Polytechnic University of Bucharest

REPORT

HW1

Subject: NNGA
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Dataset and Uses

The dataset comes from the Machine Learning Repository and it is intended on predicting whether a married couple will get divorced or not based on certain features like their age, years of marriage, and number of children.

The attributes of the dataset are as following:

1. If one of us apologizes when our discussion deteriorates, the discussion ends.
2. I know we can ignore our differences, even if things get hard sometimes.
3. When we need it, we can take our discussions with my spouse from the beginning and correct it.
4. When I discuss with my spouse, to contact him will eventually work.
5. The time I spent with my wife is special for us.
6. We don't have time at home as partners.
7. We are like two strangers who share the same environment at home rather than family.
8. I enjoy our holidays with my wife.
9. I enjoy traveling with my wife.
10. Most of our goals are common to my spouse.
11. I think that one day in the future, when I look back, I see that my spouse and I have been in harmony with each other.
12. My spouse and I have similar values in terms of personal freedom.
13. My spouse and I have similar sense of entertainment.
14. Most of our goals for people (children, friends, etc.) are the same.
15. Our dreams with my spouse are similar and harmonious.
16. We're compatible with my spouse about what love should be.
17. We share the same views about being happy in our life with my spouse
18. My spouse and I have similar ideas about how marriage should be
19. My spouse and I have similar ideas about how roles should be in marriage
20. My spouse and I have similar values in trust.
21. I know exactly what my wife likes.
22. I know how my spouse wants to be taken care of when she/he sick.
23. I know my spouse's favourite food.

24. I can tell you what kind of stress my spouse is facing in her/his life.

25. I have knowledge of my spouse's inner world.

26. I know my spouse's basic anxieties.

27. I know what my spouse's current sources of stress are.

28. I know my spouse's hopes and wishes.

29. I know my spouse very well.

30. I know my spouse's friends and their social relationships.

31. I feel aggressive when I argue with my spouse.

32. When discussing with my spouse, I usually use expressions such as ‘you always’ or ‘you never’.

33. I can use negative statements about my spouse's personality during our discussions.

34. I can use offensive expressions during our discussions.

35. I can insult my spouse during our discussions.

36. I can be humiliating when we discussions.

37. My discussion with my spouse is not calm.

38. I hate my spouse's way of open a subject.

39. Our discussions often occur suddenly.

40. We're just starting a discussion before I know what's going on.

41. When I talk to my spouse about something, my calm suddenly breaks.

42. When I argue with my spouse, ı only go out and I don't say a word.

43. I mostly stay silent to calm the environment a little bit.

44. Sometimes I think it's good for me to leave home for a while.

45. I'd rather stay silent than discuss with my spouse.

46. Even if I'm right in the discussion, I stay silent to hurt my spouse.

47. When I discuss with my spouse, I stay silent because I am afraid of not being able to control my anger.

48. I feel right in our discussions.

49. I have nothing to do with what I've been accused of.

50. I'm not actually the one who's guilty about what I'm accused of.

51. I'm not the one who's wrong about problems at home.

52. I wouldn't hesitate to tell my spouse about her/his inadequacy.
53. When I discuss, I remind my spouse of her/his inadequacy.
54. I'm not afraid to tell my spouse about her/his incompetence.

The Python Code, Discussion & Results

Firstly, we need to import some essential libraries, such as NumPy and TensorFlow – which all are crucial. Then, it loads a CSV file containing the dataset. The script then creates a neural network composed of three layers: the input layer, the hidden layer, and the output layer after some preparatory processing like moving data and dividing it into training and test sets.

The said training set is used to train the network and then to make predictions on the test set. The result is the accuracy of the model to predict whether a couple is going to divorce or not. The model is then used to predict the outcome of the testing data, and the accuracy of the predictions is evaluated using a confusion matrix and various metrics such as accuracy, precision, recall, and F1-score (known as the Harmonic Mean of Precision).

1. Perceptron Average Accuracy: 95%
2. Gaussian Naïve-Bayes Accuracy: 95%
3. Decision Tree Classifier Accuracy: 88%
4. Multi-Layer Perceptron Accuracy: 98%
5. Tensorflow Keras Model Accuracy: 97%

Comparing the accuracy scores, we can conclude that, for this dataset, the best models used are the Multi-Layer Perceptron and the Tensorflow Keras. Note that the rest of the models used score a fairly well accuracy too.

According to a comparison of the data, it appears that this neural network model is good at predicting whether a married couple will divorce or not. The fact that this is only one dataset and not necessarily representative of other couples should be kept in mind too. Also, this dataset could not contain all the variables that could be significant in predicting divorce.

Overall, this method appears to be a fair illustration of the application of neural networks to predictive modelling as a supervised learning model.