**Abstract**

**Introduction**

* **Demand of sensor measurement**

In recent years, the demand for sensor measurements has increased significantly due to the growth in various fields such as healthcare, industrial control, and environmental monitoring (Yurish et al., 2005). Sensors play a crucial role in capturing data and converting physical properties into electrical signals, which can then be processed to provide useful information. Furthermore, with advancements in technology, there is Growing demand for high accuracy and precision, such in self-driving cars that require high accuracy and precision in analyzing decision-making (Parekh et al., 2022).

* **Study about increasing the ability of measurement (calibration, filtering and digital signal processing)**

The study and approach to increasing sensor measurement quality is an important area of research that is aimed at improving the accuracy and precision of sensor measurements. In order to achieve high quality measurements, various methods and techniques are used to improve the performance of sensors and reduce the sources of error that can affect the measurement results. These methods can include the use of high-precision sensors by improving the quality of the material (Beaver et al., 2021), advanced digital signal processing techniques by implementing Kalman Filter (Ahmed et al., 2020) and Moving Average Filter (Redhyka et al., 2016), and the implementation of calibration procedures using polynomial regression (Maciej Serda et al., 2017). By combining these methods and techniques, researchers aim to provide reliable and accurate sensor measurements that can be used for a wide range of applications, from industrial process control to scientific research.

* **Purpose of this research**

There are several approaches to filtering data using digital signal processing methods in a microcontroller to avoid noise. An approach is to use digital signal processing techniques, such as averaging or median filtering, to remove noise from the data. Additionally, techniques such as Chauvenet Criterion can be used to estimate outlier in the data. hauvenet criterion over the Kalman filter is that it is computationally less intensive, making it well suited for use in microcontroller applications where processing power is limited. Furthermore, the Chauvenet criterion does not require any prior knowledge of the system being measured, whereas the other approach such as Kalman filter relies on having a model that accurately describes the system. This can make the Chauvenet criterion more flexible and adaptable to a wider range of data sets, without the need for extensive prior knowledge.

**s**This research aims to implementing the Chauvenet criterion algorithm for data filtering using the ATmega328p microcontroller with a voltage sensor is a useful approach for ensuring data quality. By combining the Chauvenet criterion with a voltage sensor, the resulting system is able to produce high-quality data with high precission and accuracy, providing reliable information for further analysis and decision making.

**Literature Review**

* **Polynomial Regression**

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| --- | --- |
|  | |
|  | = degree of the polynomial. |
|  | = intercept of k |
|  | = random error |

|  |  |
| --- | --- |
|  | |
|  | = Square of residuals |
|  | = Summation index of data |
|  | = Total number of data |
|  | = Actual value of data |

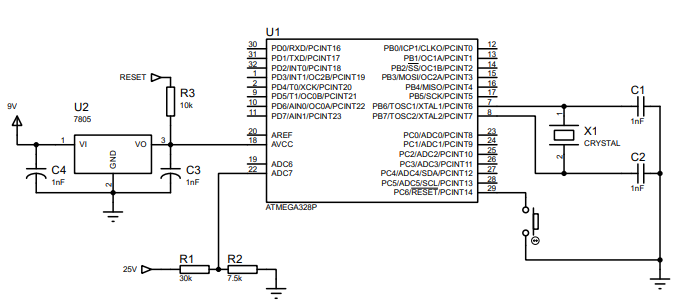
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|  | |
|  | = Square of residuals |
|  | = Summation index of data |
|  | = Total number of data |
|  | = Actual value of data |

* **Chauvenet Criterion**
* **Error function in power Series**

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| --- | --- |
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**Material and Method**

* **Circuit Design**

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* **Pseudocode removing outlier**
* **Data Collecting approach**

**Result and Discssion**

* **Data distribution without Chauvenet**
* **Data distribution with Chauvenet**
* **Chauvenet outlier graph**
* **Time consumed**

**Conclussion**

**Reference**

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