ISSN:2348-2079

Volume-6 Issue-1

International Journal of Intellectual Advancements and Research in Engineering Computations

Automatic control of preservative room in food industries

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ABSTRACT:Food safety is everybody's concern, and it is difficult to find anyone who has not encountered an unpleasant moment of foodborne illness at least once in the past year. Foodborne illnesses may result from the consumption of food contaminated by microbial pathogens, toxic chemicals or radioactive materials. Ensuring food safety is becoming increasingly important in the context of changing food habits, popularization of mass catering establishments and the globalization of our food supply. As our food supply becomes increasingly globalized, the need to strengthen food safety systems in and between all countries is becoming more and more evident.

Keywords: PLC, thermocouple, proximity sensor, SMPS, temperature controller, relay.

I. INTRODUCTION

Increasing consumer demand for fresh foods has led to the development of processing and preservation methods that have minimal impact on either the nutritional or sensory properties of foods. Freshly prepared foods often contain less salt, acid, sugar, additives and preservatives. Since the use of mild preservation technologies primarily results in pasteurized products, hygienic processing equipment and a hygienic process environment are needed to prevent microbial, chemical and physical contaminants from affecting these products while preventing product exposure to sources of filth (pests, dust, etc.). Combating product contamination may occur not only at the equipment level but also at the factory level. Incorporation of hygienic design & control into your food processing facility can prevent development of pests and microbiological niches; avoid product contamination with chemicals (e.g., cleaning agents, lubricants, peeling paint, etc.) and particles (e.g., glass, dust, iron, etc.); facilitate cleaning and sanitation and preserve hygienic conditions both during and after maintenance.

There are more technologies are available to control the preservative room but each technologies is designed to control a single parameter by this we can't able to preserve the food at good condition. And all the existing methods are depending upon the manufacturing facilities environment and manufacturing process. Other than this by maintaining the temperature and pressure inside the preservative room will keep the food condition good. This can be controlled by controlling the exhaust system and temperature. Exhaust systems should have sufficient capacity to remove excess heat, dust, vapor, aerosols, odors and bioburden from process rooms. However, a positive overpressure must always be maintained. The supply of filtered air in the room by the heating-ventilation-air conditioning system must thus be large enough; otherwise the exhaust system will attempt to draw the required amount of air from adjacent less clean areas through doorways and windows. This exhaust system can be controlled by Automation. Automation in industries began long before recorded time, with the help of microprocessors. The use of dedicated

software for safety and control applications began with the technological advancement in the field of PLC. The controlling unit in industrial system is a PLC. We will control the temperature and pressure in the preservative room using cooling fans these cooling fans are controlled by the PLC based on the temperature, measured in the room.

PLC

A programmable logic controller, **PLC** or programmable controller is a digital computer used for automation of typically industrial electromechanical processes, such as control of machinery on factory assembly lines, amusement rides, or light fixtures. PLCs are used in many industries and machines.

A **programmable logic controller**, **PLC** or **programmable controller** is a digital computer used for automation of typically industrial electromechanical processes, such as control of machinery on factory assembly lines, amusement rides, or light fixtures. PLCs are used in many industries and machines. PLCs are designed for multiple analogue and digital inputs and output arrangements, extended temperature ranges, immunity to electrical noise, and resistance to vibration and impact. Programs to control machine operation are typically stored in battery-backed-up or non-volatile memory. A PLC is an example of a "hard" real-time system since output results must be produced in response to input conditions within a limited time, otherwise unintended operation will result.

Before the PLC, control, sequencing, and safety interlock logic for manufacturing automobiles was mainly composed of relays, cam timers,drum sequencers, and dedicated closed-loop controllers. Since these could number in the hundreds or even thousands, the process for updating such facilities for the yearly model change-over was very time consuming and expensive, as electricians needed to individually rewire the relays to change their operational characteristics.

