

- **Project:** Machine Learning Model Deployment with IBM Cloud Watson
- **Phase_4:**Development and integrating with a website using flask

Problem definition:

A clear statement describing the initial state of a problem that's to be solved. The statement indicates problem properties such as the task to be solved, the current performance of existing systems and experience with the current system.

Deploying models with Watson Machine Learning:

IBM Watson Machine Learning, you can deploy models, scripts, functions and web apps, manage your deployments, and prepare your assets to be put into production and to generate predictions and insights.

The Watson Machine Learning to deploy models and solutions so that you can put them into productive use, then monitor the deployed assets for fairness and explainability. You can also automate the AI lifecycle to keep your machine learning assets current.

.Design Thinking

1. Predictive Use Case:

Predictive analytics use case provides suggestions on market segments to increase your customer value and revenue derived from your customer. The business sales are raised, and your customer walks away with items that work together.

As an example of retail predictive modeling, Walmart studies 200 billion rows of transactional information on a bi-weekly basis to best position products, schedule sales, and other activities.

Objectives:

The first step is to clearly define the problem we aim to solve with predictive analytics. This involves identifying a specific use case that has practical value.

Action Steps:

- Conduct stakeholder interviews and gather insights to understand the business needs.
- Identify potential use cases, such as predicting customer churn, forecasting sales, or optimizing resource allocation.
- Select one use case that aligns with business goals and data availability.

2. Dataset Selection:

Choose an appropriate dataset that aligns with the selected predictive use case. The dataset should contain relevant features and historical data necessary for model training.

Use cases are examples of real users using your products.

Objectives:

To build an effective predictive model, we need high-quality data that includes historical records and relevant features.

Action Steps:

- Explore available data sources, including internal databases and external datasets.
- Evaluate the quality and completeness of potential datasets.
- Select a dataset that aligns with the chosen predictive use case and contains the necessary attributes for model training.

3. Model Training:

Select a suitable machine learning algorithm for the predictive task. Utilize IBM Cloud Watson Studio's tools and resources to preprocess the dataset, train the machine learning model, and evaluate its performance.

Objectives:

Train a machine learning model that can make accurate predictions based on historical data.

Action Steps:

- Preprocess the selected dataset by handling missing values, feature engineering, and data scaling.
- Choose an appropriate machine learning algorithm (e.g., regression, classification, time series forecasting) based on the nature of the problem.
- Split the data into training and validation sets for model evaluation.
- Train and fine-tune the model using IBM Cloud Watson Studio's tools.
- the model's performance through metrics like accuracy, precision, recall, or RMSE (Root Mean Square Error).

4. Model Deployment:

Deploy the trained machine learning model as a web service using IBM Cloud Watson Studio's deployment capabilities. This step ensures that the model can be accessed and utilized via API endpoints.

Objectives:

Deploy the trained machine learning model as a web service to make it accessible for real-time predictions.

Action Steps:

- Utilize IBM Cloud Watson Studio's deployment capabilities to package the model.

- Set up API endpoints to enable external applications to interact with the model.
- Ensure scalability, security, and reliability of the deployed service.

5.Integration:

The model needs to be integrated with a proper application thus it needs to be used hence in our project we decided to use flask library in python to make it use publically

The flask library needs a skeleton structure in html and css code and then it can be easily integrated

Import necessary libraries

From flask import Flask, request, render_template

Import openai

App =Flask(__name__)

Openai.api_key ='YOUR_API_KEY'

@app.route('/', methods=['GET', 'POST'])

Def upload_image():

If request.method =='POST':

Image_caption =generate_caption(image_path)

Return render_template('result.html', caption=image_caption)

```
Return render_template('index.html')
```

```
# Function to generate captions using GPT-3
```

```
Def generate_caption(image_path):
```

Conclusion:

IBM Cloud Visual Recognition is a powerful tool that enhances image recognition capabilities. It Offers many benefits for Businesses, including improved Accuracy, increased efficiency, and enhanced customer experiences. With the ability to customize and integrate with other IBM Cloud Services, IBM Cloud Visual recognition is a valuable asset for businesses looking to improve Their workflows and stay ahead of the competition.

Architecture:

