

Credit Card Fraud Detection

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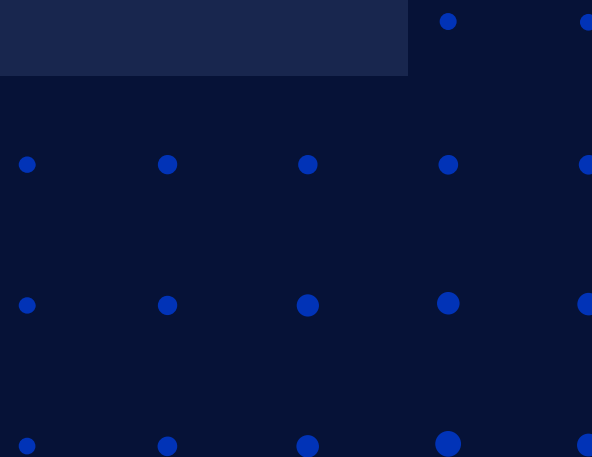


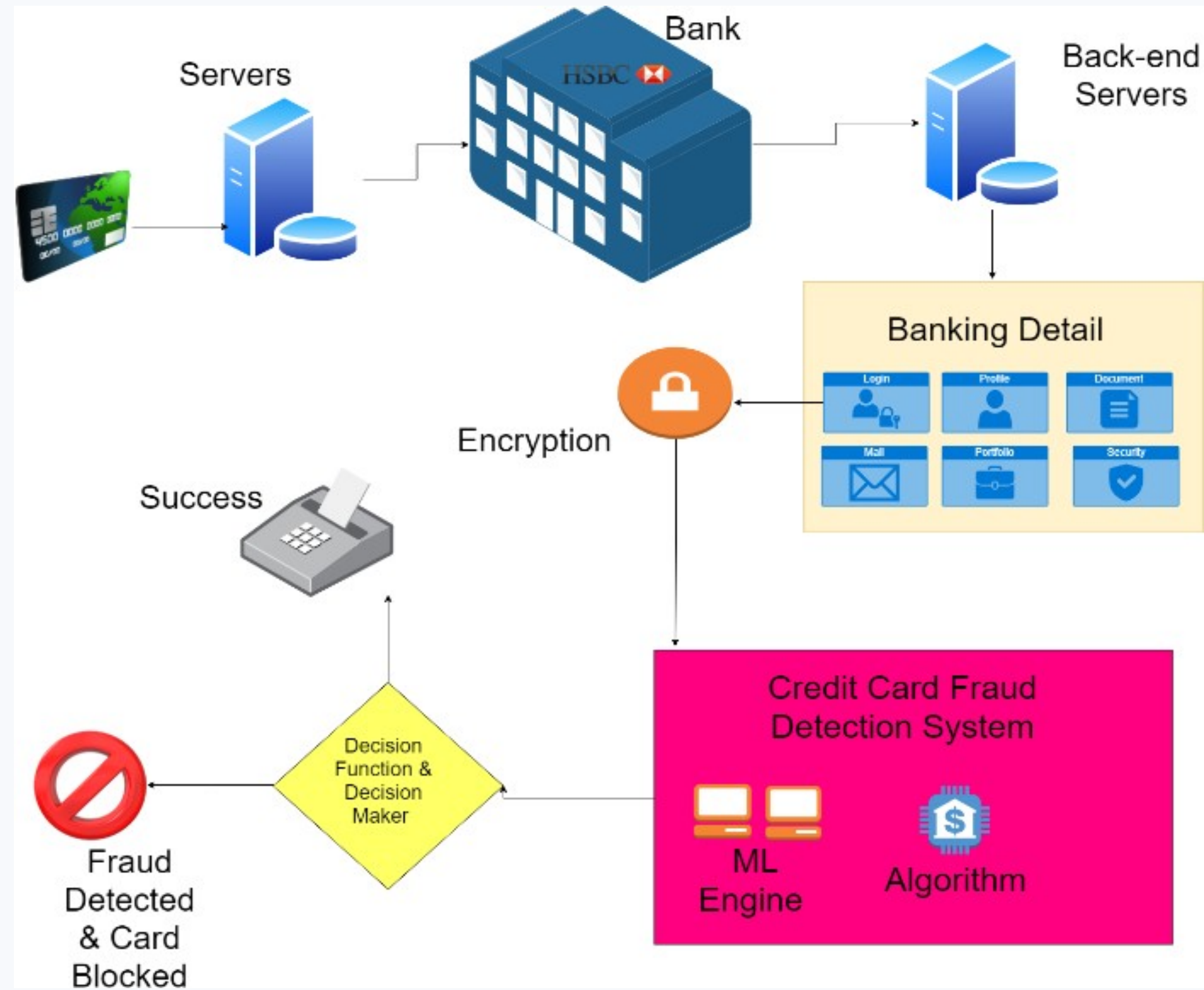


Problem Statement

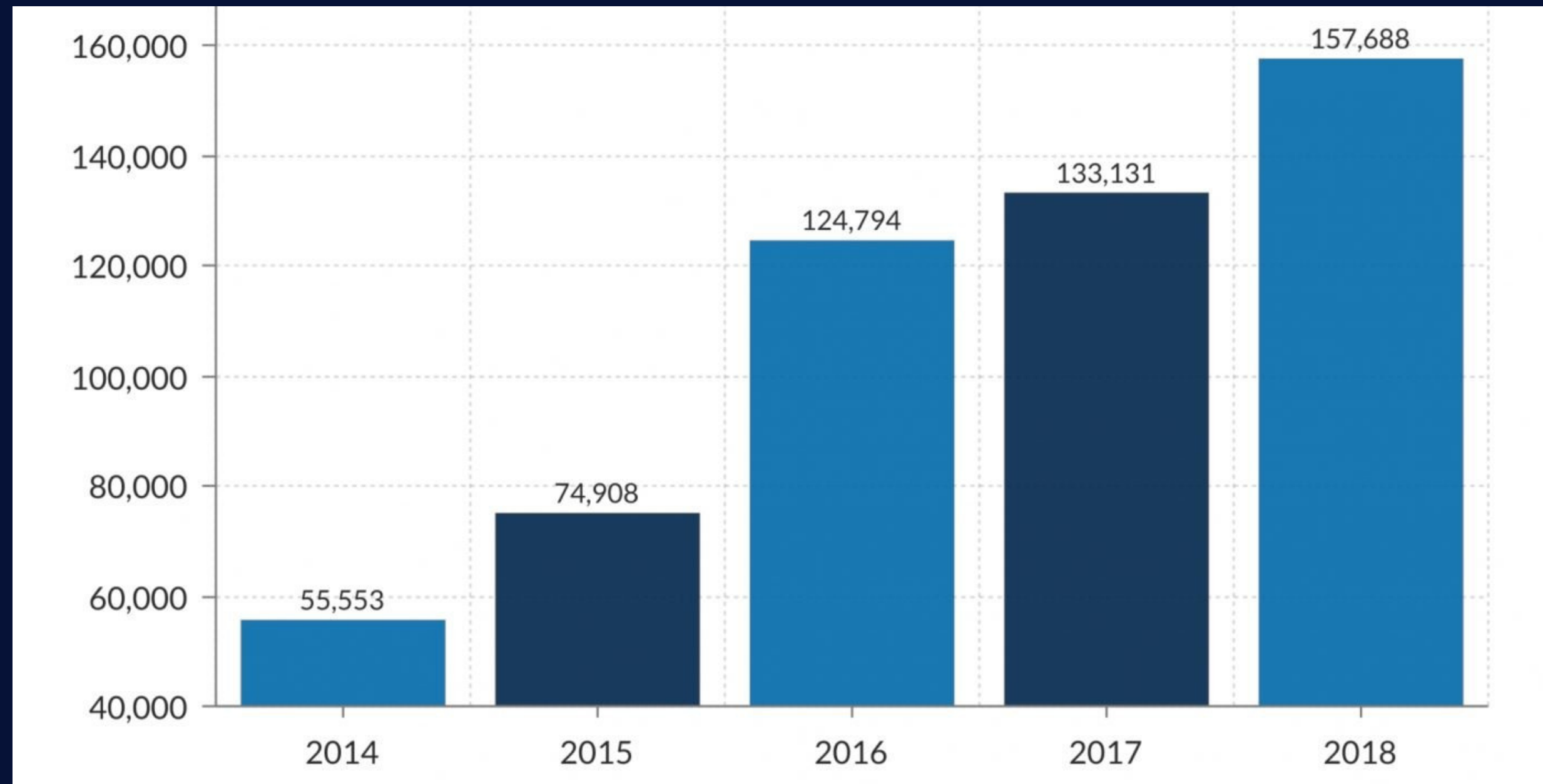
The CreditCard Fraud Detection Problem includes modeling past credit card transactions with the knowledge of the ones that turned out to be fraud. This model is then used to identify whether a new transaction is fraudulent or not. Our aim here is to detect 100% of the fraudulent transactions while minimizing the incorrect fraud classifications.

