



Matlab Projects for Engineering Students

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Emilson Pereira Leite



Matlab Projects For Engineering Students:

Octave and MATLAB for Engineering Applications Andreas Stahel, 2022-05-28 For many engineering tasks extensive computations or visualizations are required. The well established Matlab and Octave, a very similar open source software, are excellent tools for modeling, computing, and visualization. This book will help the reader to acquire basic knowledge and elementary programming skills with Octave. Matlab Basic data and programming structures are presented, and for the most often used commands illustrative code samples are provided. The selection of the presented commands is guided by the typical needs of engineers. With these skills, many and more difficult problems can be solved successfully. It is shown how basic statistical questions can be answered and how results are visualized using appropriate types of graphical representation. A selection of typical independent engineering problems is presented together with algorithms to solve these problems. Special attention is given to the methods of linear and nonlinear regression. The high level tool Matlab/Octave is used to develop computational code for micro controllers. The codes and data files for the book are available on Github and on Springer Link. **Target Groups:** Students in electrical and mechanical engineering and engineering fields in general. **Working engineers.**

An Inquiry-Based Introduction to Engineering Michelle Blum, 2022-09-20 The text introduces engineering to first year undergraduate students using Inquiry Based Learning (IBL). It draws on several different inquiry based instruction types such as confirmation inquiry, structured inquiry, guided inquiry, and open inquiry, and all of their common elements. Professor Blum's approach emphasizes the student's role in the learning process, empowering them in the classroom to explore the material, ask questions, and share ideas instead of the instructor lecturing to passive learners about what they need to know. Beginning with a preface to IBL, the book is organized into three parts, each consisting of four to ten chapters. Each chapter has a dedicated topic where an initial few paragraphs of introductory or fundamental material are provided. This is followed by a series of focused questions that guide the students' learning about the concepts being taught. Featuring multiple inquiry based strategies, each most appropriate to the topic, *An Inquiry Based Approach to Introduction to Engineering* stands as an easy to use textbook that quickly allows students to actively engage with the content during every class period.

Projects in Electrical, Electronics, Instrumentation and Computer Engineering SK Bhattacharya | S Chatterjee, The objective of this book has been to provide the students with reference material to select and work on doing various projects related to their subjects of study. The projects included in this book have been tried out and hence are realistic. The selection of the projects has been done carefully to reflect the real life job situations and also to develop in students the higher order intellectual abilities, i.e. their capability to analyze, synthesize, and decision making through real life like project activities. **Key Features:** All Projects are real life like. Projects included have been tried out by the authors. Includes variety of projects from interdisciplinary areas.

Programming Projects in C for Students of Engineering, Science, and Mathematics Rouben Rostamian, 2014-09-03 Like a pianist who practices from a book of tunes, readers of *Programming*

Projects in C for Students of Engineering Science and Mathematics will learn by doing Written as a tutorial on how to think about organize and implement programs in scientific computing this book achieves its goal through an eclectic and wide ranging collection of projects Each project presents a problem and an algorithm for solving it The reader is guided through implementing the algorithm in C and compiling and testing the results It is not necessary to carry out the projects in sequential order The projects contain suggested algorithms and partially completed programs for implementing them to enable the reader to exercise and develop skills in scientific computing require only a working knowledge of undergraduate multivariable calculus differential equations and linear algebra and are written in platform independent standard C the Unix command line is used to illustrate compilation and execution

Electromagnetic Modeling and Simulation Levent Sevgi, 2014-03-13 This unique book presents simple easy to use but effective short codes as well as virtual tools that can be used by electrical electronic communication and computer engineers in a broad range of electrical engineering problems Electromagnetic modeling is essential to the design and modeling of antenna radar satellite medical imaging and other applications In this book author Levent Sevgi explains techniques for solving real time complex physical problems using MATLAB based short scripts and comprehensive virtual tools Unique in coverage and tutorial approach Electromagnetic Modeling and Simulation covers fundamental analytical and numerical models that are widely used in teaching research and engineering designs including mode and ray summation approaches with the canonical 2D nonpenetrable parallel plate waveguide as well as FDTD MoM and SSPE scripts The book also establishes an intelligent balance among the essentials of EM MODSIM The Problem the physics The Theory and Models mathematical background and analytical solutions and The Simulations code developing plus validation verification and calibration Classroom tested in graduate level and short courses Electromagnetic Modeling and Simulation Clarifies concepts through numerous worked problems and quizzes provided throughout the book Features valuable MATLAB based user friendly effective engineering and research virtual design tools Includes sample scenarios and video clips recorded during characteristic simulations that visually impact learning available on wiley com Provides readers with their first steps in EM MODSIM as well as tools for medium and high level code developers and users Electromagnetic Modeling and Simulation thoroughly covers the physics mathematical background analytical solutions and code development of electromagnetic modeling making it an ideal resource for electrical engineers and researchers

