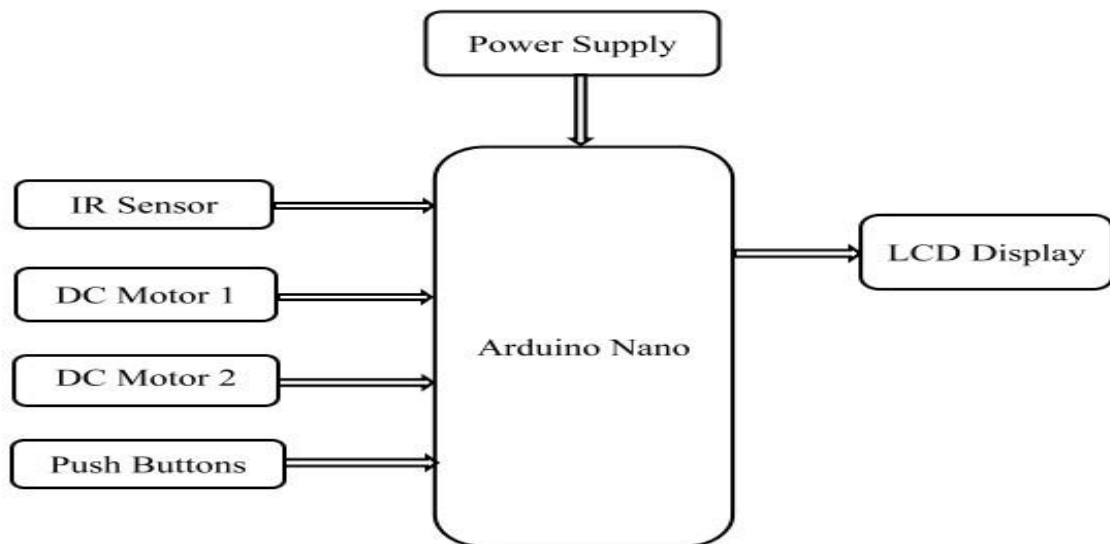
Block diagram

The automatic juice vending machine utilizes various inputs to function seamlessly. At its core, an Arduino Nano microcontroller orchestrates the system. The IR sensor serves as a crucial input, detecting the presence of a cup or container beneath the juice dispenser. Upon detection, it triggers the activation of a DC motor responsible for dispensing the juice. Additionally, pushbuttons provide manual input, allowing users to select their desired juice options or adjust settings.

A stable power supply ensures continuous operation of the system. These inputs collectively enable the vending machine to operate smoothly and efficiently. Once the appropriate inputs are received and processed by the Arduino Nano, the chosen juice selection is displayed on a visual interface, such as an LCD screen or LED display. This output provides users with clear feedback regarding their selection and confirms the machine's readiness to dispense the chosen juice. Overall, the block diagram illustrates the interconnectedness of inputs such as IR sensors, DC motors, pushbuttons, and power supplies, culminating in the presentation of user-selected juice options on the display, facilitating a user-friendly vending experience.

VI. ARDUINO NANO

The Arduino Nano stands as a testament to the evolution of microcontroller technology, offering a potent blend of compactness, versatility, and accessibility. At its core lies the ATmega328P chip, renowned for its reliability and performance. Despite its diminutive size, measuring a mere 18x45mm, this microcontroller board packs a formidable array of features, making it an indispensable tool for electronics enthusiasts, hobbyists, students, and professionals alike.

At the heart of its appeal is its versatility. With 14 digital input/output pins and 8 analog inputs, the Nano provides ample room for interfacing with a diverse range of sensors, actuators, and peripheral devices. Whether you're working on robotics, wearable technology, IoT projects, or interactive art installations, the Nano offers a robust platform for bringing your ideas to fruition. Its compact size makes it particularly well-suited for projects where space is at a premium, allowing for seamless integration into even the most constrained environments.

