INFO C260F: Getting Started with Prediction

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September 9, 2017

1 Approach 1

Our first approach was to predict each student's n-th attempt by rounding the average of their scores for their previous k attempts, for $k \in \{1 \dots 5\}$.

We chose this approach because we talked about it in class and it seemed reasonable. In particular, this approach has a temporal aspect: more recent observations take precedence over older ones.

Experimentally, we found that $k = 4$ outperformed the other values of k in terms of training accuracy:

k	Training Accuracy
1	0.7931034482758621
2	0.7586206896551724
3	0.7931034482758621
4	**0.8275862068965517**
5	0.7931034482758621

2 Approach 2

Next, we ran the suggested C++ BKT implementation, which yielded exactly the same training accuracy (0.828).

3 Approach 3

Finally, we trained a neural network using Keras to predict the student's n-th attempt using all of their prior attempts. We used two hidden layers (32 units each, ReLU) and cross-entropy loss with a softmax output layer. After 100 epochs of batch gradient descent (with batches of size 5), the model attained a 0.931 training accuracy.

We used this approach in our final submission.