Matlab - Modelling, Programming and Simulations Emilson Pereira Leite, 2010 **Intelligent Robotics and Applications** Sabina Jeschke, Honghai Liu, Daniel Schilberg, 2011-12-03 The two volume set LNAI 7101 and LNAI 7102 constitutes the refereed proceedings of the 4th International Conference on Intelligent Robotics and Applications ICIRA 2011 held in Aachen Germany in November 2011 The 122 revised full papers presented were thoroughly reviewed and selected from numerous submissions They are organized in topical sections on progress in indoor UAV robotics intelligence industrial robots rehabilitation robotics mechanisms and their applications multi robot systems robot mechanism and design parallel

kinematics parallel kinematics machines and parallel robotics handling and manipulation tangibility in human machine interaction navigation and localization of mobile robot a body for the brain embodied intelligence in bio inspired robotics intelligent visual systems self optimising production systems computational intelligence robot control systems human robot interaction manipulators and applications stability dynamics and interpolation evolutionary robotics bio inspired robotics and image processing applications

FIVE PROJECTS: POSTGRESQL AND PYTHON GUI FOR DATA ANALYSIS Vivian Siahaan, Rismon Hasiholan Sianipar, 2022-11-03

PROJECT 1 ZERO TO MASTERY THE COMPLETE GUIDE TO LEARNING POSTGRESQL WITH PYTHON GUI This book uses the PostgreSQL version of MySQL based Northwind database. The Northwind database is a sample database that was originally created by Microsoft and used as the basis for their tutorials in a variety of database products for decades. The Northwind database contains the sales data for a fictitious company called Northwind Traders which imports and exports specialty foods from around the world. The Northwind database is an excellent tutorial schema for a small business ERP with customers orders inventory purchasing suppliers shipping employees and single entry accounting. The Northwind database has since been ported to a variety of non Microsoft databases including PostgreSQL. The Northwind dataset includes sample data for the following:

- Suppliers: Suppliers and vendors of Northwind
- Customers: Customers who buy products from Northwind
- Employees: Employee details of Northwind traders
- Products: Product information
- Shippers: The details of the shippers who ship the products from the traders to the end customers
- Orders and Order_Details: Sales Order transactions taking place between the customers, the distribution of amount by year, quarter, month, week, day and hour, the distribution of bottom 10 sales by product, top 10 sales by product, bottom 10 sales by customer, top 10 sales by customer, bottom 10 sales by supplier, top 10 sales by supplier, bottom 10 sales by customer, country, top 10 sales by customer, country, bottom 10 sales by supplier, country, top 10 sales by supplier, country, average amount by month with mean and ewm, average amount by every month, amount feature over June 1997, amount feature over 1998 and all amount feature.

PROJECT 2 FULL SOURCE CODE POSTGRESQL AND DATA SCIENCE FOR PROGRAMMERS WITH PYTHON GUI This project uses the PostgreSQL version of MySQL based Sakila sample database which is a fictitious database designed to represent a DVD rental store. The tables of the database include film, film_category, actor, film_actor, customer, rental, payment and inventory among others. You can download the database from <https://dev.mysql.com/doc/sakila/en/>. In this project you will write Python script to create every table and insert rows of data into each of them. You will develop GUI with PyQt5 to each table in the database. You will also create GUI to plot case distribution of film release year, film rating, rental duration and categorize film length, plot rating variable against rental_duration variable in stacked bar plots, plot length variable against rental_duration variable in stacked bar plots, read payment table, plot case distribution of Year, Day, Month, Week and Quarter of payment, plot which year, month, week, days of week and quarter have most payment amount, read film list by joining five tables: category, film_category, film_actor, film and actor, plot case distribution of top 10 and bottom 10.

actors plot which film title have least and most sales plot which actor have least and most sales plot which film category have least and most sales plot case distribution of top 10 and bottom 10 overdue costumers plot which store have most sales plot average payment amount by month with mean and EWM and plot payment amount over June 2005 PROJECT 3 FULL SOURCE CODE POSTGRESQL FOR DATA ANALYTICS AND VISUALIZATION WITH PYTHON GUI In this project we provide you with a PostgreSQL version of an Oracle sample database named OT which is based on a global fictitious company that sells computer hardware including storage motherboard RAM video card and CPU The company maintains the product information such as name description standard cost list price and product line It also tracks the inventory information for all products including warehouses where products are available Because the company operates globally it has warehouses in various locations around the world The company records all customer information including name address and website Each customer has at least one contact person with detailed information including name email and phone The company also places a credit limit on each customer to limit the amount that customer can owe Whenever a customer issues a purchase order a sales order is created in the database with the pending status When the company ships the order the order status becomes shipped In case the customer cancels an order the order status becomes canceled In addition to the sales information the employee data is recorded with some basic information such as name email phone job title manager and hire date In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of order date by year quarter month week and day the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by category top 10 sales by category bottom 10 sales by status top 10 sales by status bottom 10 sales by customer city top 10 sales by customer city bottom 10 sales by customer state top 10 sales by customer state average amount by month with mean and EWM average amount by every month amount feature over June 2016 amount feature over 2017 and amount payment in all years PROJECT 4 FULL SOURCE CODE POSTGRESQL FOR DATA SCIENTISTS AND DATA ANALYSTS WITH PYTHON GUI In this project we will use the PostgreSQL version of SQL Server based BikeStores as a sample database to help you work with PostgreSQL quickly and effectively The detailed structure of database can be found at <https://www.sqlservertutorial.net/sql-server-sample-database/> The stores table includes the store s information Each store has a store name contact information such as phone and email and an address including street city state and zip code The staffs table stores the essential information of staffs including first name last name It also contains the communication information such as email and phone A staff works at a store specified by the value in the store_id column A store can have one or more staffs A staff reports to a store manager specified by the value in the manager_id column If the value in the manager_id is null then the staff is the top manager If a staff no longer works for any stores the value in the active column is set to zero The categories table stores the

bike s categories such as children bicycles comfort bicycles and electric bikes The products table stores the product s information such as name brand category model year and list price Each product belongs to a brand specified by the brand_id column Hence a brand may have zero or many products Each product also belongs a category specified by the category_id column Also each category may have zero or many products The customers table stores customer s information including first name last name phone email street city state zip code and photo path The orders table stores the sales order s header information including customer order status order date required date shipped date It also stores the information on where the sales transaction was created store and who created it staff Each sales order has a row in the sales_orders table A sales order has one or many line items stored in the order_items table The order_items table stores the line items of a sales order Each line item belongs to a sales order specified by the order_id column A sales order line item includes product order quantity list price and discount The stocks table stores the inventory information i e the quantity of a particular product in a specific store In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of order date by year quarter month week day and hour the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by category top 10 sales by category bottom 10 sales by brand top 10 sales by brand bottom 10 sales by customer city top 10 sales by customer city bottom 10 sales by customer state top 10 sales by customer state average amount by month with mean and EWM average amount by every month amount feature over June 2017 amount feature over 2018 and all amount feature

PROJECT 5 FULL SOURCE CODE THE COMPLETE GUIDE TO LEARNING POSTGRESQL AND DATA SCIENCE WITH PYTHON GUI

In this project we provide you with the PostgreSQL version of SQLite sample database named chinook The chinook sample database is a good database for practicing with SQL especially PostgreSQL The detailed description of the database can be found on <https://www.sqlitetutorial.net/sqlite-sample-database/> The sample database consists of 11 tables The employee table stores employees data such as employee id last name first name etc It also has a field named ReportsTo to specify who reports to whom customers table stores customers data invoices The artist table stores artists data It is a simple table that contains only the artist id and name The album table stores data about a list of tracks Each album belongs to one artist However one artist may have multiple albums The media_type table stores media types such as MPEG audio and AAC audio files genre table stores music types such as rock jazz metal etc The track table stores the data of songs Each track belongs to one album playlist the distribution of amount by year quarter month week day and hour the bottom top 10 sales by employee the bottom top 10 sales by customer the bottom top 10 sales by customer the bottom top 10 sales by artist the bottom top 10 sales by genre the bottom top 10 sales by play list the bottom top 10 sales by customer city the bottom top 10 sales by customer city the bottom top 10 sales by customer city the payment amount by month with mean and EWM the

average payment amount by every month and amount payment in all years

FIVE PROJECTS: SQLITE AND PYTHON GUI FOR DATA ANALYSIS Vivian Siahaan, Rismon Hasiholan Sianipar, 2022-11-03

PROJECT 1 FULL SOURCE CODE

PRACTICAL DATA SCIENCE WITH SQLITE AND PYTHON GUI In this project we provide you with the SQLite sample database named chinook. The chinook sample database is a good database for practicing with SQL, especially SQLite. The detailed description of the database can be found on <https://www.sqlitetutorial.net/sqlite-sample-database/>. There are 11 tables in the chinook sample database. The employee table stores employees data such as employee id, last name, first name, etc. It also has a field named ReportsTo to specify who reports to whom. The customers table stores customers data. The invoices table stores artists data. It is a simple table that contains only the artist id and name. The album table stores data about a list of tracks. Each album belongs to one artist. However, one artist may have multiple albums. The media_type table stores media types such as MPEG audio and AAC audio files. The genre table stores music types such as rock, jazz, metal, etc. The track table stores the data of songs. Each track belongs to one album. The playlist table stores the distribution of amount by year, quarter, month, week, day, and hour. The bottom_top_10_sales_by_employee table stores the bottom top 10 sales by employee. The bottom_top_10_sales_by_customer table stores the bottom top 10 sales by customer. The bottom_top_10_sales_by_artist table stores the bottom top 10 sales by artist. The bottom_top_10_sales_by_genre table stores the bottom top 10 sales by genre. The bottom_top_10_sales_by_playlist table stores the bottom top 10 sales by playlist. The bottom_top_10_sales_by_customer_city table stores the bottom top 10 sales by customer city. The bottom_top_10_sales_by_customer_city table stores the bottom top 10 sales by customer city. The payment table stores the payment amount by month with mean and EWM. The average payment amount by every month and amount payment in all years.

PROJECT 2 FULL SOURCE CODE

SQLITE FOR STUDENTS AND PROGRAMMERS WITH PYTHON GUI In this project we provide you with a SQLITE version of an Oracle sample database named OT, which is based on a global fictitious company that sells computer hardware including storage, motherboard, RAM, video card, and CPU. You can find the detailed structures of the database on <https://www.oracletutorial.com/getting-started/oracle-sample-database/>. The company maintains the product information such as name, description, standard cost, list price, and product line. It also tracks the inventory information for all products including warehouses where products are available. Because the company operates globally, it has warehouses in various locations around the world. The company records all customer information including name, address, and website. Each customer has at least one contact person with detailed information including name, email, and phone. The company also places a credit limit on each customer to limit the amount that customer can owe. Whenever a customer issues a purchase order, a sales order is created in the database with the pending status. When the company ships the order, the order status becomes shipped. In case the customer cancels an order, the order status becomes canceled. In addition to the sales information, the employee data is recorded with some basic information such as name, email, phone, job title, manager, and hire date. In this project, you will write Python script to create every table and insert rows of data into each of them. You will develop GUI with PyQt5 to each table in the database. You will also create GUI to plot case distribution of order date by year, quarter, month, week, and day. The distribution of amount by year, quarter, month, week, day, and hour. The distribution of bottom 10 sales by product. The top 10 sales.

by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by category top 10 sales by category bottom 10 sales by status top 10 sales by status bottom 10 sales by customer city top 10 sales by customer city bottom 10 sales by customer state top 10 sales by customer state average amount by month with mean and EWM average amount by every month amount feature over June 2016 amount feature over 2017 and amount payment in all years PROJECT 3 SQLITE FOR DATA ANALYST AND DATA SCIENTIST WITH PYTHON GUI In this project we will use the SQLite version of BikeStores database as a sample database to help you work with MySQL quickly and effectively The stores table includes the store s information Each store has a store name contact information such as phone and email and an address including street city state and zip code The staffs table stores the essential information of staffs including first name last name It also contains the communication information such as email and phone A staff works at a store specified by the value in the store_id column A store can have one or more staffs A staff reports to a store manager specified by the value in the manager_id column If the value in the manager_id is null then the staff is the top manager If a staff no longer works for any stores the value in the active column is set to zero The categories table stores the bike s categories such as children bicycles comfort bicycles and electric bikes The products table stores the product s information such as name brand category model year and list price Each product belongs to a brand specified by the brand_id column Hence a brand may have zero or many products Each product also belongs a category specified by the category_id column Also each category may have zero or many products The customers table stores customer s information including first name last name phone email street city state zip code and photo path The orders table stores the sales order s header information including customer order status order date required date shipped date It also stores the information on where the sales transaction was created store and who created it staff Each sales order has a row in the sales_orders table A sales order has one or many line items stored in the order_items table The order_items table stores the line items of a sales order Each line item belongs to a sales order specified by the order_id column A sales order line item includes product order quantity list price and discount The stocks table stores the inventory information i e the quantity of a particular product in a specific store In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of order date by year quarter month week day and hour the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by category top 10 sales by category bottom 10 sales by brand top 10 sales by brand bottom 10 sales by customer city top 10 sales by customer city bottom 10 sales by customer state top 10 sales by customer state average amount by month with mean and EWM average amount by every month amount feature over June 2017 amount feature over 2018 and all amount feature PROJECT 4 SQLITE FOR DATA ANALYSIS AND VISUALIZATION WITH PYTHON GUI In this project you will use SQLite version of Northwind database which is a sample

database that was originally created by Microsoft and used as the basis for their tutorials in a variety of database products for decades The Northwind database contains the sales data for a fictitious company called Northwind Traders which imports and exports specialty foods from around the world The Northwind database is an excellent tutorial schema for a small business ERP with customers orders inventory purchasing suppliers shipping employees and single entry accounting The Northwind dataset includes sample data for the following Suppliers Suppliers and vendors of Northwind Customers Customers who buy products from Northwind Employees Employee details of Northwind traders Products Product information Shippers The details of the shippers who ship the products from the traders to the end customers Orders and Order_Details Sales Order transactions taking place between the customers the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by supplier top 10 sales by supplier bottom 10 sales by customer country top 10 sales by customer country bottom 10 sales by supplier country top 10 sales by supplier country average amount by month with mean and ewm average amount by every month amount feature over June 1997 amount feature over 1998 and all amount feature

PROJECT 5 ZERO TO MASTERY THE COMPLETE GUIDE TO LEARNING SQLITE AND PYTHON GUI In this project we provide you with the SQLite version of The Oracle Database Sample Schemas that provides a common platform for examples in each release of the Oracle Database The sample database is also a good database for practicing with SQL especially SQLite The detailed description of the database can be found on <http://luna.ext.oracle.com/oracle11g/server/112/e10831/diagrams.htm> insertedID0 The four schemas are a set of interlinked schemas This set of schemas provides a layered approach to complexity A simple schema Human Resources HR is useful for introducing basic topics An extension to this schema supports Oracle Internet Directory demos A second schema Order Entry OE is useful for dealing with matters of intermediate complexity Many data types are available in this schema including non scalar data types The Online Catalog OC subschema is a collection of object relational database objects built inside the OE schema The Product Media PM schema is dedicated to multimedia data types The Sales History SH schema is designed to allow for demos with large amounts of data An extension to this schema provides support for advanced analytic processing The HR schema consists of seven tables regions countries locations departments employees jobs and job_histories This book only implements HR schema since the other schemas will be implemented in the next books

PYTHON GUI PROJECTS WITH MACHINE LEARNING AND DEEP LEARNING Vivian Siahaan,Rismon Hasiholan Sianipar,2022-01-16

PROJECT 1 THE APPLIED DATA SCIENCE WORKSHOP

Prostate Cancer Classification and Recognition Using Machine Learning and Deep Learning with Python GUI Prostate cancer is cancer that occurs in the prostate The prostate is a small walnut shaped gland in males that produces the seminal fluid that nourishes and transports sperm Prostate cancer is one of the most common types of cancer Many prostate cancers grow slowly and are confined to the prostate gland where they may not cause serious harm However while some types of prostate

cancer grow slowly and may need minimal or even no treatment other types are aggressive and can spread quickly The dataset used in this project consists of 100 patients which can be used to implement the machine learning and deep learning algorithms The dataset consists of 100 observations and 10 variables out of which 8 numeric variables and one categorical variable and is ID which are as follows Id Radius Texture Perimeter Area Smoothness Compactness Diagnosis Result Symmetry and Fractal Dimension The models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine Adaboost LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D Finally you will develop a GUI using PyQt5 to plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

PROJECT 2 THE APPLIED DATA SCIENCE WORKSHOP

Urinary Biomarkers Based Pancreatic Cancer Classification and Prediction Using Machine Learning with Python GUI

Pancreatic cancer is an extremely deadly type of cancer Once diagnosed the five year survival rate is less than 10% However if pancreatic cancer is caught early the odds of surviving are much better Unfortunately many cases of pancreatic cancer show no symptoms until the cancer has spread throughout the body A diagnostic test to identify people with pancreatic cancer could be enormously helpful In a paper by Silvana Debernardi and colleagues published this year in the journal PLOS Medicine a multi national team of researchers sought to develop an accurate diagnostic test for the most common type of pancreatic cancer called pancreatic ductal adenocarcinoma or PDAC They gathered a series of biomarkers from the urine of three groups of patients Healthy controls Patients with non cancerous pancreatic conditions like chronic pancreatitis and Patients with pancreatic ductal adenocarcinoma When possible these patients were age and sex matched The goal was to develop an accurate way to identify patients with pancreatic cancer The key features are four urinary biomarkers creatinine LYVE1 REG1B and TFF1 Creatinine is a protein that is often used as an indicator of kidney function YVLE1 is lymphatic vessel endothelial hyaluronan receptor 1 a protein that may play a role in tumor metastasis REG1B is a protein that may be associated with pancreas regeneration TFF1 is trefoil factor 1 which may be related to regeneration and repair of the urinary tract The models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine Adaboost LGBM classifier Gradient Boosting XGB classifier and MLP classifier Finally you will develop a GUI using PyQt5 to plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

PROJECT 3 DATA SCIENCE CRASH COURSE

Voice Based Gender Classification and Prediction Using Machine Learning and Deep Learning with Python GUI

This dataset was created to identify a voice as male or female based upon acoustic properties of the voice and speech The dataset consists of 3 168 recorded voice samples collected from male and female speakers The voice samples are pre processed by acoustic

analysis in R using the seewave and tuneR packages with an analyzed frequency range of 0hz 280hz human vocal range The following acoustic properties of each voice are measured and included within the CSV meanfreq mean frequency in kHz sd standard deviation of frequency median median frequency in kHz Q25 first quantile in kHz Q75 third quantile in kHz IQR interquantile range in kHz skew skewness kurt kurtosis sp ent spectral entropy sfm spectral flatness mode mode frequency centroid frequency centroid see specprop peakf peak frequency frequency with highest energy meanfun average of fundamental frequency measured across acoustic signal minfun minimum fundamental frequency measured across acoustic signal maxfun maximum fundamental frequency measured across acoustic signal meandom average of dominant frequency measured across acoustic signal mindom minimum of dominant frequency measured across acoustic signal maxdom maximum of dominant frequency measured across acoustic signal dfrange range of dominant frequency measured across acoustic signal modindx modulation index Calculated as the accumulated absolute difference between adjacent measurements of fundamental frequencies divided by the frequency range and label male or female The models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine Adaboost LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D Finally you will develop a GUI using PyQt5 to plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

PROJECT 4 DATA SCIENCE CRASH COURSE Thyroid Disease Classification and Prediction Using Machine Learning and Deep Learning with Python GUI Thyroid disease is a general term for a medical condition that keeps your thyroid from making the right amount of hormones Thyroid typically makes hormones that keep body functioning normally When the thyroid makes too much thyroid hormone body uses energy too quickly The two main types of thyroid disease are hypothyroidism and hyperthyroidism Both conditions can be caused by other diseases that impact the way the thyroid gland works Dataset used in this project was from Garavan Institute Documentation as given by Ross Quinlan 6 databases from the Garavan Institute in Sydney Australia Approximately the following for each database 2800 training data instances and 972 test instances This dataset contains plenty of missing data while 29 or so attributes either Boolean or continuously valued The models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine Adaboost LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D Finally you will develop a GUI using PyQt5 to plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

FOUR PROJECTS: MYSQL AND PYTHON GUI FOR DATA ANALYSIS

Vivian Siahaan, Rismon Hasiholan Sianipar, 2022-11-04 **PROJECT 1 FULL SOURCE CODE MYSQL FOR STUDENTS AND PROGRAMMERS WITH PYTHON GUI** In this project we provide you with a MySQL version of an Oracle sample database

named OT which is based on a global fictitious company that sells computer hardware including storage motherboard RAM video card and CPU The company maintains the product information such as name description standard cost list price and product line It also tracks the inventory information for all products including warehouses where products are available Because the company operates globally it has warehouses in various locations around the world The company records all customer information including name address and website Each customer has at least one contact person with detailed information including name email and phone The company also places a credit limit on each customer to limit the amount that customer can owe Whenever a customer issues a purchase order a sales order is created in the database with the pending status When the company ships the order the order status becomes shipped In case the customer cancels an order the order status becomes canceled In addition to the sales information the employee data is recorded with some basic information such as name email phone job title manager and hire date In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of order date by year quarter month week and day the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by category top 10 sales by category bottom 10 sales by status top 10 sales by status bottom 10 sales by customer city top 10 sales by customer city bottom 10 sales by customer state top 10 sales by customer state average amount by month with mean and EWM average amount by every month amount feature over June 2016 amount feature over 2017 and amount payment in all years PROJECT 2 MYSQL FOR DATA ANALYST AND DATA SCIENTIST WITH PYTHON GUI In this project we will use the BikeStores database as a MySQL sample database to help you work with MySQL quickly and effectively The stores table includes the store s information Each store has a store name contact information such as phone and email and an address including street city state and zip code The staffs table stores the essential information of staffs including first name last name It also contains the communication information such as email and phone A staff works at a store specified by the value in the store_id column A store can have one or more staffs A staff reports to a store manager specified by the value in the manager_id column If the value in the manager_id is null then the staff is the top manager If a staff no longer works for any stores the value in the active column is set to zero The categories table stores the bike s categories such as children bicycles comfort bicycles and electric bikes The products table stores the product s information such as name brand category model year and list price Each product belongs to a brand specified by the brand_id column Hence a brand may have zero or many products Each product also belongs a category specified by the category_id column Also each category may have zero or many products The customers table stores customer s information including first name last name phone email street city state zip code and photo path The orders table stores the sales order s header information including customer order status order date required date shipped date It also

stores the information on where the sales transaction was created store and who created it staff Each sales order has a row in the sales_orders table A sales order has one or many line items stored in the order_items table The order_items table stores the line items of a sales order Each line item belongs to a sales order specified by the order_id column A sales order line item includes product order quantity list price and discount The stocks table stores the inventory information i e the quantity of a particular product in a specific store In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of order date by year quarter month week day and hour the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by category top 10 sales by category bottom 10 sales by brand top 10 sales by brand bottom 10 sales by customer city top 10 sales by customer city bottom 10 sales by customer state top 10 sales by customer state average amount by month with mean and EWM average amount by every month amount feature over June 2017 amount feature over 2018 and all amount feature PROJECT 3 MYSQL FOR DATA ANALYSIS AND VISUALIZATION WITH PYTHON GUI In this project you will use the Northwind database which is a sample database that was originally created by Microsoft and used as the basis for their tutorials in a variety of database products for decades The Northwind database contains the sales data for a fictitious company called Northwind Traders which imports and exports specialty foods from around the world The Northwind database is an excellent tutorial schema for a small business ERP with customers orders inventory purchasing suppliers shipping employees and single entry accounting The Northwind dataset includes sample data for the following Suppliers Suppliers and vendors of Northwind Customers Customers who buy products from Northwind Employees Employee details of Northwind traders Products Product information Shippers The details of the shippers who ship the products from the traders to the end customers Orders and Order_Details Sales Order transactions taking place between the customers the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by supplier top 10 sales by supplier bottom 10 sales by customer country top 10 sales by customer country bottom 10 sales by supplier country top 10 sales by supplier country average amount by month with mean and ewm average amount by every month amount feature over june 1997 amount feature over 1998 and all amount feature PROJECT 4 MYSQL AND DATA SCIENCE QUERIES AND VISUALIZATION WITH PYTHON GUI In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of film release year film rating rental duration and categorize film length plot rating variable against rental_duration variable in stacked bar plots plot length variable against rental_duration variable in stacked bar plots read payment table plot case distribution of Year Day Month Week and Quarter of payment plot which year month week days of

week and quarter have most payment amount read film list by joining five tables category film_category film_actor film and actor plot case distribution of top 10 and bottom 10 actors plot which film title have least and most sales plot which actor have least and most sales plot which film category have least and most sales plot case distribution of top 10 and bottom 10 overdue costumers plot which customer have least and most overdue days plot which store have most sales plot average payment amount by month with mean and EWM and plot payment amount over June 2005 This project uses the Sakila sample database which is a fictitious database designed to represent a DVD rental store The tables of the database include film film_category actor film_actor customer rental payment and inventory among others You can download the MySQL from <https://dev.mysql.com/doc/sakila/en>

