INTERNSHIP REPORT

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 34

DEPARTMENT OF COMPUTER SCIENCE

NAME	**:**	J. ROSAN JOHN REDSIN
DEPARTMENT NUMBER	**:**	22-UCA-006
INTERNSHIP START DATE	**:**	18-12-2024
INTERNSHIP END DATE	**:**	18-01-2025
NUMBER OF DAYS	**:**	31
INTERNSHIP TYPE	**:**	Machine Learning
COMPANY NAME	**:**	DLK Technologies
GUIDE NAME	**:**	Dr. A. Stella, M.Sc., M.Phil., Ph. D.,

DECLARATION

I am ROSAN JOHN REDSIN J (Department number: (22-UCA-006)) hereby declare that the institutional internship training report for the partial fulfilment of the degree of BCA Computer Science entitled "A REPORT ON INTERNSHIP TRAINING UNDERGONE AT DLK TECHNOLOGIES", is my original work and this project work has not formed the basis for the Award of any degree associate ship, fellowship or any other similar titles.

PLACE: Chennai **J. Rosan John Redsin**

DATE:14-02-2025 SIGNATURE OF THE STUDENT

ACKNOWLEDGEMENT

First of all, I thank God for the gift of life and good health, which enabled me to attend all the internship sessions without any difficulties or interruptions. I express my gratitude to Loyola College Management, Department of Computer Science, and to the Principal **REV. Dr. A. LOUIS AROCKIARAJ SJ** and Deputy Principal **Dr. J. A. CHARLES**, for providing me with this incredible opportunity to experience industrial life.

I would also like to thank our Head of the Department**, Dr. J. JEROLD INICO, M.Sc., M.Phil., MCP, Ph.D.,** and our **Coordinator, Dr. I. JUSTIN SOPHIA, M.Sc., M.Phil., Ph.D.,** for their unwavering support and encouragement throughout my internship.

My heartfelt thanks go to **Dr. A. STELLA, M.Sc., M.Phil., Ph. D.,** for accepting my internship company approval letter, providing regular updates, and motivating me throughout this journey.

I extend my deepest appreciation to **Mr. ARUL DHINESH** (Full-Stack Developer) and **Mrs. SANDHIYA** (ML Developer), my internship supervisors at **DLK Technologies**, for their invaluable guidance, constructive feedback, and encouragement during the internship. Their support greatly enriched my learning experience and helped me develop practical skills.

Lastly, I am immensely thankful to my family, friends, and peers for their continuous encouragement and support, which played a vital role in the successful completion of this internship.

ACCEPTANCE LETTER

DLK TECHNOLOGIES
Born to Achieve...

DLK TECHNOLOGIES
IT SERVICES TECHNOLOGY CONSULTING

Date:07/Dec/ 24

To

Head of Department,
Department of BCA (Bachelor of Computer Application), Loyola college.

Sub: Letter of Internship Acceptance

This is to certify that **Mr. J. Rosan John Redsin (Reg No: 22-UCA-006)** pursuing BCA (Bachelor of Computer Application) final year at Loyola college has accepted the Internship work duration from **18th December 2024 to 18th January 2025** under the domain **"Machine Learning".** During the Internship, all information and data collected from you should be kept confidential.

We Appreciate your Interest in **DLK Technologies**

For DLK Technologies

J Velmurugan
Project Team Head

DLK TECHNOLOGIES PVT. LTD. CHENNAI 600 026

COMPLETION LETTER

DLK TECHNOLOGIES
Born to Achieve...

DLK TECHNOLOGIES
IT SERVICES TECHNOLOGY CONSULTING

Date: 18/Jan/25

TO WHOM IT MAY CONCERN

This is to certify that **Mr. J. Rosan John Redsin (REG No: 22-UCA-006)** pursuing BCA (Computer Application) at Loyola College has successfully completed the Internship duration from **18th December 2024 to 18th January 2025** under the domain **"Machine Learning"**. During the Internship, all information and data collected from you should be kept confidential.

We appreciate your interest in **DLK Technologies**

"Best Wishes for Your Future Endeavors"

For DLK Technologies

J Velmurugan
Project Team Head

DLK TECHNOLOGIES PVT. LTD. CHENNAI 600 026

ADMIN OFFICE: DOOR NO: 66, GROUND FLOOR, NO. 172, RAAHAT PLAZA, ARCOT ROAD, VADAPALANI, CHENNAI - 26. TAMIL NADU, INDIA.

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CHAPTER I

INTRODUCTION

This report outlines the activities carried out during a 30-day internship program at **DLK TECHNOLOGIES** from 18 December 2024 to 18 January 2025. The document provides insights into the organization's operations and details the responsibilities and experiences gained during this period as a BCA student.

