Title:- **IMAGE RECOGNITION USING PYTHON IN AWS CLOUD**

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IMAGE RECOGNITION USING PYTHON IN AWS CLOUD

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ABSTRACT

Responsiveness and scalability are important quality-of-service attributes for any Web applications. While performing image classifications online. Web sites that are slow, either because of poor responsiveness or lack of scalability, can produce user dissatisfaction by slow image processing, loss of revenue and productivity, and potentially more serious consequences. To avoid these problems, it is important to know whether users will be able to access information in a timely fashion, whether the hardware will be able to handle the incoming load, and whether the system will scale to meet project demand before the system is deployed. Amazon Web Services (AWS) is used to deploy this application and solve these problems. Classification of image is processed using Flask. Application will perform backend predictions using Keras a module of Tensorflow. User will input a Image file by clicking on upload image or by using drag & drop feature implemented by using JavaScript, that input data is processed through Keras to predict the image online Pre- Trained data present in Tensorflow and produces image kind as output in text format.

1. INTRODUCTION

1.1 Introduction

Keras is one of the most popular python libraries for Deep Learning. It is the finest choice for Deep Learning models and programs. It is very simple and easy and written in Python. Keras is an API for training different programs. It can run on the top of Theano and TensorFlow. It is a high-level library. Keras was invented to make the Deep Learning task fast and efficient. It is one of the most useful libraries in Deep learning. It provides an effective and convenient way to learn and train Deep Learning models and programs. Kerascan execute on GPU and CPU both. It is compatible with Python 2.7 to 3.6 to date and has cross-platform compatibility. Keras supports both recurrent networks and convolutional networks. It also enables the combination of both. It enhances the use of multiple platforms. Keras also supports the use of backends. It is because Keras does not handle low-level computations. So, it makes use of other libraries to do this. Keras focuses on the idea of the model. It enables you to develop deep learning projects with fewer lines of code.

It is a very useful library for Deep Learning. It enables the prototyping tasks of Deep Learning easy and fast. Many developers prefer Keras because it helps to optimize their tasks. It saves time and energy. There are many famous organizations that make use of Keras like Google, Netflix, Uber, Microsoft, Huwaei, etc. It has a large adaptation by various industries and research communities. There is around 200,00 user who considers Keras the best platform for Deep Learning. Many of the start-ups working with the model of Machine Learning prefer Keras. Amazon Web Services Automatic Scaling with Elastic load Balancer monitors the applications and automatically adjusts capacity to maintain steady, predictable performance while performing the prediction of image usingPython. With AWS Auto scaling, the applications always have the right resources available at the right time.

1.2 Existing System

In earlier days when a simple image needs to be preceded it first need to be trained by similar images in bulk to get identified which gets process slowed down which cause more delay, we have to manually

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setup training on new images to be trained separately. We have to provide more time and required data models in bulk. This takes a lot of manpower and time to collect data for models or for scrapping online. During this process the website may be unavailable to the users so that there may be inconvenience to both users and the owner. Since the shared web hosting has very limited resources, these servers cannot handle high traffic and drain the performance of an application when processing the image.

1.3 Proposed System

Using Pre-Trained models to predict the images without training data every time, we use Keras module to automatically detect from the per-trained module from Keras/ Tensorflow APIs references from online. One can automatically increase the size of your Auto Scaling group when demand goes up and decrease it when demand goes down so there won't be any problem while processing image. As the Auto Scaling group adds and removes Amazon EC2 instances, you must make sure that the traffic for your application is distributed across all of your instances. The Elastic Load Balancing service automatically routes incoming web traffic across such a dynamically changing number of instances.

2. SYSTEM ANALYSIS

2.1 Scope of the Project Better fault tolerance:

TensorFlow pre-trained data will be used for better image prediction which reduce wrong data to be trained as before and also Amazon EC2 Auto Scaling can detect when an instance is unhealthy, terminate it, and launch an instance to replace it. You can also configure Amazon EC2 Auto Scaling to use multiple Availability Zones. If one Availability Zone becomes unavailable, Amazon EC2 Auto Scaling can launch instances in another one to

compensate. Better availability: Due to pre trained modules accuracy will be more than our trained data with bulk images, Amazon EC2 Auto Scaling helps ensure that your application always has the right amount of capacity to handle the current traffic demand. Better cost management: Amazon EC2 Auto Scaling can dynamically increase and decrease performance required for image processing as needed. Because you pay for the EC2 instances you use, you save money by launching instances when they are needed and terminating them when they aren't.

2.2 Identification of Needs

The dataset is taken from the Animal breed Identification competition hosted on Kaggle, a data science and machine learning competitions hosting platform. It contains approximately 10,000 labeled images, each of them depicts a animal from one of 120 breeds, and the same amount of testing (i.e. unlabeled) data. Generally, these images have different resolutions, various zoom levels, they could have more than one animal shown, and were taken in various lighting conditions.

2.3 Preliminary Investigation

In previous days when a web page or a website gets more requests or crosses the limit of users accessing the web page then the servers must be launched manually which was a big problem. This also causes a huge man power and loss of time and data.

2.4 Feasibility Study

An important outcome of the preliminary investigation is the determination that system requested is feasible. This is to identify the objectives of a new system. Before solving a problem one must know what the problem is. The study is carried out by a small group of people who are familiar with system analysis and design

process. Fact finding techniques are used to gather the required information.

3. SYSTEM DESIGN

3.1 System Architecture and Flow

System design is transition from a user-oriented document to programmers or data base personnel. The design is a solution, how to approach to the creation of a new system. This is composed of several steps. It provides the understanding and procedural details necessary for implementing the system recommended in the feasibility study. Designing goes through logical and physical stages of development, logical design reviews the present physical system, prepare input and output specification, details of implementation plan and prepare a logical design walk through. The database tables are designed by analyzing functions involved in the system and format of the fields is also designed. The fields in the database tables should define their role in the system. The unnecessary fields should be avoided because it affects the storage areas of the system. Then in the input and output screen design, the design should be made user friendly. The menu should be precise and compact.

Software Design

In designing the software following principles are followed:

• Modularity and partitioning:Software is designed such that, each system should consist of hierarchy of modules and serve to partition into separate function.

• Coupling: Modules should have little dependence on other modules of a system.

• Cohesion: Modules should carry out in a single processing function.

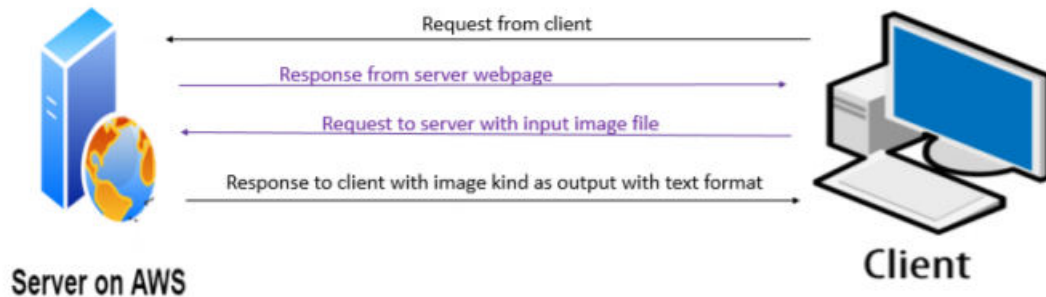• Shared use: Avoid duplication by allowing a single module is called by other

3.2 Design Diagrams using UML Approach

The unified modeling is a standard language for specifying, visualizing, constructing and documenting the system and its components is a graphical language which provides a vocabulary and set of semantics and rules. The UML focuses on the conceptual and physical representation of the system. It captures the decisions and understandings about systems that must be constructed. It is used to understand, design, configure and control information about the systems. Depending on the development culture, some of these artifacts are treated more or less formally than others. Such artifacts are not only the deliverables of a project, they are also critical in controlling, measuring, and communicating about a system during its development and after its deployment. The UML addresses the documentation of a system's architecture and all of its details. The UML also provides a language for expressing requirements and for tests. Finally, the UML provides a language for modeling the activities of project planning and release management.

Application Flow

Application Flow is the diagram represents the working sequence of our website , At first when client access the website it will send a Request to server and will sends acknowledgment to the client to access web Page When the person search the image using the webpage It will send a Request to server along with image dimensions which are calculated by keras and in response the client / person will receives the data from the online keras database and will display the type of the image on screen.

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Server on AWS — Request from client — Response from server webpage — Request to server with input image file — Response to client with image kind as output with text format — Client

4. DEVELOPMENT TOOLS AND TECHNOLOGIES

4.1.1 Python

Python is an interpreted, interactive, object-oriented programming language. It incorporates modules, exceptions, dynamic typing, very high level dynamic data types, and classes. Python combines remarkable power with very clear syntax. It has interfaces to many system calls and libraries, as well as to various window systems, and is extensible in C or C++. It is also usable as an extension language for applications that need a programmable interface. Finally, Python is portable: it runs on many Unix variants, on the Mac, and on Windows 2000 and later. When he began implementing Python, Guido van Rossum was also reading the published scripts from "Monty Python's Flying Circus", a BBC comedy series from the 1970s. Van Rossum thought he needed a name that was short, unique, and slightly mysterious, so he decided to call the language Python.

Python Features

provides lots of features that are listed below.

1) Easy to Learn and Use Python is easy to learn and use. Python It is developer-friendly and high level programming language.

2) Expressive Language Python language is more expressive means that it is more understandable and readable.

3) Interpreted Language Python is an interpreted language i.e. interpreter executes the code line by line at a time. This makes debugging easy and thus suitable for beginners.

4) Cross-platform Language Python can run equally on different platforms such as Windows, Linux, Unix and Macintosh etc. So, we can say that Python is a portable language.

5) Free and Open Source Python language is freely available at official web address. The source-code is also available. Therefore it is open source.

6) Object-Oriented Language Python supports object oriented language and concepts of classes and objects come into existence.

5. TESTING

5.1 Testing Techniques and Testing Strategies used:

Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. The user tests developed system and changes are made according to their needs. Testing is process, which reveals errors in the program. It is the major quality measure played during software development. During testing, the program is executed with a set of test cases and the output of the program for the test cases is evaluated determine if the program is performing as it is expected topper form. When a system is developed, it is hoped that it performs properly. In practice

however some errors always occur. The main purpose of testing an informationsystem is to find the errors and correct them. A successful test is one that found an error. The main objectives of the system testing are,

• To ensure during operation the system will perform as per specification
• To make sure that the system meets user requirements during operation
• To verify that the controls incorporated in the system function as intended.
• To see that when correct inputs are fed to the system and the outputs are correct.

• To make sure that during operation, incorrect input processing and output will be deleted.

If the testing is conducted successfully, it will uncover errors in the software. As a secondary benefit, testing demonstrates that the software functions appear to be working according to specification and that performance requirements appear to have been made.

5.2 Testcases:

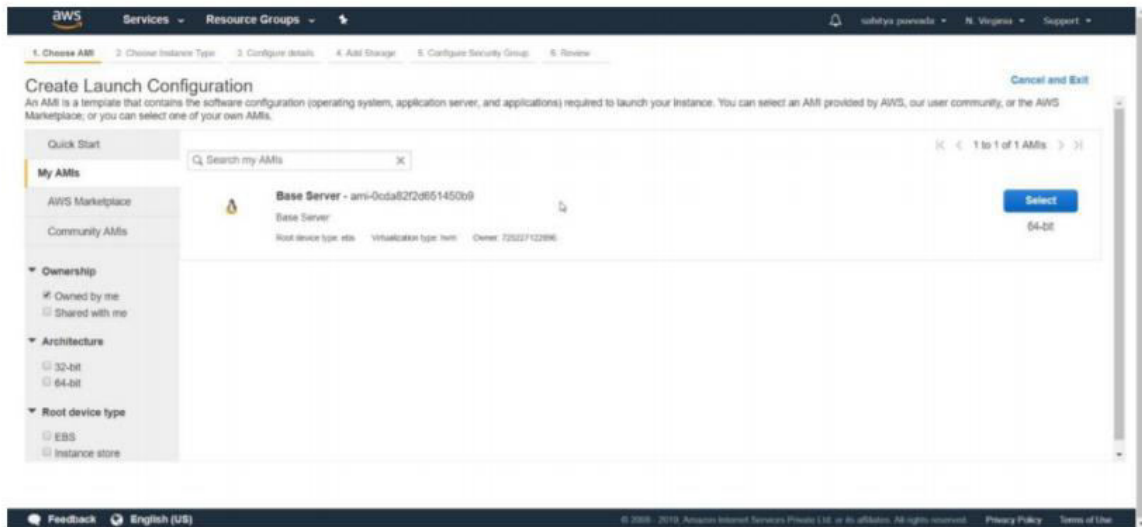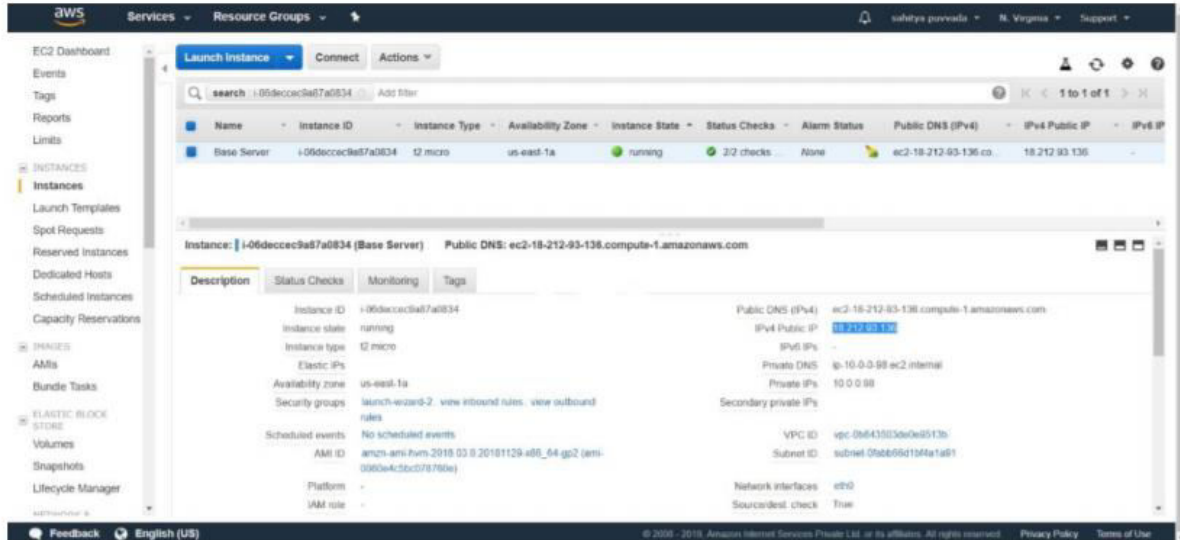Testcase 1: Authorized user from AWS with an active account.
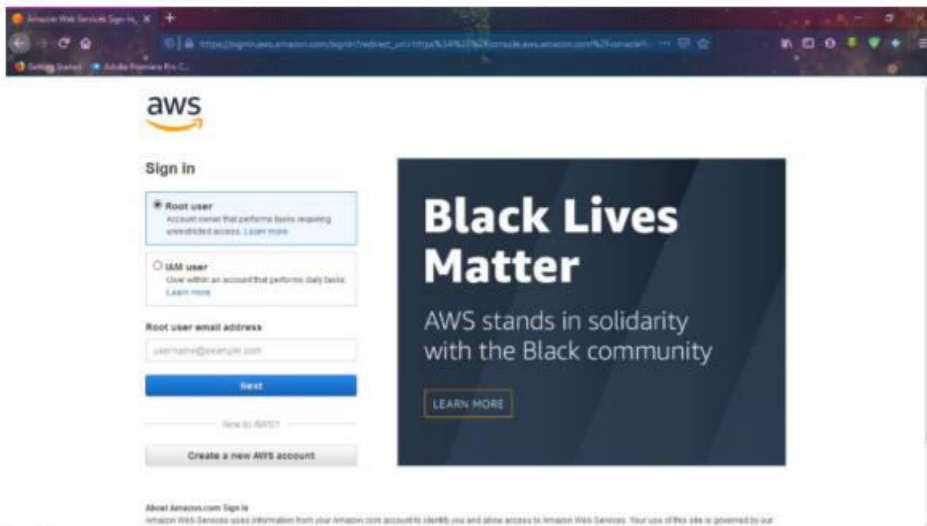
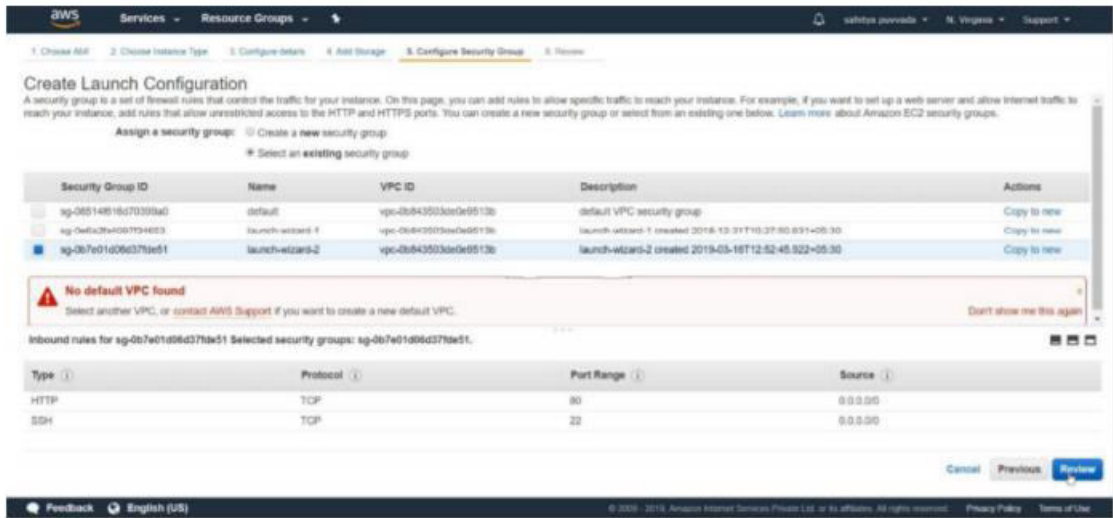Testcase 2. Output of front-end page with source code

