

Survey on Sensors Usage in Distributed Control System

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Abstract— Sensors play a crucial role in various fields, from everyday consumer devices to advanced scientific research. They are designed to detect and measure physical quantities such as Organic Electrochemical, Humidity, light, Nitrite measurement, and more. This paper provides an overview of sensors, their types, applications, and the impact they have on these systems.

Keywords— Sensor, Control system, Distributed system, light sensor, Electrochemical sensor

I. INTRODUCTION

Deploying sensors and sensing technology has multiple benefits, including predictive and preventive maintenance. They not only ensure that measurement data is transmitted faster, but also increase accuracy, thereby improving process control, and enhancing asset health.

Sensors play a critical role in industrial automation by providing real-time data and enabling the automation of processes, thereby optimising manufacturing and increasing productivity.

This paper consists of three sections. Section 1 introduces the basic principles used in this paper, section 2 describe about sensors, section 3 talk about proposed scheme.

A. Laser Sensor

- Summery

The paper focuses on the development of an integrated laser sensors based measurement system for large-scale components automated assembly applications. The aim is to improve the accuracy and efficiency of the assembly process by implementing a reliable and precise measurement system. The study explores the integration of laser sensors into the assembly line to provide real-time measurements, ensuring proper alignment and positioning of the components. The research presents a comprehensive analysis of the system's development, implementation, and performance evaluation[1].

- Sensor

Laser sensors are optical devices that utilize laser beams to measure distances, positions, and dimensions with high precision. They emit a laser beam onto a target surface and measure the reflected light to determine the distance or

position of the target. Laser sensors offer several advantages for automated assembly applications, including non-contact measurement, fast response time, and high accuracy. In this study, laser sensors are selected based on their suitability for large-scale components automated assembly applications. Factors such as measurement range, resolution, response time, and compatibility with automation systems are considered during sensor selection. The chosen laser sensors are integrated into the assembly line to provide real-time measurements for alignment and positioning of the components. By continuously monitoring the position and alignment of the components during the assembly process, any deviations or errors can be detected and corrected promptly.

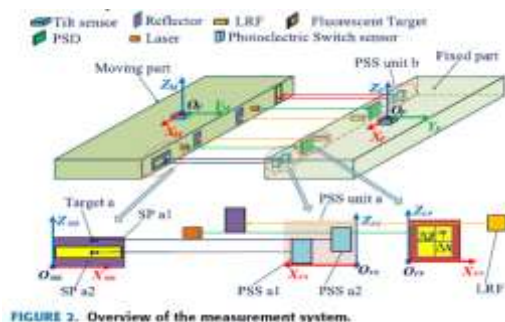


FIGURE 2. Overview of the measurement system.

B. Organic Electrochemical Sensor

- Summery

The paper focuses on develop an impedimetric, PEDOT:PSS-based organic electrochemical sensor for the detection of histamine in precision animal agriculture. Histamine is an important biomarker that indicates spoilage or contamination in animal products such as meat and milk. The objective of this study is to design a sensor that can accurately and rapidly detect histamine levels in real-time, enabling quality control and ensuring food safety. The sensor is fabricated using a thin film of PEDOT:PSS, a conducting polymer, which is deposited onto a substrate. It operates based on the impedimetric sensing principle, where changes in impedance are measured when histamine molecules

interact with the PEDOT:PSS film. Electrochemical impedance spectroscopy (EIS) is employed to characterize the electrical response of the sensor to histamine[2].

- Sensor

Organic Electrochemical Sensor is fabricated using a thin film of PEDOT:PSS (poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate)) material. This conducting polymer is deposited onto a substrate using techniques such as spin coating or inkjet printing.

Sensing Mechanism: The sensor operates based on the impedimetric sensing principle. When histamine molecules come into contact with the PEDOT:PSS film, they interact with the polymer and cause changes in its electrical properties.

Electrochemical Impedance Spectroscopy (EIS): The sensor measures impedance changes in the PEDOT:PSS film by applying an alternating current (AC) signal at different frequencies. EIS allows for the characterization of the electrical response of the sensor to histamine molecules.