More than a mere account of tasks performed, the purpose of this report is to reflect on the practical knowledge acquired during the internship, focusing on areas such as Machine Learning and Frontend Development. The first section offers an overview of the company, followed by an outline of the tasks completed. It further delves into specific activities and an analysis of the learning outcomes.

The internship did not include Sundays or Government Holidays. DLK Technologies provided a well-equipped infrastructure and a conducive learning environment, making it an ideal setting to enhance my understanding of Software Development and Machine Learning. My decision to intern at this organization stemmed from my interest in these fields, which was nurtured during my college studies.

This internship allowed me to bridge the gap between theoretical knowledge and practical application in Machine Learning and Frontend Development. Additionally, it offered valuable exposure to professional work management and collaboration, enriching my understanding of the industry's dynamics.

CHAPTER II

COMPANY PROFILE

COMPANY LOGO:

NAME	**:**	DLK Technologies Private Limited
ESTABLISHED	**:**	2010
ADDRESS	**:**	Door No: 68 & 70, No: 174, Ground Floor, Rahaat Plaza (Opp. of Vijaya Hospital), Vadapalani, Chennai, Tamil Nadu 600026.
CONTACT:	**:**	91-7299951536
WEBSITE	**:**	www.dlktech.co.in

SECTOR AND SERVICES

DLK Technologies operates in the **Information Technology (IT) Solutions sector**, offering

Web development and design, E-commerce solutions, SEO and digital marketing, Graphic designing and Domain registration and web hosting

CUSTOMERS

The company serves startups, established enterprises, e-commerce platforms, and end users needing robust digital solutions.

ORGANIZATION STRUCTURE

CEO	**:**	Mr. Satheesh Kumar
DEPARTMENTS	**:**	IT, R&D, Marketing, Operations, HR, and Customer Support
EMPLOYEES	**:**	Approximately 50+

FUNCTIONS OF THE IT/EDP DEPARTMENT

- Small Business, Corporate, and E-Commerce Website Design
- Landing Pages, PSD to HTML Conversion, and Responsive Web Design with Custom Web Design
- PHP, CMS (WordPress, Joomla), CodeIgniter, Magento Web Development
- B2B and B2C Portal Development
- SEO, Social Media Marketing, Content Marketing
- YouTube Promotion, Email & SMS Marketing, Google AdWords PPC, Facebook Ads
- Logo, Brochure, Business Card, Flyers Design
- Social Media Graphics, Photoshop Editing

CHAPTER III

SUMMARY OF THE INTERNSHIP

During my internship at **DLK Technologies**, I gained practical experience in both machine learning and frontend development. The initial weeks focused on learning Python and essential libraries like **Pandas**, **NumPy**, **Matplotlib**, and **Seaborn**, which were vital for data analysis and visualization. I worked extensively on supervised learning projects, including obesity prediction, where I performed tasks such as **data collection, preprocessing, exploratory data analysis (EDA)**, and model training using algorithms like **Logistic Regression, Random Forest, and Decision Trees**, achieving an impressive accuracy of **99.854%**. These models were saved in **`.pkl` format** for future use.

Later, I transitioned to frontend development, where I utilized **Django, HTML, CSS**, and **SQLite3 databases** to build interactive web applications that integrated machine learning models. This experience enhanced my understanding of user interfaces and how machine learning solutions can be deployed effectively. I also explored unsupervised learning techniques like **K-Means clustering, DBSCAN**, and **Principal Component Analysis (PCA)** to improve model efficiency and segment data effectively. Additionally, I was introduced to **Deep Q-learning**, a reinforcement learning approach, which provided foundational knowledge for potential applications in game development.

Despite challenges in web application testing, which I could not complete due to technical errors, the internship enriched my technical skills, including data preprocessing, model evaluation, and web development. This experience has been instrumental in equipping me with the knowledge and tools to apply machine learning and development principles in real-world scenarios, aligning well with my future career aspirations.

CHAPTER IV

INTERNSHIP ACTIVITIES

MACHINE LEARNING ACTIVITY:

My work in **Machine Learning** revolved around several stages of the data science pipeline, with an emphasis on preparing datasets, training models, and evaluating their performance.

DATA PREPROCESSING:

I began with **data collection** for the cancer and obesity prediction projects, followed by **data preprocessing**. This involved cleaning the data by removing outliers and handling missing values. I used **LabelEncoder**(Fig 7.2:) to convert categorical variables into numerical format and applied **StandardScaler**(Fig 7.3) to standardize the numerical features, ensuring they were on the same scale for better model performance.

EXPLORATORY DATA ANALYSIS (EDA):

Once the data was cleaned, I performed **Exploratory Data Analysis (EDA)(Fig 7.4)** using **Matplotlib** and **Seaborn**. I created various plots like histograms, box plots, and scatter plots to understand the relationships between features and identify patterns, trends, and potential outliers in the data. This allowed me to make informed decisions about feature selection and the choice of algorithms for model training.

