

**Complex Deep Models of Convolutional Neural Networks:
A Case Study on Social Lending Data**

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Convolutional neural network (CNN) is one of the two most popular models in deep learning at this moment of time. Relatively simple operations of convolution and pooling yield strong local features with shared weights and sparse connectivity, where the convolution filters emphasize or distort the inputs and the pooling function makes the representation invariant to translations in the input [1]. An extensive effort to improve the power of CNN leads to a variety of complex deep models such as inception module and residual module.

The inception module extracts various features using a smaller number of weights through a receptive field of various sizes and composes it into layers of complex modules [2]. It is possible to increase the depth of the entire network and to extract various features from a single layer. The residual module adds a link from the first convolution layer to the last convolution layer in the module of three convolution layers [3]. The residual connection allows to build a deeper model by preventing the gradient vanishing problem that dilutes the original input repeatedly as the weight matrix is multiplied.

We have constructed complex deep models of CNN with these modules to work out an online social lending problem. The number of loan transactions in a social lending company in the US has shown an exponential growth every year. Because the investor chooses the debtor directly, the investor must choose a debtor who can repay the debt within a given period based on the information of the debtor. In this study, we have predicted the debt repayment of the debtor based on the loan information with the complex models and reported a preliminary result with large transaction dataset to show the potential of the complex deep models for this problem.

References

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