VII. RESULT
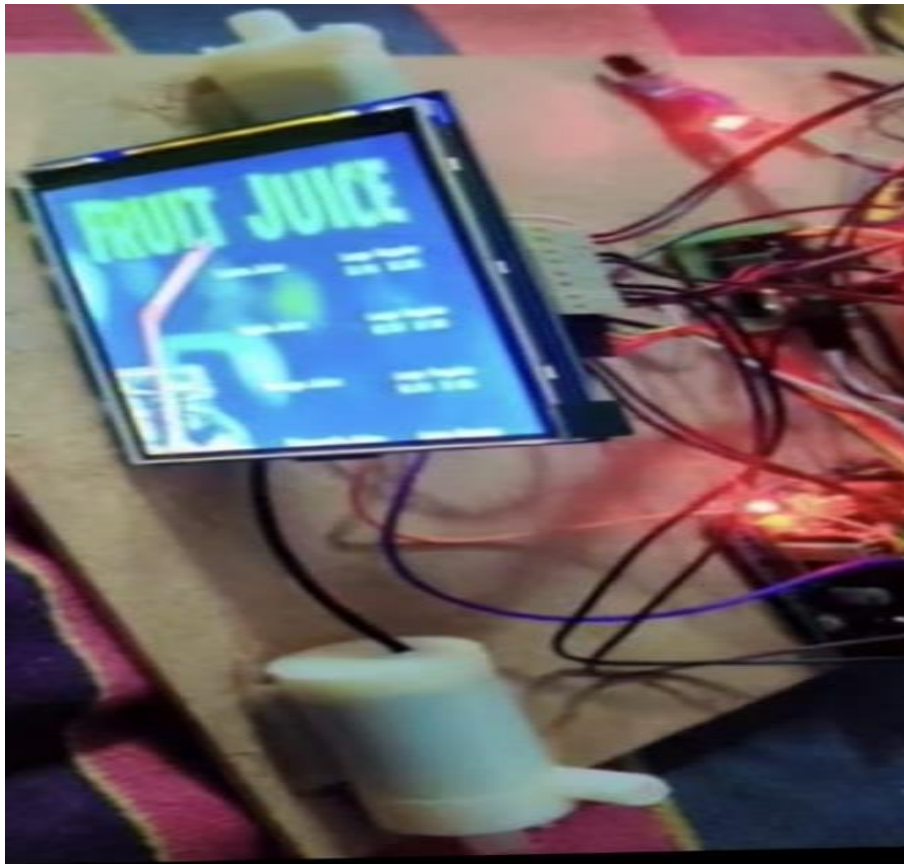
Fruit juice Selection
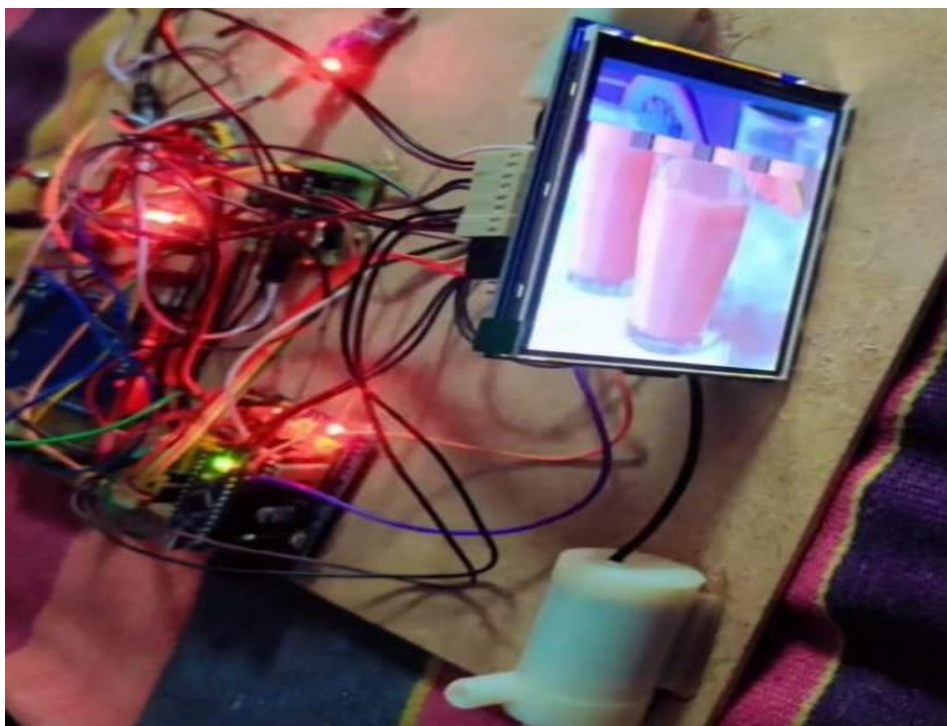
Juice Container Selection

Payment Processing

VIII. CONCLUSION

The implementation of a juice vending machine in an embedded system offers several advantages, including convenience, efficiency, and potentially improved hygiene compared to traditional vending methods. By integrating automated processes into a compact system, users can access freshly prepared juice with ease, reducing wait times and minimizing human error. Additionally, the embedded system can incorporate features such as payment processing and inventory management, enhancing the overall customer experience.

However, challenges such as system reliability, maintenance, and cost-effectiveness must be carefully addressed to ensure the success and sustainability of the juice vending machine project. Overall, the adoption of embedded systems in juice vending machines presents promising opportunities for innovation and customer satisfaction in the beverage industry.

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