MODEL DEVELOPMENT AND TRAINING:

I then proceeded to train several machine learning models, such as **Random Forest**, **Logistic Regression**, **Linear Regression**, and **Decision Trees** using **Scikit-learn**. I also worked with unsupervised learning algorithms like **PCA (Principal Component Analysis)**, **KMeans** clustering, and **DBSCAN(Fig 7.4)** . These models were trained on the dataset using the **train_test_split** method, which separated the data into training (80%) and testing (20%) sets. After training, I evaluated the models using performance metrics like **accuracy_score**, **precision_score**,

f1_score, and **confusion_matrix**. For regression models, I used **mean_squared_error, mean_absolute_error** and **r2_score** to measure prediction accuracy.

EXPLORATION OF DEEP Q-LEARNING:

Additionally, I gained exposure to **Deep Q-learning**, a reinforcement learning technique where I learned the basics of how an agent can learn optimal actions by interacting with its environment. While my exposure was brief, it piqued my interest in reinforcement learning, and I plan to explore it more deeply in the future.

FRONTEND DEVELOPMENT ACTIVITY:

Alongside machine learning, I worked on **Frontend Development**, creating web applications that allowed users to interact with the machine learning models and receive predictions.

HTML and CSS:

I used **HTML** to structure web pages and **CSS** to design their layout and styling. I focused on making the interfaces user-friendly, ensuring a responsive design that worked well across various devices.

DJANGO FRAMEWORK:

I utilized the **Django** web framework to create dynamic web applications that integrated machine learning models. This allowed users to input their health data (such as age, BMI, and medical history) into forms and receive predictions about their cancer or obesity risks. I used **SQLite3** to manage and store user data and results, making it easy to retrieve and display predictions.

WEB APPLICATION TESTING:

I attempted **Web Application Testing** to ensure the application worked properly and was responsive across different devices. Unfortunately, I encountered several errors during the testing

phase, which prevented me from fully completing this task. Despite troubleshooting efforts, I was unable to resolve the issues in time. However, this experience taught me a lot about debugging and the importance of thorough testing in the development process.

COLLABORATION AND TEAMWORK

Throughout my internship, I worked closely with senior team members, including data scientists and web developers, who guided me in overcoming challenges and improving my technical skills. Regular discussions and collaborative problem-solving helped me refine my understanding of machine learning concepts and the development process.

The internship was an invaluable experience that allowed me to develop my skills in both **Machine Learning** and **Frontend Development**. I applied my knowledge of supervised and unsupervised learning algorithms, gained hands-on experience with web development using **Django**, and got a brief but valuable introduction to **Deep Q-learning**. While I did not engage in formal documentation or reporting during my internship, the practical experience I gained in real-world applications of machine learning and web development has been incredibly beneficial.

CHAPTER V

ASSESSMENT OF THE INTERNSHIP

During my internship at DLK Technologies, I was involved in various tasks related to Machine Learning and Frontend Development. In the Machine Learning domain, my responsibilities included data collection, preprocessing, and exploratory data analysis (EDA), where I cleaned datasets using tools like LabelEncoder and StandardScaler and created visualizations with Matplotlib and Seaborn. I also developed and trained multiple models such as Random Forest, Logistic Regression, Linear Regression, and Decision Trees, and worked with unsupervised learning algorithms like PCA, KMeans, and DBSCAN. On the Frontend Development side, I worked with HTML, CSS, and Django to create web applications, integrating machine learning models into the web interface. Although I encountered some challenges testing the web applications, I gained valuable experience. Throughout the internship, I acquired technical skills in both fields, becoming proficient in tools like Scikit-learn, Matplotlib, and Seaborn, and gaining hands-on experience in data preprocessing, model development, and evaluation. I also worked with SQLite3 to manage user data and was introduced to Deep Q-learning, expanding my knowledge in reinforcement learning. This internship influenced my future career plans by enhancing my ability to implement machine learning techniques in real-world projects, such as health-related predictive models, and by introducing me to reinforcement learning, which has applications in game development. The internship activities were closely aligned with my classroom learning, where I applied concepts such as data preprocessing, machine learning algorithms, and web development frameworks in a practical setting, bridging the gap between theoretical knowledge and real-world application.

