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Title: Assignment on Improving Performance of Classifier
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Problem Statement: A SMS unsolicited mail (every now
and then known as cell smartphone junk mail) is
any junk message brought to a cellular phone as
texual content messaging via the short Message
Service (SMS). Use probabilistic approach (Naive Bayes
Classifier/ Bayesian Network) to implement SMS spam
filtering system. SMS messages are categorized as SPAM or HAM using features like length of message,
word depend, unique keywords etc. Download dataset
from: https://archive.ics.uci.edu/ml/datasets/sms+spam+
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This dataset is composed by just one text file,
while each line has the correct class followed by the
raw message a) Apply data pre-processing (Label
Encoding, Data Transformation) techniques if necess-
any b) Perform data-preparation (Train-Test-Split).
c) Apply at least two Machine Learning Algorithm and
evaluate models. d) Apply cross-validation & evaluate
models & compare performance e) Apply hyper
parameter tuning & evaluate models & compare
performance.
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Course Outcome:
C314448.1: Implement different supervised & unsuper-

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1	e la sia algorithm
	uised learning algorithm.
1	C314448.2: Evaluate performance of machine learn-
-	ing algorithms for real-world applications.
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1	Pre-requisites: Python, Discrete Structure
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-	Practical Assignment Objective: Understand the basics
1	fundamental elements of machine learning to work
Ĺ	on machine learning classification algorithm.
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	Requirements: Python programming, Jupiter Notebook,
	Google hoolog still the parbabilistic applications
Annual Section	Miss insamplymi at Chroman missegues Acoilisals
	Theory: and eappearing all alleger are cityoned
1	1) Explain classifier models in MAH TO MAH
THE CONTRACTOR	-> Classifier models are algorithms used to cate-
And the Person of the Person o	gorize data points into predefined labels or classes.
100000000000000000000000000000000000000	These models learns from labeled training data
Charles and the	& make predictions for new, unseen data and
	make predictions for new unseen data. Common
	classifier models include decision trees,
	support vector machines, k-nearest neighbors,
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	They are used in various applications such
11	as spam detection, medical diagnosis & image
	classification evoluting their performance through
	metrics like accuracy, precision, recall & F1-score.
	2) What is a Naive Bayes classifier?
	→ The Naive Bayes classifier is a probabilistic
	model based on Baye's theorem, assuming that
	model bases on pages and the

features are conditionally independent given the class label. Despite this "Noive" assumption it performs well in many real-world situations, especially for large datasets. It is commonly used in text classification tasks like spam detection & sentiment analysis due to its simplicity & efficiency & in handling categorial data.

3) How does the Naive Bayes classifier work?

Naive Bayes works by calculating the posterior probability of a class given the feature values, using Baye's theorem:

$$\frac{P(c|x) = \frac{P(x/c) \cdot P(c)}{P(x)}}{P(x)}$$

The model assumes that features are independent of each other, given the class label. If multiples the likelihoods of each features & chooses the class with highest posterior probability. This makes it fast & effective for classification.

Algorithm:

- 1) Data proprocessing step.
- 2) Fitting Naive Bayes to the training set.
- 3) Predicting the test result
- 4) Test accuracy of the result.
- 5) Visualizing the test set result

Input: We are giving dataset SMS_SPAMLCOLLECTION as an input to classifier model.

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14	Output: Students are able to design classification
	model & predicting whether a student will
1	get permission or not
	induction of it is a reported when it is in the control of the
2	Inference: Hence, we have studied working of
144	Noive Bayes classifier algorithm in details.
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