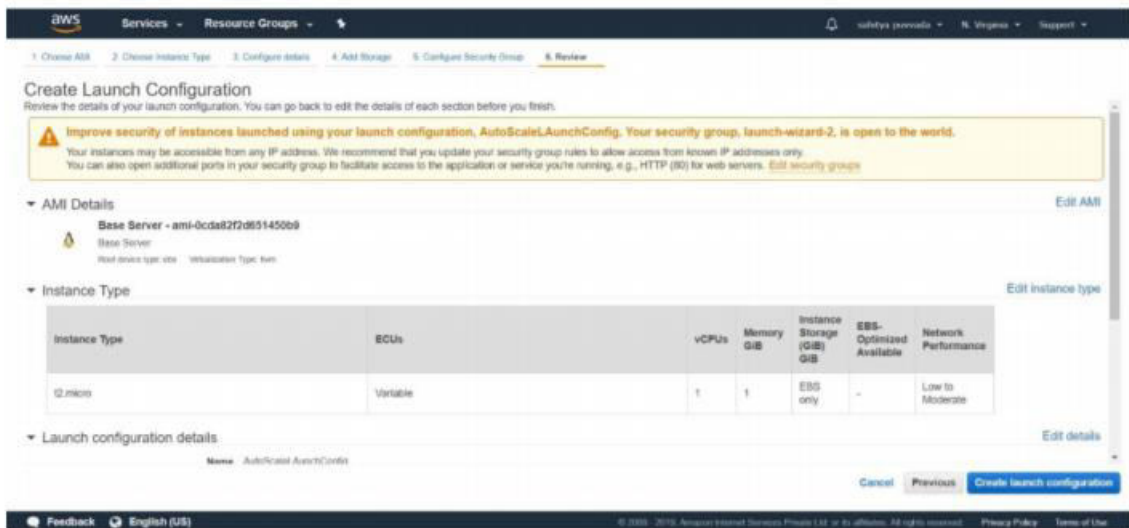**6. SCREENSHOTS**   Launching   an   EC2   Instance:

Creating AMI for Auto Scaling:Configuring the security groupsfor the instance:
Create Launch Configuration

Launch configuration creation review:

CONCLUSION

In our project we are using Pre-Trained models to predict the images without training data every time, we use Keras module to automatically detect from the per-trained module from Keras/ Tensorflow APIs references from online.In order to increase the availability of our application we are deploying the application in AWS cloud .So it provides scalability and availability to the user during image processing.

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