CHAPTER VI

CONCLUSION

During my internship at DLK Technologies, I gained valuable hands-on experience in both Machine Learning and Frontend Development, working on real-world projects like predicting cancer and obesity risks using machine learning algorithms. I was involved in various stages of the data science pipeline, including data preprocessing, model training, and evaluation with metrics such as accuracy and precision, while using tools like Scikit-learn, Matplotlib, and Seaborn to build and optimize models. Additionally, I developed web applications using HTML, CSS, and Django, integrating machine learning models to provide real-time predictions. The internship also exposed me to Deep Q-learning, which piqued my interest in its applications for game development and AI in gaming. This experience reinforced my understanding of how machine learning can be applied to fields like healthcare, gaming, and robotics. Observing the sector, DLK Technologies operates in the highly competitive IT solutions space, focusing on web development, digital marketing, and SEO services, with increasing demand for E-commerce solutions and SEO as businesses prioritize their online presence. The integration of machine learning and AI into web development and digital marketing is growing, with AI being used for personalization, predictive models, and data analytics shaping marketing strategies. The skills I gained in machine learning and frontend development are particularly valuable in addressing these emerging trends, emphasizing the growing importance of AI and data science in the IT solutions sector.

CHAPTER VII

APPENDIX

MODEL 1: OBESITY PREDICTION

SUPERVISED LEARNING MODEL:

```
#Model 1: Obesity Prediction
import pandas as py
import sys
from sklearn.preprocessing import LabelEncoder
import matplotlib.pyplot as plb
import matplotlib
matplotlib.use('Agg')
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor, RandomForestClassifier
From sklearn.metrics import mean_squared_error,mean_absolute_error, classification_report, confusion_matrix, accuracy_score
ob=py.read_csv('/content/drive/MyDrive/obesity.csv')
print(ob.head())
#print(ob.info())
print(ob.shape)
#data preprocessing
print(ob.isnull().sum())
#label encoding using encoding
encoder=LabelEncoder ()
ob['ObesityCategory']=encoder.fit_transform(ob['ObesityCategory'])
ob['Gender']=encoder.fit_transform(ob['Gender'])
#data splitting using train test split function
X=ob.drop('ObesityCategory',axis=1)
Y=ob['ObesityCategory']
print('X dimensional shape',X.shape)
print('Y dimensional shape:',Y.shape)
print('Value Count of all Possibilities:',Y.value_counts())
X_train,X_test,Y_train,Y_test=train_test_split(X,Y,test_size=0.2,random_state=42
#Model Training from sklearn lib
modal1=RandomForestRegressor(random_state=42)
modal1.fit(X_train,Y_train)
modal2=RandomForestClassifier(random_state=42)
modal2.fit(X_train,Y_train)
```

```
#Make Prediction from that model
pred1=modal1.predict(X_test)
pred2=modal2.predict(X_test)
print('Mean Squared Error:',mean_squared_error(Y_test,pred1))
print('Mean Absolute Error:',mean_absolute_error(Y_test,pred1))
print('Accuracy Score:', accuracy_score(Y_test,pred2))
print('Confusion Matrix:', confusion_matrix(Y_test,pred2))
#Taking plot graph for reference
ob.plot(kind='scatter',x='Age',y='ObesityCategory',legend=True)
plb.title('Obesity Prediction Scatter Chart')
plb.savefig('/content/drive/MyDrive/obesity1.png')
sys.stdout.flush()
ob.plot(kind='hexbin',x='Age',y='BMI')
plb.title('Obesity Prediction HexBin Chart')
plb.savefig('/content/drive/MyDrive/obesity_hex.png')
sys.stdout.flush()
#save this ml model using joblib
import joblib
joblib.dump(modal1,'/content/drive/MyDrive/obesity_regress.pkl')
joblib.dump(modal2,'/content/drive/MyDrive/obesity_classify.pkl')
#load the saved model
obesity1=joblib.load('/content/drive/MyDrive/obesity_regress.pkl')
print('Random Forest Regression:',obesity1.predict(X_test))
obesity2=joblib.load('/content/drive/MyDrive/obesity_classify.pkl')
print('Random Forest Classification:',obesity2.predict(X_test))
```

OUTPUT:

Mean Squared Error: 0.0012615000000000005

Mean Absolute Error: 0.0046500000000000005

Accuracy Score: 0.995

Confusion Matrix: [[72 0 0 0]

[0 31 1 0]

[0 0 65 0]

[0 0 0 31]]

Random Forest Regression: [2. 2. 2. 0. 2. 0. 3. 0. 2. 3. 3. 3. 0. 1. 2. 0. 2.88 2. 2. 0. 2. 3. 2. 0. 3. 1. 0. 2. 2. 3. 0. 2. 1. 2. 0. 0. 3. 1. 0. 0. 1. 0. 1. 3. 0. 0. 2. 0. 2. 0. 1.96 2. 2. 0. 0. 2. 2. 2. 1. 2. 0. 3. 1. 2. 1. 0. 2. 0. 1. 0. 3. 2. 2. 2. 3. 0. 2. 1. 0. 0. 2. 3. 1. 1. 0. 0. 0. 0. 1.27 1. 1. 2. 3. 3. 2. 2. 1. 0. 0. 0. 3. 0. 0. 2. 1.96 2. 0. 0. 1. 2. 0. 2. 1. 0. 0. 0. 3. 2.97 0. 0. 0. 0. 0.4 3. 0. 1. 0.03 0. 1. 3. 0. 3. 2. 2. 1. 3. 2. 2. 3. 2. 0. 0. 2. 2. 2. 2. 0. 0. 0. 2. 0. 1. 2. 1. 0. 1. 1. 3. 2. 2. 2. 0. 2. 1. 0. 2. 0. 0. 1. 2. 0. 0. 0. 3. 2. 3. 2. 0. 0. 2. 2. 1. 0. 2. 2. 1. 0. 2. 2. 1. 3. 1. 2. 3. 3. 2. 0. 3. 0. 0.]

Random Forest Classification: [2 2 2 0 2 0 3 0 2 3 3 3 0 1 2 0 3 2 2 0 2 3 2 0 3 1 0 2 2 3 0 2 1 2 0 0 3 1 0 0 1 0 1 3 0 0 2 0 2 0 2 2 2 0 0 2 2 2 1 2 0 3 1 2 1 0 2 0 1 0 3 2 2 2 3 0 2 1 0 0 2 3 1 1 0 0 0 0 2 1 1 2 3 3 2 2 1 0 0 0 3 0 0 2 2 2 0 0 1 2 0 2 1 0 0 0 3 3 0 0 0 0 0 3 0 1 0 0 1 3 0 3 2 2 1 3 2 2 3 2 0 0 2 2 2 2 0 0 0 2 0 1 2 1 0 1 1 3 2 2 2 0 2 1 0 2 0 0 1 2 0 0 0 3 2 3 2 0 0 2 2 1 0 2 2 1 0 2 2 1 3 1 2 3 3 2 0 3 0 0]

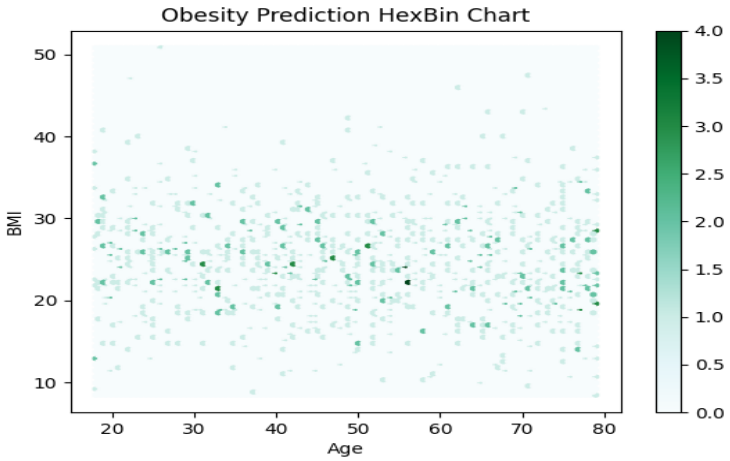


Fig. 7.1: Obesity Prediction using HexBin Plot

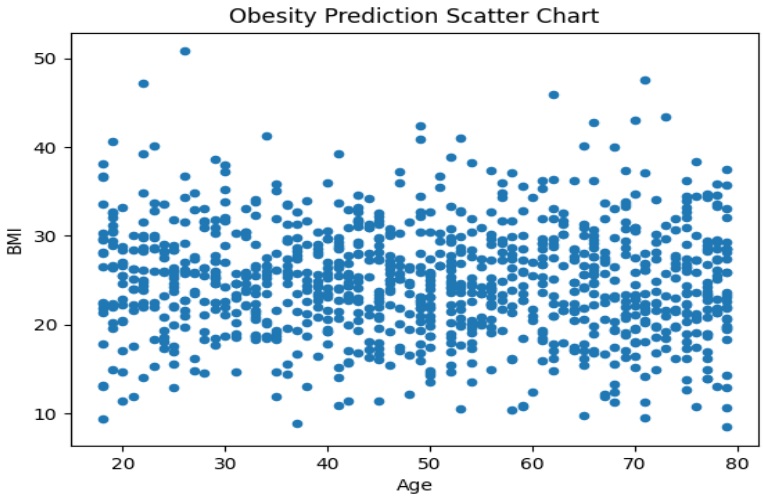


Fig. 7.2: Obesity Prediction using Scatter Plot

UNSUPERVISED LEARNING MODEL:

```
import pandas as pd
from sklearn.cluster import KMeans
from sklearn.preprocessing import StandardScaler
import matplotlib.pyplot as plt
data = pd.read_csv('/content/obesity.csv')
# Step 2: Preprocess the data
numerical_data = data.drop(columns=["Gender", "ObesityCategory"])
# Standardize the numerical data
scaler = StandardScaler()
scaled_data = scaler.fit_transform(numerical_data)
# Step 3: Model Training with K-Means clustering
kmeans = KMeans(n_clusters=3, random_state=42)
clusters = kmeans.fit_predict(scaled_data)
data['Cluster'] = clusters
# Step 4: EDA
plt.figure(figsize=(8, 6))
plt.scatter(scaled_data[:, 0], scaled_data[:, 1], c=clusters, cmap='viridis')
plt.xlabel('Feature 1 (Standardized Age)')
plt.ylabel('Feature 2 (Standardized Height)')
plt.title('K-Means Clustering on Obesity Dataset')
plt.colorbar(label='Cluster Label')
plt.show()
print("Dataset with Clusters:")
print(data.head())
```

OUTPUT:

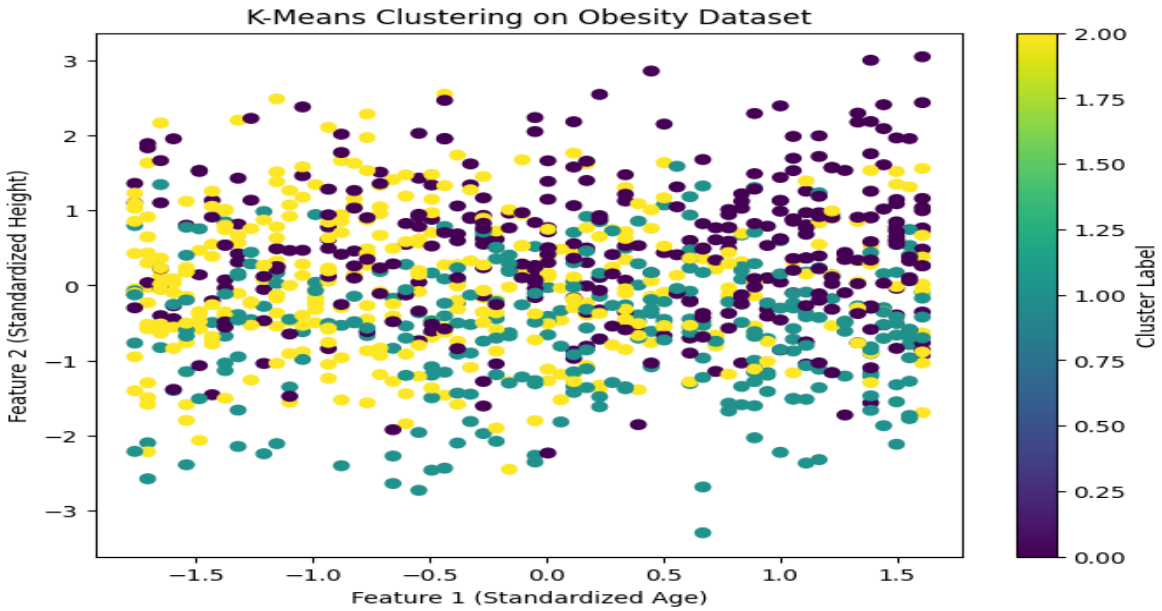


Fig. 7.3: Obesity Prediction using Viridis plot

Dataset with Clusters:

	Age	Gender	Height	Weight	BMI	PhysicalActivityLevel	\
0	56	Male	173.575262	71.982051	23.891783	4	
1	69	Male	164.127306	89.959256	33.395209	2	
2	46	Female	168.072202	72.930629	25.817737	4	
3	32	Male	168.459633	84.886912	29.912247	3	
4	60	Male	183.568568	69.038945	20.487903	3	

	ObesityCategory	Cluster
0	Normal weight	2
1	Obese	1
2	Overweight	2
3	Overweight	2
4	Normal weight	0

MODEL 2: CANCER PREDICTION

UNSUPERVISED LEARNING MODEL:

```
import joblib
from sklearn.preprocessing import StandardScaler,LabelEncoder
import pandas as py
import matplotlib
matplotlib.use('Agg')
from sklearn.decomposition import PCA
import sys
import matplotlib.pyplot as plt
from sklearn.cluster import DBSCAN
cancer=py.read_csv('/content/drive/MyDrive/cancer.csv')
cancer=cancer.drop('index', axis=1)
cancer=cancer.drop('Patient Id', axis=1)
cancer.head()
print(cancer.info())
encoder=LabelEncoder()
cancer['Level']=encoder.fit_transform(cancer['Level'])
print(cancer.head())
stdscale=StandardScaler()
scaled_data=stdscale.fit_transform(cancer)
modal1=DBSCAN(eps=0.5,min_samples=5)
modal1.fit_predict(scaled_data)
pca=PCA(n_components=3)
cancer2d=pca.fit_transform(scaled_data)
plt.figure(figsize=(8,6))
plt.scatter(cancer2d[:,0],cancer2d[:,1],cmap='viridus')
plt.xlabel('Feature x : Age')
plt.ylabel('Feature y : Level')
plt.title('Cancer prediction Analysis')
plt.colorbar(label='Color Label')
plt.savefig('/content/drive/MyDrive/cancer.png')
sys.stdout.flush()
```

