BRIDGELABZ Image and Video Analytics DEVELOPMENT PLAN

Week Number	Software / App Development	Concept Introduction	Technology Used	Functionality Developed
Week 1	**Basic Python**	Software Installations, GIT concepts, I/O operations, Basic Data Types, Operators for Data manipulation and Comparison, Conditional Statements, Loop Structures, Operations on String Variables, Data Storage Objects, Functions,Importing modules, file handling operations	Linux Commands, GIT, Python	**Core Programming & Version Management**- Logical Programmings, Data Types, Statements, Exception Handlig, Logging, File IO, Source Control Management with Coding Standards. All Programs and Application Developed will be in GIT Repository
Week 2	**Python Data Structures**	Array, Dictionary, List, Sets,Tuple, Strings	Python 3.7, Data Structures	**Data Structure**- Developed Data Structure Programs (without using Libraries) like Arrays, Dictionary,List, Sets, Tuple, Strings
Week 3	**Linear Algebra Probability & Statistics**	**Linear Algebra**- Matrices and Vectors, Addition and Scalar Multiplication Matrix Vector Multiplication, Matrix Matrix Multiplication Inverse and Transpose of Matrix **Probability & Statistics -**Dependence, Independence, Conditional probablity, Bayes's therom, Random variables, Continuous distribution, Normal distribution, Central limit therom, Correlation	Python, Array Data Structure	**Linear Algebra**- Solved problems like addition of matrices, scalar multiplication, matrix and vector multiplication, matrix-matrix multiplication, inverse and transpose of matrix using python **Probability & Statistics**- Solved problems like finding dependent/independent probability using python, Solved finding corelation coeficient problems
Week 4	**Python Libraries**	**Core Libraries**- NumPy, Pandas **Visualization Libraries**- Matplotlib, Seaborn, Plotly	Python libraries Numpy, Pandas, Matplotlib, Seaborn, Plotly	Solved problems using Numpy and Pandas. Plotted various types of graph using visualization libraries like Matplotlib, Seaborn and Plotly
Week 5	**ML Overview and Data Preprocessing Regression**	ML Overivew, ML Types, Different data preprocessing steps Simple linear regression, Multiple linear regression	Python Libraries Numpy, Pandas, Python, Categorical data encoding, Feature Scaling, Missing data manipulation,	1. Identified which type of problem itis-supervised/unsupervised, reinforcement, 2. Applied different data preprocessing steps like handling missing data, categorical data, feature scaling etc. 3. Predicted Y value for random X value 4. Predicted apparent temperature based on humidity data. 5. Solved regression problems using multiple linear regression, predicted apparent temperature for given temperature,humidity,windspeed,visibility, pressure

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Week 6	Classification	Logistic Regression, K-Nearest Neighbor (KNN)	Logistic Regression Mathematics, KNN Concepts.	Solved classification problems using Logistic regression and KNN 1. Based on bank customer data, predicted whet her customer will subscribe to term deposit or not 2. Based on given users data like his work area,qualification,marrital status, predicted whether user will make more than 50k a year or not. 1. Based on bank customer data, predicted whet her customer will subscribe to term deposit or not using single and multi layer neural network. 2. Based on given users data like his work area, qualification, marrital status, predictedwhetheruserwillmakemorethan50kayearornotusingsingleand multi layer neural network
Week 7	Neural Network	Single Layer Neural Network, Multilayer Neural Network, Forward Propagation, Backward Propagation Deep Learning Concept, Neuron, Activation Function, How Neural Networks work, How Neural Networks Learn.	Python Libraries Numpy, Pandas, Python, Categorical data encoding, Feature Scaling, Missing data manipulation, Mathematics for Neural network	1. Based on bank customer data, predicted what customer will subscribe to term deposit or not using single and multi layer neural network. 2. Based on given users data like his work area, qualification, marrital status, predicted whet her user will make more than 50k a year or not using single and multi layer neural network.
Week 8	Analysis Tools, Error Reduction Techniques	Confusion Matrix, Accuracy Paradox, CAP Curve Analysis, False Positives and False Negatives, Bias Variance Trade off, Learning Curves, Validation Curves Error Analysis,Regularization Techniques, Anamoly Detection	Numpy, Pandas, Matplotlib and Keras	1. Studied different analysis tools and their uses 2. Studied Different Error reduction techniques
Week 9	Convolutional Neural Network	Introduction to Tensorflow and Keras. What is CNN, Convolution Operation, ReLu Layer, Pooling , Flattening, Full Connection, Softmax and Cross Entropy	Keras - Sequential, Convolution2D, MaxPooling2D, Flatten, Dense and ImageDataGenerator	1. Predicted cat and dog from given set of images 2. Classified the images into different classes from the CIFAR-10 dataset consisting of60000 32x32 colour images.

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Week 10	OpenCV	Face detection, Object recognition and Image/Face processing,motion Detection.	OpenCV - Face detection, Object recognition and Image/Face Processing ,python.	1. Buid face detection using OpenCV on still images, videos and webcam. 2. Buid Motion detection using OpenCV on videos or webcam.
Week 11	RCNN, Fast - RCNN using OpenCV, Tensorflow and Keras.	What is RCNN,Fast – RCNN, and faster RCNN,Concept behind that. implementation in Keras, Tensorflow.	RCNN, Fast - RCNN, Faster_RCNN, Python, OpenCV, Keras and Tensorflow	1. Build your own Faster RCNN Object Detector by taking your own Dataset. 2. Experiment on still images, webcam and videos.
Week 12	Mask RCNN using OpenCV, Tensorflow and Keras.	What is mask RCNN,Concept behind that. implementation in Keras, Tensorflow.	Mask RCNN, OpenCV, Keras and Tensorflow	1 .Build your own Mask RCNN Object Detector by taking your own Dataset. 2. Experiment on still images, webcam and videos.
Week 13	SDD using OpenCV, Keras or Tensorflow	What is SDD, Concept behind SSD, multi-box concept, prediction object positions, implementation in Keras or Tensorflow.	SDD, Python, OpenCV, Keras and Tensorflow	1. Build your own SDD Object Detector by taking your own Dataset. 2. Experiment with SDD on still images, webcam and videos.
Week 14	YOLO, YOLOv2,YOLOv3 using OpenCV and Keras, Caffe model.	What is YOLO and its versions, mathematics behind YOLO ,what is Caffe , object and image detection	YOLO, YOLOv2, YOLOv3, Python, OpenCV, Keras,Caffe and Tensorflow	1. Build your own YOLO Object Detector by taking own Dataset. 2. Experiment with YOLO on still images, webcam and videos.
Week 15	GANs using OpenCV and Keras	What is GANs, mathematics behind GANs, Image Generation,loss function,types of GAN & implementation in Keras or Tensorflow.	Mask RCNN, OpenCV, Keras and Tensorflow	1. Build your own Mask RCNN Object Detector by taking your own Dataset. 2. Experiment on still images, webcam and videos.

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Week 16	Problem Statement	problem statement requirement	Engineer will be assigned a unique problem statement Will be provided by the Product Manager based on the Ideation	