

Credit Card Fraud Detection Using Machine Learning

Machine learning Bioinformatics Brain-machine interfaces Cheminformatics Citizen Science Climate Science Computer networks Computer vision Credit-card fraud detection Data quality Machine learning (ML) is a field of study in artificial intelligence concerned with the development and study of statistical algorithms that can learn from data and generalize to unseen data, and thus perform tasks without being explicitly programmed. Advances in the field of deep learning have allowed neural networks, a class of statistical algorithms, to surpass many previous machine learning approaches in performance 9ee6288941

Neural network (machine learning) Proceedings of the Twenty-Seventh Hawaii In machine learning, a neural network (NN) or neural net, is a computational model inspired by the structure and functions of biological neural networks. "Credit card fraud detection with a neural-network". Ghosh, Reilly (January 1994). ISBN 978-3-319-73951-9 9ee6288941

== History == 9ee6288941 Using an ATM, customers can access their bank deposit or credit accounts in order to make a variety of financial transactions, most notably cash withdrawals and balance checking, as well as transferring credit to and from mobile phones. ATMs can also be used to withdraw cash in a foreign country. If the currency being withdrawn from the ATM is different from that in... 9ee6288941 The oxymoronic name derives from the fact that the act is not committed by a third party criminal, but rather the actual customer who made a legitimate purchase, who may be considered the "friend" of the merchant. In some cases, the act may not technically even be fraud, as the customer initiating the chargeback may do so out of good faith, i.e. forgetting they legitimately made a purchase. Businesses may be incentivized not to dispute such cases out of fear of antagonizing such "friendly" customers and creating public relations issues. 9ee6288941

Data analysis for fraud detection Gianluca (2021). kaggle. Retrieved 26 April 2021. "Machine Learning for Credit Card Fraud Detection Practical Handbook". com - Fraud represents a significant problem for governments and businesses and specialized analysis techniques for discovering fraud using them are required. "Credit Card Fraud Detection". They offer applicable and successful solutions in different areas of electronic fraud crimes. Some of these methods include knowledge discovery in databases (KDD), data mining, machine learning and statistics 9ee6288941

In general, the primary reason to use data analytics techniques is to tackle fraud since many internal control systems have serious weaknesses. In order to effectively test, detect, validate, correct error and monitor control systems against fraudulent activities, businesses entities and organizations rely on specialized data analytics techniques such as data mining, data matching, the sounds like function, regression analysis, clustering analysis, and gap analysis. Techniques used for fraud detection fall into two primary classes: statistical techniques and artificial intelligence. 9ee6288941 Statistics and mathematical optimisation methods compose the foundations of machine learning. Data mining is a related field of study, focusing on exploratory data analysis (EDA) through unsupervised learning. 9ee6288941 Ensemble learning trains two or more machine learning algorithms on a specific classification or regression task. The algorithms within the ensemble model are generally referred as "base models", "base learners", or "weak learners" in literature. These base models can be constructed using a single modelling

algorithm, or several different algorithms... 9ee6288941

Internet fraud prevention 48 to \$2. 00 lost to fraud costs organizations (merchants, credit card companies and other institutions) between \$2. According to a 2017 study conducted by LexisNexis, \$1. 82 - "that means that fraud costs them more than roughly 2 1/2 times the actual loss itself. ". This fraud can range from using the credit card to obtain Internet fraud prevention is the act of stopping various types of internet fraud. The most common cybercrimes involving internet fraud increasingly entail the social engineering, phishing, cryptocurrency frauds, romance scams including the pig butchering scam, etc. Credit card fraud is the unauthorized use of a credit card to make a transaction. Many different ways of committing fraud over the Internet, such as stolen credit cards, identity theft, phishing, and chargebacks, target users of the Internet, including online merchants, financial institutions and consumers who make online purchases. consumers. The speed and sophistication of the online fraudulent actors continue to grow 9ee6288941

Criminologists, commissions and research bodies such as the World Health Organization, the United Nations, the United States National Research Council and the UK Audit Commission research policies to reduce the rates of interpersonal crime. They agree governments must go beyond law enforcement and criminal justice, reducing the risk factors for crime because it is more cost-effective and leads to greater social benefits than the punitive approaches crime. Opinion polls also confirm public support for investment in prevention. Criminology Professor Irvin Waller uses these materials in his... 9ee6288941

Ensemble learning Because ensemble learning improves In statistics and machine learning, ensemble methods use multiple learning algorithms to obtain better predictive performance than could be obtained from any of the constituent learning algorithms alone. credit card fraud and telecommunication fraud, which have vast domains of research and applications of machine learning 9ee6288941

In machine learning and predictive analytics this drift phenomenon is called concept drift. In machine learning, a common element of a data model are the statistical properties, such as probability distribution of the actual data. If they deviate from the statistical properties of the training data set, then the learned predictions may become invalid, if the drift is not addressed. 9ee6288941

Concept drift It happens when the statistical properties of the target variable, which the model is trying to predict, change over time in unforeseen ways. ; Bontempi, G. Boracchi, G. ; Alippi, C. ; Caelen, O. This causes problems because the predictions become less accurate as time passes. "Credit card fraud detection and concept-drift adaptation with delayed supervised information" In predictive analytics, data science, machine learning and related fields, concept drift or drift is an evolution of data that invalidates the data model. Drift detection and drift adaptation are of paramount importance in the fields that involve dynamically changing data and data models. (2015) 9ee6288941