Digital computers, being general-purpose programmable devices, were soon applied to control of industrial processes. Early computers required specialist programmers, and stringent operating environmental control for temperature, cleanliness, and power quality. Using a general-purpose computer for process control required protecting the computer from the plant floor conditions. An industrial control computer would have several attributes: it would tolerate the shop-floor environment, it would support discrete (bit-form) input and output in an easily extensible manner, it would not require years of training to use, and it would permit its operation to be monitored. The response time of any computer system must be fast enough to be useful for control; the required speed varying according to the nature of the process.[1] Since many industrial processes have timescales

easily addressed by millisecond response times, modern (fast, small, reliable) electronics greatly facilitate building reliable controllers, especially because performance can be traded off for reliability.

II. EXISTING SYSTEM

There are numerous technologies to preserve the food products, but they proposed on basis to control a single parameter. The exhaust system is brought out later using automation. This began in industries using microprocessors and microcontrollers.

III. PROPOSED METHOD

The proposed method was to overcome the drawbacks in existing one. The technique used in this with the help of PLC. The technique of this overcomes the problem of single parameter automation and effective maintenance of temperature to preserve the food products. It also enhances the effective automation in overall.

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2.1 DESIGNING OF PRESERVATIVE SYSTEM

A PLC product is mainly an assembly of four primary sub-components:

- Proximity Sensor
- Thermocouple
- Temperature Controller
- SMPS

PROXIMITY SENSOR

A proximity sensor is an electronic sensor capable of detecting the presence of nearby objects without physical contact. It emits an electromagnetic field or a beam of electromagnetic radiation (for example: infrared) and then looks for changes in the return signal or field. The object that is being sensed is the proximity sensor's target. Depending on the proximity sensor targets, different sensors may be used. For example, an inductive proximity sensor requires a metal target, whereas a capacitive

photoelectric sensor may be suitable for a plastic target. Proximity sensors have a long functional life and high reliability due to the absence of mechanical parts and the lack of physical contact between the sensor and the target. A proximity sensor that is adjusted to a very short range can often be used as a touch switch.

TEMPERATURE CONTROLLER

A temperature controller is a device used to hold a desired temperature at a specified value. The simplest example of a temperature controller is a common thermostat found in homes. For instance, a hot water heater uses a thermostat to control the temperature of the water and maintain it at a certain commanded temperature. Temperature controllers are also used in ovens. When a temperature is set for an oven, a controller monitors the actual temperature inside of the oven. If it falls below the set temperature, it sends a signal to activate the heater to raise the temperature back to the setpoint. Thermostats are also used in refrigerators. So if the temperature gets too high, a controller initiates an action to bring the temperature down.

Common Controller Applications

Temperature controllers in industry work much the same way they do in common household applications. A basic temperature controller provides control of industrial or laboratory heating and cooling processes. In a typical application,sensors measure the actual temperature. This sensed temperature is constantly compared to a user setpoint. When the actual temperature deviates from the setpoint, the controller generates an output signal to activate other temperature regulating devices such as heating elements or refrigeration components to bring the temperature back to the setpoint.

THERMOCOUPLE

A **thermocouple** is an electrical device consisting of two dissimilar electrical conductors forming electrical junctions at differing temperatures. A thermocouple produces a temperature-dependent voltage as a result of the thermoelectric effect, and this voltage can be interpreted to measure temperature. Thermocouples are a widely used type of temperature sensor.[1]

Commercial thermocouples are inexpensive,[2] interchangeable, are supplied with standard connectors, and can measure a wide range of temperatures. In contrast to most other methods of temperature measurement, thermocouples are self powered and require no external form of excitation. The main limitation with thermocouples is accuracy; system errors of less than one degree Celsius (°C) can be difficult to achieve.[3]

Thermocouples are widely used in science and industry. Applications include temperature measurement for kilns, gas turbine exhaust, diesel engines, and other industrial processes. Thermocouples are also used in homes, offices and businesses as the temperature sensors in thermostats, and also as flame sensors in safety devices for gas-powered major appliances.

SMPS

A switching regulator does the regulation in the switch mode power supply. A series switching element switches the current supply to a smoothing capacitor turn ON and OFF. The voltage on the smoothing capacitor controls the time when the series element is switched. The constant switching of the capacitor keeps the voltage at the necessary level.

SMPS Circuit

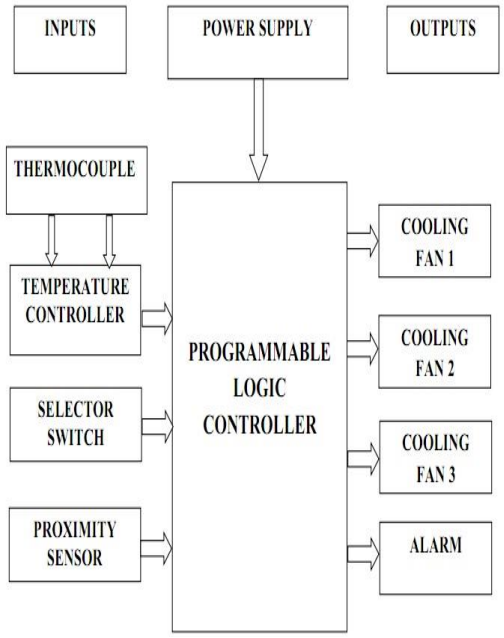
AC power first flows through the fuses & a line filter, then it is resolved by a full wave bridge rectifier. The voltage which is resolved is next used to the PFC (power factor correction) pre-regulator followed by the downstream DC to DC converter. Most of the computers and small machines utilize IEC (International Electrotechnical Commission) style i/p connector. As for o/p connectors and pinouts, excluding for some industries like PC & compact PCI. In general, they are not consistent and are left up to the manufacturer.

Like every electronic device, the switch mode power supply also comprises some active & passive components. And like each of those devices, it has its own benefits and drawbacks.

2.2 PRESERVATIVE ASSEMBLY WITH PLC

Plc is the main component of whole assembly which acts as the central processing unit of preservative system. The working principle of the circuit is once if

the temperature of the preservative room is beyond or below the constant level then it is automatically sensed by the temperature sensor and it is automatically controlled by the temperature controller and the cooling phone is automatically switched on to maintain the constant level of temperature. By this way the temperature is controlled and maintains its originality.



CHALLENGES

1. It can be controlled the whole unit in single rather it is impossible to activate automatically without human intervention.

ADVANTAGES

1. It consumes less time.
2. User friendly.
3. Less power consumption.

Future Scope:

As we are moving to the world of automation, people do expect for advanced technologies without the human intervention. This project has large scope in industries and work field.

CONCLUSION AND FUTURE WORK

In conclusion the overall system of automation is to preserve the food its naturality and its original flavour with good hygiene. The future work of implementation is bringing out SCADA in higher priority.

REFERENCES

G. Dudek and M. Jenkin. Computational Principles of Mobile Robots. Cambridge University Press, 2000.

Evan Terry Associates. Pocket Guide to the ADA: Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities. John Wiley & Sons, revised edition, 1997

K. Goldberg and R. Siegwart, editors. Beyond Webcams. MIT Press, 2002. Chapter 9.

InTouch Health. http://www.intouchhealth.com/, 2003.

N. P. Jouppi. First Steps Towards Mutually-Immersive Mobile Telepresence. In Proc. of the ACM Conference on Computer Supported Cooperative Work, pages 354-363, 2002.

N. P. Jouppi, S. Iyer, W. Mack, A. Slayden, and S. Thomas. A First Generation Mutually-Immersive Mobile Telepresence Surrogate with Automatic Backtracking. In Proc. of IEEE International Conference on Robotics and Automation, 2004.

N. P. Jouppi, S. Iyer, S. Thomas, and A. Slayden. BiReality: Mutually-Immersive Telepresence. In Proc. of ACM Multimedia, 2004.

A. Martinelli. The Odometry Error of a Mobile Robot with a Synchronous Drive System. IEEE Transactions on Robotics and Automation, 18(3):399-405, June 2002.

E. Paulos and J. Canny. Designing Personal Tele-embodiment. In IEEE International Conference on Robotics & Automation, pages 3173-3178, 1998.

E. Paulos and J. Canny. PRoP: Personal Roving Presence. In ACM CHI '98, pages 296-303, 1998.