OUTPUT:

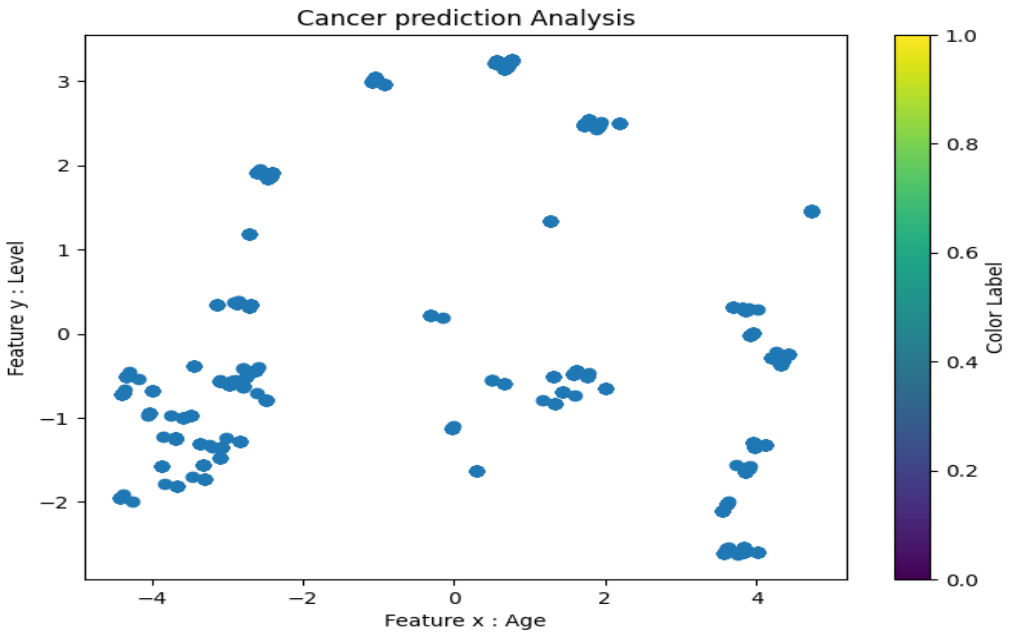


Fig. 7.4: Cancer Prediction using Scatter Plot

SUPERVISED LEARNING MODEL:

```
import pandas as py
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import confusion_matrix, classification_report,f1_score, accuracy_score,
precision_score
import joblib
from sklearn import tree
import matplotlib
matplotlib.use('Agg')
cancer=py.read_csv('/content/drive/MyDrive/cancer.csv')
cancer=cancer.drop('index', axis=1)
cancer=cancer.drop('Patient Id', axis=1)
print(cancer.duplicated())
cancer.drop_duplicates(inplace=True)
print(cancer.duplicated())
print(cancer.isnull().sum())
encoder=LabelEncoder()
cancer['Level']=encoder.fit_transform(cancer['Level'])
print(cancer.head())
X=cancer.drop('Level', axis=1)
Y=cancer['Level']
X_train,X_test,Y_train,Y_test=train_test_split(X,Y,random_state=42,test_size=0.4
modal1=RandomForestClassifier(random_state=42)
modal1.fit(X_train,Y_train)
modal2=DecisionTreeClassifier(random_state=42)
modal2.fit(X_train,Y_train)
pred=modal1.predict(X_test)
print('Confusion Matrix: ', confusion_matrix(Y_test,pred))
print('Accuracy score : ' ,accuracy_score(Y_test,pred))
print('Precision Score : ' ,precision_score(Y_test,pred,average='micro'))
print('F1 score : ' ,f1_score(Y_test,pred,average='micro'))
print('Classification Report : ', classification_report(Y_test,pred))
tree.plot_tree(modal2,filled=True,rounded=True,feature_names=X.columns)
plt.savefig('/content/drive/MyDrive/cancer_decision.png')
sys.stdout.flush()
joblib.dump(modal1,'/content/drive/MyDrive/cancer_decision.pkl')
joblib.dump(modal2,'/content/drive/MyDrive/cancer_classify.pkl')
```

OUTPUT:

Confusion Matrix: [[24 0 1]

[1 11 0]

[0 0 24]]