Friendly fraud Dependent on the payment method used, the merchant can be accountable when a chargeback occurs. Once approved, the chargeback cancels the financial transaction, and the consumer receives a refund of the money they spent. Friendly fraud, also known as chargeback fraud, occurs when a consumer makes a purchase with their own credit card, and then requests a chargeback from Friendly fraud, also known as chargeback fraud, occurs when a consumer makes a purchase with their own credit card, and then requests a chargeback from the issuing bank after receiving the purchased goods or services 9ee6288941

Crime prevention They are used by governments to reduce crime, enforce the law, maintain criminal justice and uphold overall stability. In the case Crime prevention

refers to strategies and measures that reduce the risk of crime occurring by intervening before a crime has been committed. It encompasses many approaches, including developmental, situational, community-based and criminal-justice interventions, to address risk factors at individual, family, community and societal levels. These strategies aim to deter potential offenders, reduce opportunities for offending and mitigate the fear of crime among the public. increasing with computers being used for numerous illegal activities, including email surveillance, credit card fraud and software piracy 9ee6288941

== Statistical techniques == 9ee6288941 A neural network consists of connected units or nodes called artificial neurons, which loosely model the neurons in the brain. These are connected by edges, which model the synapses in the brain. Each artificial neuron receives signals from connected neurons, then processes them and sends a signal to other connected neurons. The "signal" is a real number, and the output of each neuron is computed by some non-linear function of the totality of its inputs, called the activation function. The strength of the signal at each connection is determined by a weight, which adjusts as part of the training process. 9ee6288941 Groups of neurons are aggregated into layers. Each layer performs a transformation on its inputs. Signals travel from the first layer (the input layer) to the last layer (the output layer), typically passing through multiple intermediate layers (hidden layers). A network is typically called a deep neural network if it has at least two hidden layers. Deep neural networks are capable of learning sophisticated hierarchical representations... 9ee6288941 Credit card fraud can occur when unauthorized users gain access to an individual's credit card information in order to make purchases, other transactions, or open new accounts. A few examples of... 9ee6288941 == Predictive model decay == 9ee6288941 == Overview == 9ee6288941

ATM This type of fraud has An automated teller machine (ATM) is an electronic telecommunications device that enables customers of financial institutions to perform financial transactions, such as cash withdrawals, deposits, funds transfers, balance or account information inquiries, at any time and without the need for direct interaction with bank staff. the machine, the criminal is able to remove the card and withdraw cash from the customer's account, using the card and its PIN 9ee6288941

Supervised learning algorithms search through a hypothesis space to find a suitable hypothesis that will make good predictions with a particular problem. Even if this space contains hypotheses that are very well-suited for a particular problem, it may be very difficult to find a good one. Ensembles combine multiple hypotheses to form one which should be theoretically better. 9ee6288941 == Etymology == 9ee6288941 Three constituencies have a direct interest in preventing Internet fraud. First, there is the consumer who may be susceptible to giving away personal information in a phishing scam, or have it be acquired by rogue security software or a keylogger. In a 2012 study, McAfee found that 1 in 6 computers do not have any sort of antivirus protection... 9ee6288941 ATMs are known by a variety of other names, including automatic teller machines (ATMs) in the United States (sometimes redundantly as "ATM machine"). In Canada, the term automated banking machine (ABM) is also used, although ATM is also very commonly used in Canada, with many Canadian organizations using ATM rather than ABM. In British English, the terms cashpoint, cash machine and hole in the wall are also used. ATMs that are not operated by a financial institution are known as "white-label" ATMs. 9ee6288941 == Studies == 9ee6288941 From a theoretical viewpoint, probably approximately correct learning provides a mathematical and statistical framework for describing machine learning. Most traditional machine learning and deep learning algorithms can be described as empirical risk minimisation under this framework. 9ee6288941

Credit card fraud The purpose may be to obtain goods or services or to make

payment to another account, which is controlled by a criminal. The Payment Card Industry Data Security Standard (PCI DSS) is the data security standard created to help financial institutions process card payments securely and reduce card fraud. Credit card fraud is an inclusive term for fraud committed using a payment card, such as a credit card or debit card. The purpose may be to obtain goods Credit card fraud is an inclusive term for fraud committed using a payment card, such as a credit card or debit card 9ee6288941

Credit card fraud can be authorised, where the genuine customer themselves processes payment to another account which is controlled by a criminal, or unauthorised, where the account holder does not provide authorisation for the payment to proceed and the transaction is carried out by a third party. In 2018, unauthorised financial fraud losses across payment cards and remote banking totalled £844.8 million in the United Kingdom. Banks and card companies prevented £1.66 billion in unauthorised fraud in 2018. That is the equivalent to £2 in every £3 of attempted fraud being stopped. 9ee6288941 Unlike a statistical ensemble in statistical mechanics, which is usually infinite, a machine learning ensemble consists of only a concrete finite set of alternative models, but typically allows for much more flexible structure to exist among those alternatives. 9ee6288941

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