Task 1 - build a model to answer a question

* **question: Model the err, and errf columns for individual 'scanners' to show a expected failure rate of the encoder component.**

1. **Scanners identified into two groups, based on the following criteria and grouping:**
   1. **never fail: scanners whom never reach the 12 % range for err**
   2. **routinely fail: scanners whom reach the 12% range for err on a routine basis**
2. **err and errf are both float values, they are loosely tied to each other, and are not a 1 for 1 relationship, e.g. a rising err value doesn't mean a errf value will rise, nor the opposite.**

Failure is defined as a err that is above 12 % and/or a errf that is above 0.5 %

* 1. background:  err and errf represent a encoder error rate at which a led light is pulsating into a window barrier.  This barrier, and subsequent calculation, represent the rate of rotation of a component, and the compensated ERRor and ERRor Filtered value.

task 3 - explain why the model was chosen to answer the question asked

task 4 - explain the performance of the model, and of other models that would prove the same question.

[**https://towardsdatascience.com/how-to-implement-machine-learning-for-predictive-maintenance-4633cdbe4860**](https://towardsdatascience.com/how-to-implement-machine-learning-for-predictive-maintenance-4633cdbe4860)

[**https://tryolabs.com/blog/2020/09/03/predictive-maintenance-using-machine-learning/**](https://tryolabs.com/blog/2020/09/03/predictive-maintenance-using-machine-learning/)

**\*\*\*** [**https://medium.com/swlh/machine-learning-for-equipment-failure-prediction-and-predictive-maintenance-pm-e72b1ce42da1**](https://medium.com/swlh/machine-learning-for-equipment-failure-prediction-and-predictive-maintenance-pm-e72b1ce42da1)

1. **Amazon Monitron, a Simple and Cost-Effective Service Enabling Predictive Maintenance:**

[**https://www.youtube.com/redirect?event=video\_description&redir\_token=QUFFLUhqbTdldjZjWHZRVDJ5Y0wtd0RjNE1TcS1yZC1Zd3xBQ3Jtc0tubVpRVXZUZHV4dTlfRXlaR2VqeWNKeE5CMWNOaVl3czVJMnpuS1N5R205U1lwLUFLdU1TbXlUNGtCblN2WWgzeTZ1d3FiYzJnNHl5UmJEbElUeXZlV2JhSHVhN1gyd0JjRmJMSmVxYUVUS182b2pEaw&q=https%3A%2F%2Faws.amazon.com%2Fblogs%2Faws%2Famazon-monitron-a-simple-cost-effective-service-enabling-predictive-maintenance%2F**](https://www.youtube.com/redirect?event=video_description&redir_token=QUFFLUhqbTdldjZjWHZRVDJ5Y0wtd0RjNE1TcS1yZC1Zd3xBQ3Jtc0tubVpRVXZUZHV4dTlfRXlaR2VqeWNKeE5CMWNOaVl3czVJMnpuS1N5R205U1lwLUFLdU1TbXlUNGtCblN2WWgzeTZ1d3FiYzJnNHl5UmJEbElUeXZlV2JhSHVhN1gyd0JjRmJMSmVxYUVUS182b2pEaw&q=https%3A%2F%2Faws.amazon.com%2Fblogs%2Faws%2Famazon-monitron-a-simple-cost-effective-service-enabling-predictive-maintenance%2F)

# Amazon Lookout for Equipment Analyzes Sensor Data to Help Detect Equipment Failure

[**https://www.youtube.com/redirect?event=video\_description&redir\_token=QUFFLUhqbVVWeUN4MXNSRldOb2p4MkV5Tl8wUU5kQ0ZOUXxBQ3Jtc0tuLXRONDl4U1NudC0zU0J5bFRnV2NxMEc2V1RGQkRnckQtYzhCRHpIZnpwMkFpVGtPeGpZQnd0TzlYX1BfanllRHJiTDNrakhVeTQ3QXQxcVRjSms4Q0VtQVROSWJYUVhSSFhpX3Z0ejA5U19rLTNWYw&q=https%3A%2F%2Faws.amazon.com%2Fblogs%2Faws%2Fnew-amazon-lookout-for-equipment-analyzes-sensor-data-to-help-detect-equipment-failure%2F**](https://www.youtube.com/redirect?event=video_description&redir_token=QUFFLUhqbVVWeUN4MXNSRldOb2p4MkV5Tl8wUU5kQ0ZOUXxBQ3Jtc0tuLXRONDl4U1NudC0zU0J5bFRnV2NxMEc2V1RGQkRnckQtYzhCRHpIZnpwMkFpVGtPeGpZQnd0TzlYX1BfanllRHJiTDNrakhVeTQ3QXQxcVRjSms4Q0VtQVROSWJYUVhSSFhpX3Z0ejA5U19rLTNWYw&q=https%3A%2F%2Faws.amazon.com%2Fblogs%2Faws%2Fnew-amazon-lookout-for-equipment-analyzes-sensor-data-to-help-detect-equipment-failure%2F)

To develop an algorithm, you need a large set of sensor data collected under different operating conditions. In cases, where sensor data is not enough, you can use simulation data that is representative of failures by creating a model of your machine and simulating faulty operating conditions

1. Designing Algorithms for Condition Monitoring and Predictive Maintenance:

[Designing Algorithms for Condition Monitoring and Predictive Maintenance - MATLAB & Simulink (mathworks.com)](https://www.mathworks.com/help/predmaint/gs/designing-algorithms-for-condition-monitoring-and-predictive-maintenance.html?s_eid=PSM_15028)