Accuracy score: 0.9672131147540983

Precision Score: 0.9672131147540983

F1 score: 0.9672131147540983

Classification Report: precision recall f1-score support

0 0.96 0.96 0.96 25

1 1.00 0.92 0.96 12

2 0.96 1.00 0.98 24

accuracy 0.97 61

macro avg 0.97 0.96 0.97 61

weighted avg 0.97 0.97 0.97 61

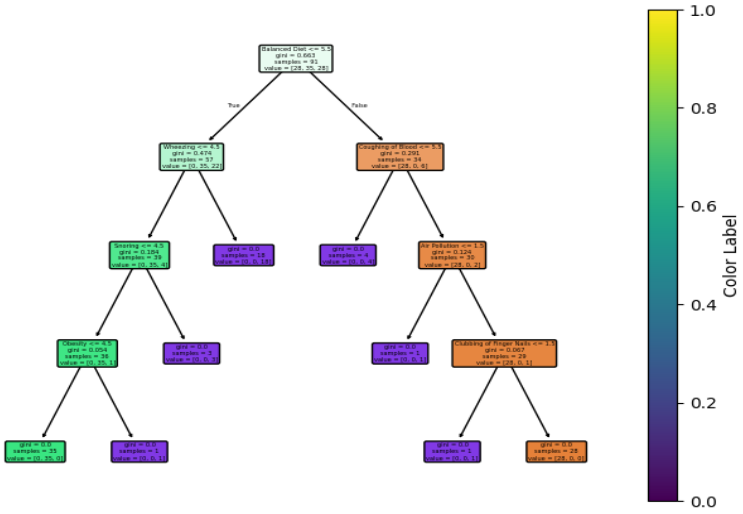
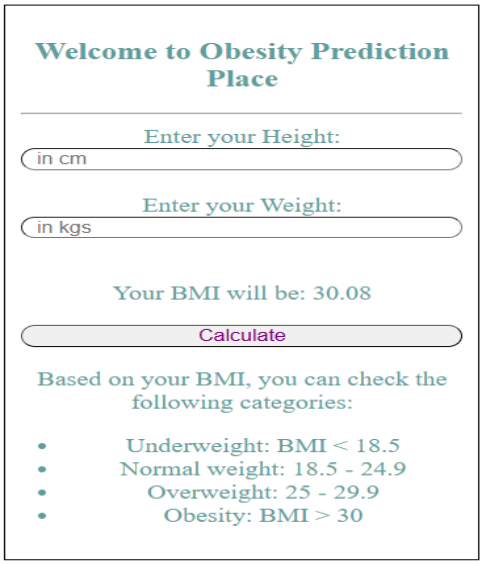


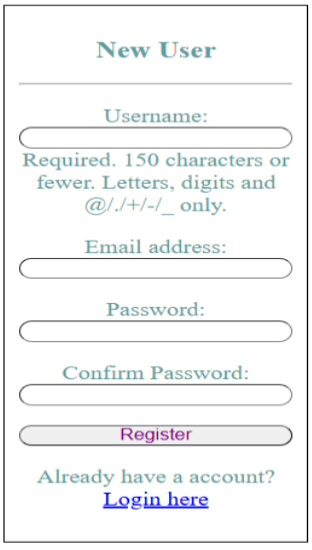
Fig. 7.5: Cancer Prediction using Decision Tree Plot

OBESITY PREDICTION ANALYSIS

HOMEPAGE



REGISTERATION PAGE



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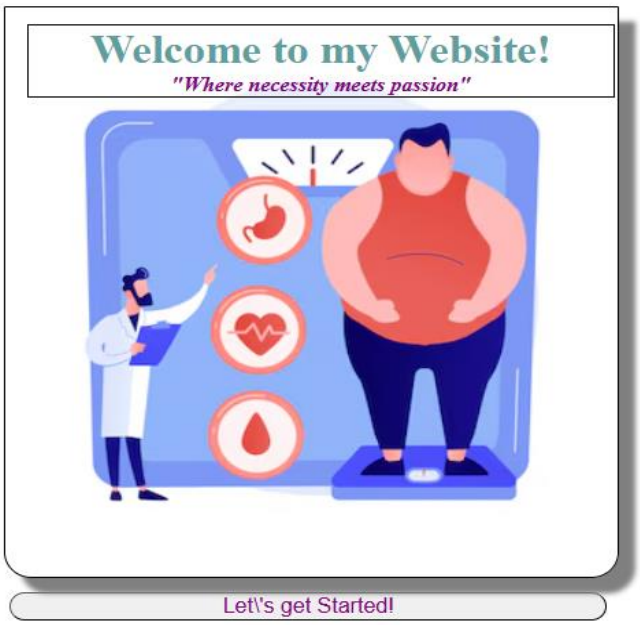
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CHAPTER VIII

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   https://www.w3schools.com/python/
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