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THE DAIRY DATA ACQUISITION SYSTEM

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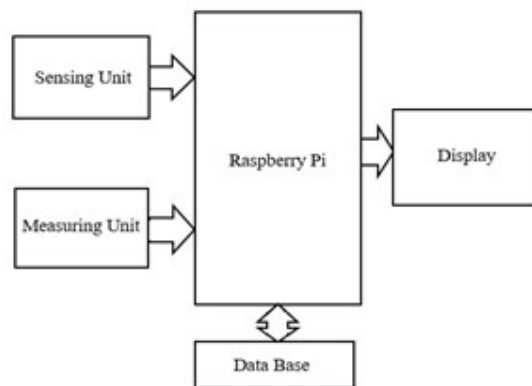
ABSTRACT

The main objective of the smart milk measurement logger is to automate the complete operations of the Milk Distributor Office. The mission of the milk diary data acquisition system is to build a communication bridge between rural area people and dairy distributor booths. This is done to maintain the day to day transactions in milk booths. This project helps to register all the supplier and buyer details, purchase and sales details etc. It is also mandatory to maintain hundreds of thousands of records. Also searching and fetching of the required details should be made instantly which is facilitated by this project. The RFID Based system is used to create an individual data for former. Using these Individual tag id created to dispatch required milk and limit of milk and using different sensors to monitor quality of milk.

KEYWORDS: Data Acquisition, Hardware, Sensor, GSM

INTRODUCTION

Now-a-days the milk adulteration is mostly detected using various chemical tests. These methods are tedious, time consuming and costly. Also the knowledge of the tests is necessary. The nutritional value of milk to human health needs no introduction; it also has traditional impact on Indian society. At the same time it is alarming that many vendors adulterating it with water, detergents, caustic soda, starch, formalin, urea, ammonium sulphate, sodium carbonate which have harmful effect on the human health. The greed for money has pushed them to the extent of producing synthetic milk which has no nutritional content. "Adulteration" is a legal term meaning that a milk product fails to meet federal or state standards. Adulteration is an addition of another substance to milk in order to increase the quantity of the milk in raw form or prepared form, which may result in the loss of actual quality of milk. Milk adulterated is mainly done for financial gain but it can also be adulterated due to unhygienic conditions such as processing, packaging, transportation, distribution etc. Water is the most common adulterant used which decreases nutritional value of milk and lowers the quality of milk. For this reason we are creating this project to check the quality of milk.



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Fig.1. Block Diagram

WORKING METHODOLOGY

The working of our proposed system is based on RFID based system. Initially individual former Milk is dispatched using Individual RFID Tag. The RFID Tag read by RFID reader the individual id of former required milk is dispatched. The different sensor like temperature sensor is used to check the milk temperature; LDR sensor is used to monitor the condemnation level of Milk, moisture sensor is used to monitor the moisture content in Milk. The ultrasonic sensor is used to check the milk flow level and distance of milk dispatched. The milk is dispatched using open and close switch for valve. Any one of sensor abnormal or quality milk low the emergency message sent food department or someone theft the milk diary area the emergency switch in lock it automatically sent message via GSM modem

HARDWARE DETAILS

TEMPERATURE SENSOR

A thermostat is a type of resistor whose resistance varies with temperature. The word is a portmanteau of thermal and resistor. Thermostats are widely used as inrush current limiters, temperature sensors, self-resetting over current protectors, and self-regulating heating elements. Thermostats differ from resistance temperature detectors (RTD) in that the material used in a thermostat is generally a ceramic or polymer, while RTDs use pure metals. The temperature response is also different; RTDs are useful over larger temperature ranges, while thermostats typically achieve a higher precision within a limited temperature range [usually -90°C to 130°C].

LDR

A photoresistor or light dependent resistor or cadmium sulfide (CdS) cell is a resistor whose resistance decreases with increasing incident light intensity. It can also be referred to as a photoconductor. A photoresistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron conduct electricity, thereby lowering resistance.



Fig.2.LDR

A photoelectric device can be either intrinsic or extrinsic. An intrinsic semiconductor has its own charge carriers and is not an efficient semiconductor, e.g. silicon. In intrinsic devices the only available electrons are in the valence band, and hence the photon must have enough energy to excite the electron across the entire bandgap.