The credit card fraud detection features use user behaviour and location scanning to check for unusual patterns. These patterns include user characteristics such as user spending patterns as well as usual user geographic location to verify his identity. If any unusual pattern is detected, the system requires revivification.





Frauds over the years

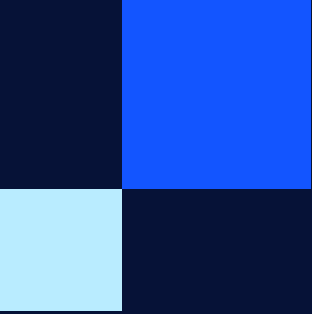


Testing Process

. We choose Credit Approval Dataset due to its contents i.e. it contains about 15 features divided into 3 classes (integer, real and categorical) which would surely help in training the model to achieve a high accuracy. This dataset was very interesting because there was a good mix of attributes -- continuous, nominal with small numbers of values, and nominal with larger numbers of values. There were also a few missing values. For building the neural network used keras with TensorFlow as a backend to build the network.

- The network is a 3-layer network with 11 input nodes 3 nodes in middle layer and one node in Output layer. Visualization of the results is done using Matplotlib

Project Timeline



	Week 1	Week 2	Week 3	Week 4	Week 5
Task name	Choosing project	Gathering data	Testing model	Frontend Coding	Deployed backend on django
Task name	Studying research paper	Choosing libararies	Enhancing algo for optimization	Frontend design	Backend connected to local server
Task name	Setting Environment	Trainnig data	Prediction of result	Validating the web application	Final Outlook



Results & Findings

Our model achieved a accuracy of 94.49 % for fraud detection and the affected population (which were considered fraud but were not fraud was found to be 22.60 %. The results may vary if you run the same jupyter notebook because initialization of the weights of the nodes of SOM grid is done by randomly selecting the records/ patterns from the input space i.e. randomly selecting the records from the given dataset. Since, we have done training for 100 iterations and weights are randomly initialized every time, convergence may vary. We may try with different iterations like 100, 150, 200 etc. to have better convergence. You may also store the weights of the SOM for which you achieve better accuracy.



Conclusion



From the above comparative analysis of the various creditcard fraud detection techniques it is clear that Artificial Neural Networks performs best in this scenario. But the drawbacks of Artificial Neural Networks is that they are very expensive to train and can be easily over trained. In order to minimize their expense we need to create a hybrid of neural network with some optimisation technique. Optimisation techniques that could be successfully paired with Neural Network are Genetic Algorithm, Artificial Immune System, Case Based Reasoning and any other similar optimisation technique



Resources

[1] Dataset:

<http://archive.ics.uci.edu/ml/datasets/Credit+Approval>

IEEE Technical Paper:

https://www.researchgate.net/publication/334761474_Real-time_Credit_Card_Fraud_Detection_Using_Machine_Learning

[4]Website:

<https://towardsdatascience.com/credit-card-fraud-detection-using-self-organizing-featuremaps-f6e8bca707bd>



Does Anyone Have
a Questions?