C. Nitrite measurement Sensor

- Summery

The paper focuses on the Development an automatic measurement system for nitrite and nitrate in water bodies. Nitrite and nitrate are important indicators of water quality and can have significant impacts on aquatic ecosystems and human health. The objective of this study is to design a system that can accurately and efficiently measure nitrite and nitrate levels in water bodies. The system is designed to be automated, reducing the need for manual sampling and analysis, which can be time-consuming and prone to errors. The measurement system incorporates sensors specifically designed for detecting nitrite and nitrate in water samples. These sensors employ various principles such as electrochemical methods to measure the concentrations of these compounds accurately[3].

- Sensor

Nitrite measurement Sensor utilizes a specific sensing mechanism to detect and measure nitrite and nitrate concentrations in the water.

Electrochemical Sensors: In the case of electrochemical sensors, they consist of electrodes that are designed to selectively react with nitrite and nitrate ions present in the water. These reactions generate an electrical signal that is proportional to the concentration of nitrite or nitrate.

D. Humidity Sensor

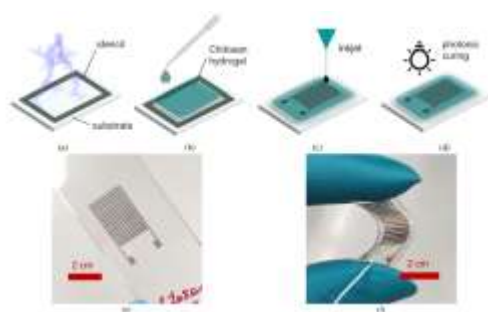
- Summery

The paper focuses on develop a sustainable humidity sensor using a chitosan-based sensing material on a flexible biocompatible polymer substrate. The sensor is fabricated by printing the chitosan-based sensing material onto the flexible polymer substrate using techniques like screen printing or inkjet printing. This allows for precise deposition of the sensing material and integration into various applications. The chitosan-based sensing material exhibits excellent moisture absorption properties, making it suitable for humidity sensing. It can change its electrical conductivity in response to changes in humidity levels. When connected to an electrical circuit, the sensor measures changes in conductivity, which are then converted into meaningful humidity readings[4].

- Sensor

Humidity sensors is the chitosan-based sensing material. Chitosan is a natural polymer derived from chitin, which is found in the exoskeletons of crustaceans like shrimp and crabs. Chitosan has excellent moisture absorption properties, making it suitable for humidity sensing applications. It can change its electrical conductivity in response to changes in humidity levels.

To create the sensor, the chitosan-based sensing material is printed onto the flexible biocompatible polymer substrate using a printing technique such as screen printing or inkjet printing. This allows for precise deposition of the sensing material onto the substrate.



E. COMPARISON OF SENSORS

Title	Summery	Sensors
Laser Sensor	The aim is to improve the accuracy and efficiency of the	Laser sensors are optical devices that utilize laser beams to measure

	assembly process by implementing a reliable and precise measurement system. The study explores the integration of laser sensors into the assembly line to provide real-time measurements, ensuring proper alignment and positioning of the components	distances, positions, and dimensions with high precision. They emit a laser beam onto a target surface and measure the reflected light to determine the distance or position of the target.		humidity sensor using a chitosan-based sensing material on a flexible biocompatible polymer substrate.	the exoskeletons of crustaceans like shrimp and crabs. Chitosan has excellent moisture absorption properties, making it suitable for humidity sensing applications.
Organic Electrochemical Sensor	The paper focuses on develop an impedimetric, PEDOT:PSS-based organic electrochemical sensor for the detection of histamine in precision animal agriculture	sensor operates based on the impedimetric sensing principle. When histamine molecules come into contact with the PEDOT:PSS film, they interact with the polymer and cause changes in its electrical properties			
Nitrite measurement Sensor	The paper focuses on the Development an automatic measurement system for nitrite and nitrate in water bodies	react with nitrite and nitrate ions present in the water. These reactions generate an electrical signal that is proportional to the concentration of nitrite or nitrate.			
Humidity Sensor	The paper focuses on develop a sustainable	Chitosan is a natural polymer derived from chitin, which is found in			

II. PROPOSED SCHEME

Sensors are essential devices that detect and measure physical quantities in order to provide valuable data for analysis and decision-making.

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