Data Mining & Machine Learning
Neural Networks
11/2019

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Exercise 1: Modification and Evaluation

Revisit the neural network in '*Lab 9.0.ipynb*':

1. Add a set of layers to the model: a dense layer with a ReLu activation layer followed by a dropout layer for regularization. Put this set of layers before the final dense layer, i.e. the one with a softmax activation. Inspect the error rate, did the addition help? What if you remove one of the dropout layer, any noticeable changes in the error rate?
2. Continue sifting through several examples that the model got wrong (*Hint: check if there are some classes that the model often got wrong)*. Take a look at the predicted probability of these instances (use the *predict* function instead of *predict_classes*), did the model got totally off the mark? Or was it unsure of its own prediction?

Exercise 2: Build your own Neural Network

For this exercise you can work on '*Lab 9.1.ipynb*' notebook.

Use the *'EA_FIFA.csv'* dataset. Build two neural networks: one for a regression task of predicting a player's *'Rating'*, and another for a classification task of predicting a player's *'Preffered_Position'* (don't mind the typo in "preffered"!)

Here are several pointers to help you in building the networks:

- Look for example neural network architectures as a start instead of starting from scratch. For example the '*Lab 9.0.ipynb*' notebook or tutorials on the web, e.g. https://towardsdatascience.com/building-a-deep-learning-model-using-keras-1548ca149d37
- Pay attention to the different variable types. You might or might not want to use all the variables. Pick a starting idea that you can quickly implement, evaluate, and move from there. In the notebook we have already selected a set of variables (features) but feel free try your own set of variables.
- There are 292 unique values of *'Preffered_Position'*. If you decided to simplify the categories, how would you do it? For example, taking only the first position, redo the categorizing into something like: goalkeeper, defender, midfielder, and forward, or even goalkeeper and non-goalkeeper.