Data Science Interview Challenge

Task description

In this data challenge, you're going to work with 8 datasets from a bank (dataset was collected from year of 1999). As a data scientist, you will need to perform the following tasks:

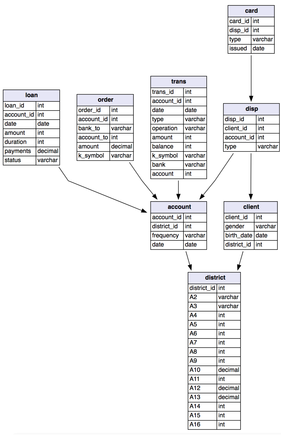
- Import the raw data into a mysql database
- Explore the tables to familiarize yourself with the tables
- Run database queries to prepare modeling datasets
- Use Python to connect to mysql DB and read tables into Pandas dataframes
- Preprocess data for machine learning
- Train a ML model to predict customers who are more likely to default on loans
- Evaluate model performance
- Try to understand the key predictors of default
- Prepare a 15-slide presentation.

Data description

The data about the clients and their accounts consist of following relations:

- relation **account** (4500 objects in the file ACCOUNT.ASC) - each record describes static characteristics of an account,
- relation **client** (5369 objects in the file CLIENT.ASC) - each record describes characteristics of a client,
- relation **disposition** (5369 objects in the file DISP.ASC) - each record relates together a client with an account i.e. this relation describes the rights of clients to operate accounts,
- relation **permanent order** (6471 objects in the file ORDER.ASC) - each record describes characteristics of a payment order,
- relation **transaction** (1056320 objects in the file TRANS.ASC) - each record describes one transaction on an account,
- relation **loan** (682 objects in the file LOAN.ASC) - each record describes a loan granted for a given account,
- relation **credit card** (892 objects in the file CARD.ASC) - each record describes a credit card issued to an account,
- relation **demographic data** (77 objects in the file DISTRICT.ASC) - each record describes demographic characteristics of a district.

Each account has both static characteristics (e.g. date of creation, address of the branch) given in relation "account" and dynamic characteristics (e.g. payments debited or credited, balances) given in relations "permanent order" and "transaction". Relation "client" describes characteristics of persons who can manipulate with the accounts. One client can have more accounts, more clients can manipulate with single account; clients and accounts are related together in relation "disposition". Relations "loan" and "credit card" describe some services which the bank offers to its clients; more credit cards can be issued to an account, at most one loan can be granted for an account. Relation "demographic data" gives some publicly available information about the districts (e.g. the unemployment rate); additional information about the clients can be deduced from this.



Account

COLUMN	DESCRIPTION	NOTES
account_id	identification of the account	
district_id	location of the branch	
date	Date of create of the account	In the form of YYMMDD
frequency	Frequency of issuance of statements	"POPLATEK MESICNE" stands for monthly issuance "POPLATEK TYDNE" stands for weekly issuance "POPLATEK PO OBRATU" stands for issuance after transaction

Client

COLUMN	DESCRIPTION	NOTES
client_id	Client identifier	
birth_number	Birthday and sex	the number is in the form YYMMDD for men, the number is in the form YYMM+50DD for women, where YYMMDD is the date of birth
district_id	Address of the client	In the form of YYMMDD

Disposition

COLUMN	DESCRIPTION	NOTES
disp_id	Record identifier	
client_id	Identification of a client	
account_id	Identification of an account	
type	Type of disposition (owner/user)	Only owner can issue permanent orders and ask for a loan

Orders (Permanent Orders - Debit Only)

COLUMN	DESCRIPTION	NOTES
order_id	Record identifier	
account_id	account, the order is issued for	
bank_to	bank of the recipient	each bank has unique two-letter code
account_to	account of the recipient	
amount	debited amount	
K_symbol	type of the payment	"POJISTNE" stands for insurance payment "SIPO" stands for household payment "LEASING" stands for leasing "UVER" stands for loan payment

Transactions

COLUMN	DESCRIPTION	NOTES
trans_id	record identifier	
account_id	account, the transation deals with	
date	date of transaction	in the form YYMMDD
type	+/- transaction	"PRIJEM" stands for credit "VYDAJ" stands for withdrawal
operation	mode of transaction	"VYBER KARTOU" credit card withdrawal "VKLAD" credit in cash "PREVOD Z UCTU" collection from another bank "VYBER" withdrawal in cash "PREVOD NA UCET" remittance to another bank
amount		
balance	balance after transaction	"POJISTNE" stands for insurance payment "SLUZBY" stands for payment for statement "UROK" stands for interest credited "SANKC. UROK" sanction interest if negative balance "SIPO" stands for household "DUCHOD" stands for old-age pension "UVER" stands for loan payment
k_symbol	characterization of the transaction	
bank	bank of the partner	each bank has unique two-letter code
account	account of the partner	

Loan

COLUMN	DESCRIPTION	NOTES
loan_id	Record identifier	
account_id	identification of the account	
date	date when the loan was granted	in the form YYMMDD
amount		
duration	duration of the loan	
payments	monthly payments	
status	status of paying off the loan	'A' stands for contract finished, no problems, 'B' stands for contract finished, loan not payed, 'C' stands for running contract, OK so far, 'D' stands for running contract, client in debt

Credit Card

COLUMN	DESCRIPTION	NOTES
card_id	Record identifier	
disp_id	disposition to an account	
type	type of card	possible values are "junior", "classic", "gold"
issued	issue date	in the form YYMMDD

Demographic Data

COLUMN	DESCRIPTION	NOTES
A1 = district_id	District code	
A2	District name	
A3	Region	
A4	no. Of inhabitants	
A5	no. of municipalities with inhabitants < 499	
A6	no. of municipalities with inhabitants 500-1999	
A7	no. of municipalities with inhabitants 2000-9999	
A8	no. of municipalities with inhabitants >10000	
A9	no. of cities	
A10	ratio of urban inhabitants	
A11	average salary	
A12	unemploymant rate '95	
A13	unemploymant rate '96	
A14	no. of enterpreneurs per 1000 inhabitants	
A15	no. of commited crimes '95	
A16	no. of commited crimes '96	