SOIL MOISTURE SENSOR

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Soil moisture sensors measure the water content in soil. A soil moisture probe is made up of multiple soil moisture sensors. One common type of soil moisture sensors in commercial use is a frequency domain sensor such as a capacitance sensor. Another sensor, the neutron moisture gauge, utilize the moderator properties of water for neutrons. Cheaper sensors -often for home use- are based on two electrodes measuring the resistance of the soil. Sometimes this simply consists of two bare (galvanized) wires, but there are also probes with wires embedded in gypsum.



Fig.3. Soil moisture sensors

Measuring soil moisture is important in agriculture to help farmers manage their irrigation systems more efficiently. Not only are farmers able to generally use less water to grow a crop, they are able to increase yields and the quality of the crop by better management of soil moisture during critical plant growth stages. Besides agriculture, there are many other disciplines using soil moisture sensors. Golf courses are now using sensors to increase the efficiencies of their irrigation systems to prevent over watering and leaching of fertilizers and other chemicals offsite.

ULTRASONIC SENSOR

Ultrasonic sensors (also known as transceivers when they both send and receive) work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. This technology can be used for measuring: wind speed and direction (anemometer), fullness of a tank and speed through air or water. For measuring speed or direction a device uses multiple detectors and calculates the speed from the relative distances to particulates in the air or water.



Fig.4. Ultrasonic sensor

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To measure the amount of liquid in a tank, the sensor measures the distance to the surface of the fluid. Further applications include: humidifiers, sonar, medical ultrasonography, burglar alarms and non-destructive testing. Systems typically use a transducer which generates sound waves in the ultrasonic range, above 20,000 hertz, by turning electrical energy into sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and displayed. The technology is limited by the shapes of surfaces and the density or consistency of the material. For example foam on the surface of a fluid in a tank could distort a reading.

RFID

The Transponder or tag is fixed on to the baggage to be tracked in the airport. When this tag comes within the range of the reader or integrator, the tag is energized. Now, this tag transmits the data to the reader. This data is automatically sent to the micro-controller for further processing. The time at which the tag is sensed is sent to the micro-controller from the RTC (Real Time Clock). These details are displayed on LCD (Liquid Crystal Display) .The same is sent to the EEPROM (Electrically Erasable and Programmable Read Only Memory), which is used as a backup. It can be stored, and retrieved.



Fig.5. RFID

There are a huge variety of different operating principles for RFID systems. The most important principle is inductive coupling, which is described in detail below.

LCD DISPLAY

A liquid crystal display or LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology. We can see that there is a disadvantage of this project that some patch of the given area may be left uncut due to the obstacle present, in future, we may interface the bot with a wireless technology where we can control the kit manually and keep a check that it does not go out of the desired area.

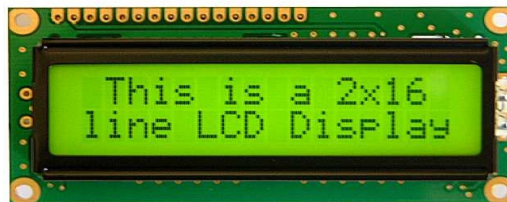


Fig.6.LCD Display

Liquid crystal display screen works on the principle of blocking light rather than emitting light. LCD's requires backlight as they do not emits light by them. We always use devices which are made up of LCD's displays which are replacing the use of cathode ray tube.

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GSM MODEM

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. For the purpose of this document, the term GSM modem is used as a generic term to refer to any modem that supports one or more of the protocols in the GSM evolutionary family, including the 2.5G technologies GPRS and EDGE, as well as the 3G technologies WCDMA, UMTS, HSDPA and HSUPA.



Fig.7. GSM Modem

A GSM modem exposes an interface that allows applications such as Now SMS to send and receive messages over the modem interface. The mobile operator charges for this message sending and receiving as if it was performed directly on a mobile phone. To perform these tasks, a GSM modem must support an “extended AT command set” for sending/receiving SMS messages, as defined in the ETSI GSM 07.05 and 3GPP TS 27.005 specifications.

CONCLUSION

The development and application of low cost and efficient milk dairy quality checking and analyzing system using Arduino controller has been designed in this project. The system allows the measurement of quantitative and qualitative parameters. The developed system is smaller in size and weight; it works with low power consumption and has a fast response. Also efforts could be made to make the system handier so that it could be freely implemented in field operations.

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