PES-MCOE (Dept. of IT)

Lab Practice-I Machine Learning

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	NAME: KSHITIJ VINOD SALI
	CLASS & DIV: TE-A
	Roll No.: 35059 UA-02
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labon	Title: Assignment an Régression Technique
	Problem Statement: Assignment on Regression technique
li di	download temperature data from below link:
P.	https://www.kaggle.com/venky73/temperatureofindia?select =
T T	temperature (csv. I stugat asin is beaut
	I todt egit dipinets o til at ei loop casice
l l	This data consists of temperature of INDIA averaging
	the temperature of all places monthly. Temperature
	value are recorded in CEISIUS.
	a) Apply linear regression using suitable library
	function & predict the monthwise temperature.
F 5	b) Assess the performance of regression model using
	and MSE and R-square methics bashings.
3011 2	c) Visualize Simple regression model
	top described as a specifical family of many
	Course d'Outcome: 19 2 annov barbaba la
	C314448.1: Implement different supervised & unsuper-
	vised learning algorithms
- Annual Control of the Control	C314448.2: Evaluate performance of machine learning
	algorithms for real-world applications.
	Groups & MASE, MARY Require
11	Pre-requisite: Python, Discrete Structure
11	O assert Asserts and Objection 11/15 and 16
- 11	Practical Assignment Objective: Understand fundament-
45	al elements of machine learning to work on
	machine learning regression algorithm.
11	

	Requirement: Python programming, Jupiter notebook,
	Google Colab.
	N. 11 M. 11 B. CENT.
	Theory Laurence and the
	i) Introduction to regression
	- Regression is a statistical method used to model
Superint	the relationship between a dependant variable
-	le one or more independent variables. It helps
is topology	in predicting the value of dependent variable
	based on given inputs. In simple linear regr-
	ession, goal is to fit a straight line that best
(11/01-1	represents data points, minimizing the emor
rizot	between opredicted bractual values not all
	value ase veeraded in alignes.
	ii) Types of Universal Regression - Least Square
	Method, Model Representation
pact of	- Universal regression involves predicting a
The state of the s	dependend variable using a single independent
	variable. The least-square method minimizes the
ent-billionals	sum of squared differences between actual
The second secon	and predicted values, ensuring the best-
	fit line. Model representation involves defining
1 13 1 2 2 1	linear equation y= me+b, where m is the slope
1 March	pite of pp browdser of earthopte
	iii) Cost functions: MSE, MAE, R-square.
	→ a) MSE: MSE measures the average of squared
	differences between predicted & actual values. It
for and	penalizes larger errors more heavily, making it
	sensitive to outlines. A lower MSE indicates
	better model performance

- b) MAE: It calculates the average magnitude of emors between predictions & actual values, without considering their direction. It treats all emors equally, making it robust to outliers. A lower MAE indicates a more accurate model.
- c) R-squared: It indicates proportion of variance in dependenal variable explained by independent variable. R² values range from 0 to 1, with values closer to 1 indicating a better fit. It helps assess how will the model captures data's variability.
- iv) Performance evaluation, optimization of simple linear regression.
- → Performance evaluation in simple linear regression is done using matrices like MSE, MAE & R-squared Optimization involves adjusting parameters to minimize cost function, which can be done using gradient descent or analytical methods. The goal is to find line that best fit data, predicting outcomes with minimal error.
- v) Note on overfitting, underfitting, bias & varience.

 -> · Overfitting occurs when a model is too complex
- & fits the for training data too closely capturing noise & performing poorely on new data.
- · Underfitting happens when a model is too complex failing to capture underlying trend.
- · Bias refers to emons due to overly simplistic models, while varience refers to sentivity to small functions in training data. The balance between

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	biasti servariance is trucial tefor generalization.
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1	Algorithm: Linear regression is used to predict a
	quantitative response Y from predictor variable X.
	Mathematically, we write as:
	$y = a + b \approx$
1	cohere, withour compatibile of the control to
1	nturque $b = n \cdot \Sigma xy - (\Sigma x)(\Sigma y)$ then $A = xy$
	dios roto $(2 \times 2)^2$ unio $(2 \times 2)^2$ oto $(2 \times 2)^2$
	appet to at an Europe (Six) it at annote
1.1	This or south contigo tohom at the war
	Here, & & y are two variables on regression line.
	ub = 1. Slope 11 of othe line: whove some of wi
	a = y-intercept of the line para mail
mi same	2 = Independent variable from data set
out the	y = Dependent variable from dataset
-	t aretamorne politicijas residentij anitosiedije
	Input: We have given temperature data as an input
1	to regression model to calculate different outputs.
	enitalibora outab idi tess torit and buil ot
	Output: Students are able to design regression
	models & predict the different temperature values
. 900/12 (t	v llote ou overlitting, underfibling, bins & w
	Inference: Thus, we have studied about regression
	and assess the performance of regression
	models using MSE, MAE and R-square matrics
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	s a replace code expets particularly all marries with