

CS 3600 Project 4 Wrapper

CS 3600 - Fall 2023

Due December 8th 2023 at 11:59pm EST via Gradescope

Introduction

This Project Wrapper consists of a context paragraph, which identifies the topic of the wrapper, followed by four short-answer questions, each worth 1 point. Please limit your response to each question to **a maximum of 200 words**. The goal of this assignment is to train your ability to reason through the consequences and ethical implications of computational intelligence.

Context

You are working for a financial institution which is in the business of assessing risk of loaning money to potential clients. The CTO of the company has been an avid Twitter user swept up in the rumor that GPT-4 will have 100 trillion parameters, and has a dream to completely automate the loan risk assessment process. As a former CS3600 student and experienced engineer in the AI/ML team for the company the CTO comes to you to ask for a plan to implement this algorithm. You have historical data since the 1930s in this format (Note that all strings come from a fixed, enumerated set of values):

				Zip				Credit	Net	Loan	Accepted for
Name	Pronouns	Sex	Age	Code	Race	Hobbies	Score	Worth	Amount	Loan	(target)
string	string	string	int	int	string	string	int	int	int		boolean

Table 1: Loan Dataset

Question 1

Fully engaged in the Twitter hype for GPT-4 and constantly up to date on the NeurIPS threads the CTO pitches a neural network architecture for predicting if the client will default on the loan. The CTO suggests the various columns of the table act as features to a deep neural network with 50 hidden layers. With your experience in the field you think that there could be a better model for such a sensitive task as this. Make an argument for why a decision tree is better for use in this particular situation (hint: you can mention runtime at inference, but there is an even stronger case to be made for a decision tree that we are looking for here! Especially consider that this ML model will be making highly sensitive decisions.)

Answer:

Question 2

The ethics review board at the company rejects the initial proposal from the CTO on the basis that algorithm could easily end up rejecting loan applicants based on race or sex. To fix this the CTO proposes that the sex and race columns be removed from the dataset. Will this completely prevent the machine learning model from discriminating based on race/sex? Why or why not?

Answer:

Question 3

Algorithmic discrimination is a serious problem with the wide dissemination of machine learning models. (?) Unfortunately, these harms can go unnoticed due to the false assumption that math and algorithms are unbiased and objective. Machine learning models are only as good as the data used to train them. Research an instance where a machine learning model was used to make critical decisions, but was later found to be biased (excluding the example with bank loans). Summarize what the purpose of the model was, and how it ended up causing harm. Include a link to a news article or research paper discussing this issue.

Answer:

Question 4

What is the reason for having a separate train and test set when constructing a machine learning model? Why not use all the possible data for training and testing?

Answer: