

# Image Quality Inspection tool using AWS

## Project Report

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### Problem Statement:

Errors can be made by both humans and machines. Detecting and correcting these errors is important as ignoring them could lead to fatal damages to human kind or the machines used. Being on the safer side and fixing the problem is always the best way to fix the error.

Reviewing every single piece of product could be tedious and is extremely manual labour intensive, this could be extremely time consuming and labour intensive, with the results being not very accurate.

### Project Description:

The project aims to build a Quality inspection tool for machines which automates the process of error detection using Machine Learning.

- Such an automated tool would simplify the error detection mechanism in machines and circuits.
- This ML and cloud based algorithm can also help the user detect error with high accuracy and could reduce a lot of manual labour and expense.

Using AWS Cloud services, we will build an automated image quality inspection tool using Amazon Lookout for vision. Amazon lookout for Vision is a Machine Learning tool provided by Amazon which we used to do image Analytics and address interesting use cases such as Drone detection, defect detection, object detection, smile detection, fall detection without writing a single line of code.

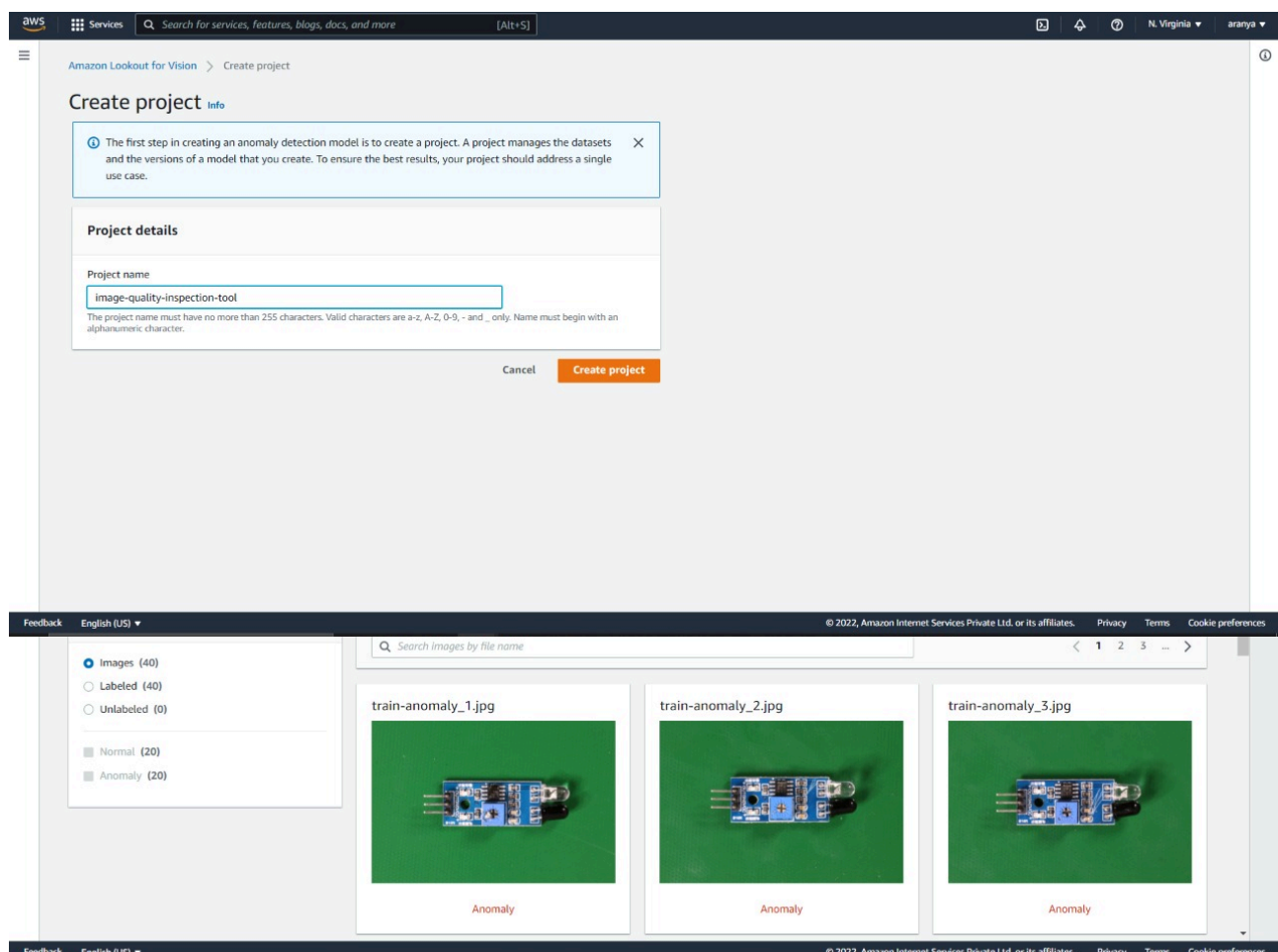
### Steps we have taken in the project are:

1. Creating a blank project on AWS:- We create an empty project on AWS Lookout for vision.
2. Creating an S3 bucket linked with Lookout for vision:- a S3 bucket is created automatically and linked to our new model.
3. Uploading and labelling our Dataset:- We have taken multiple pictures as our training images and as our test images, and then we label them as anomaly or normal data so the platform learns the difference between them.
4. Train your model:- We train our model here using the Anomaly and normal pictures in the training model data set and they look at the pictures and note

down the key differences between the normal pictures and the damaged or blur ones.

5. Evaluating performance metrics:- in this step we run our test cases and recheck if our trained model is working accurately and here we can find out the the accuracy of our model and the errors in it.
6. Running trial detection:- Trial detection is run so we know if the Instances deployed work properly.
7. Retraining Model:- Our model is retrained with extra images given as a data set and then hence the results coming in this test case will be much more accurate.

## Attached Screenshots of the steps taken:



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Amazon Lookout for Vision > Projects > image-quality-inspection-tool > Dataset

image-quality-inspection-tool

Add labels

Actions

Train model

Training (40)

Test (40)

Your test dataset has enough labeled images to test a model.

- You can add more labeled test images to improve the testing of your model.
- Unlabeled images aren't used for testing.

Filters

Images (40)

Labeled (40)

Unlabeled (0)

Normal (20)

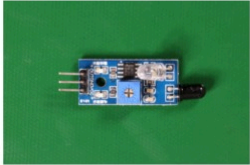
Anomaly (20)

Images (40)

Search images by file name

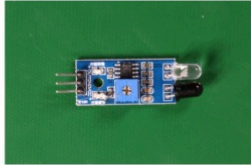
< 1 2 3 ... >

test-anomaly\_1.jpg



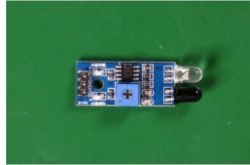
Anomaly

test-anomaly\_2.jpg



Anomaly

test-anomaly\_3.jpg



Anomaly

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Performance metrics

Tags

Model performance metrics

Status

Training complete

Status message

Training completed successfully.

Date created

March 6th, 2022 at 1:27:30 AM GMT+05:30

Train duration

42 minutes 27 seconds

Test images

40 images

Precision

95%

19 anomalies were correct out of 20 total predictions

Recall

95%

19 anomalies were predicted out of 20 total anomalies

F1 score

95%

The overall model performance.

Test results overview

Predicted as normal

Correct (True negative)

19

Incorrect (False negative)

1

Predicted as anomaly

Correct (True positive)

19

Incorrect (False positive)

1

Filters

Images (40)

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Predicted as normal

Correct (True negative)

19

Incorrect (False negative)

1

Predicted as anomaly

Correct (True positive)

19

Incorrect (False positive)

1

Filters

All images (40)

Predicted as normal (20)

Predicted as anomaly (20)

Correct (38)

Incorrect (2)

Sorting options

Lowest confidence score

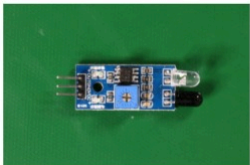
Highest confidence score

Images (1)

Search images by file name

< 1 - >

test-anomaly\_13.jpg



Incorrect

Prediction

Normal

Confidence

99.1%

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**Conclusion:**

The trained model on AWS Lookout for vision gives an approximate accuracy of 95% which is extremely accurate compared to manual error detection and our Machine works perfectly.