Introduction To Numerical Computation, An (Second Edition) Wen Shen, 2019-08-28 This book serves as a set of lecture notes for a senior undergraduate level course on the introduction to numerical computation which was developed through 4 semesters of teaching the course over 10 years The book requires minimum background knowledge from the students including only a three semester of calculus and a bit on matrices The book covers many of the introductory topics for a first course in numerical computation which fits in the short time frame of a semester course Topics range from polynomial approximations and interpolation to numerical methods for ODEs and PDEs Emphasis was made more on algorithm development basic mathematical ideas behind the algorithms and the implementation in Matlab The book is supplemented by two sets of videos available through the author's YouTube channel Homework problem sets are provided for each chapter and complete answer sets are available for instructors upon request The second edition contains a set of selected advanced topics written in a self contained manner suitable for self learning or as additional material for an honored version of the course Videos are also available for these added topics

Classification and Prediction Projects with Machine Learning and Deep Learning Vivian Siahaan, Rismon Hasiholan Sianipar, 2022-02-06

PROJECT 1 DATA SCIENCE CRASH COURSE Drinking Water Potability Classification and Prediction Using Machine Learning and Deep Learning with Python Access to safe drinking water is essential to health a basic human right and a component of effective policy for health protection This is important as a health and development issue at a national regional and local level In some regions it has been shown that investments in water supply and sanitation can yield a net economic benefit since the reductions in adverse health effects and health care costs outweigh the costs of undertaking the interventions The drinkingwaterpotability csv file contains water quality metrics for 3276 different water bodies The columns in the file are as follows ph Hardness Solids Chloramines Sulfate Conductivity Organic_carbon Trihalomethanes Turbidity and Potability Contaminated water and poor sanitation are linked to the transmission of diseases such as cholera diarrhea dysentery hepatitis A typhoid and polio Absent inadequate or inappropriately managed water and sanitation services expose individuals to preventable health risks This is particularly the case in health care facilities where both patients and staff are placed at additional risk of infection and disease when water sanitation and hygiene services are lacking The machine learning models

used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine Adaboost LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D Finally you will plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

PROJECT 2 DATA SCIENCE CRASH COURSE Skin Cancer Classification and Prediction Using Machine Learning and Deep Learning Skin cancer develops primarily on areas of sun exposed skin including the scalp face lips ears neck chest arms and hands and on the legs in women But it can also form on areas that rarely see the light of day your palms beneath your fingernails or toenails and your genital area Skin cancer affects people of all skin tones including those with darker complexions When melanoma occurs in people with dark skin tones it s more likely to occur in areas not normally exposed to the sun such as the palms of the hands and soles of the feet Dataset used in this project contains a balanced dataset of images of benign skin moles and malignant skin moles The data consists of two folders with each 1800 pictures 224x244 of the two types of moles The machine learning models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine Adaboost LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D The deep learning models used are CNN and MobileNet

THREE PROJECTS: SQL SERVER AND PYTHON GUI FOR DATA ANALYSIS Vivian Siahaan,Rismon Hasiholan Sianipar,2022-11-08

PROJECT 1 FULL SOURCE CODE SQL SERVER FOR STUDENTS AND DATA SCIENTISTS WITH PYTHON GUI In this project we provide you with the SQL SERVER version of SQLite sample database named chinook The chinook sample database is a good database for practicing with SQL especially PostgreSQL The detailed description of the database can be found on <https://www.sqlitetutorial.net/sqlite-sample-database/> The sample database consists of 11 tables The employee table stores employees data such as employee id last name first name etc It also has a field named ReportsTo to specify who reports to whom customers table stores customers data invoices The artist table stores artists data It is a simple table that contains only the artist id and name The album table stores data about a list of tracks Each album belongs to one artist However one artist may have multiple albums The media_type table stores media types such as MPEG audio and AAC audio files genre table stores music types such as rock jazz metal etc The track table stores the data of songs Each track belongs to one album

playlist the distribution of amount by year quarter month week day and hour the bottom top 10 sales by employee the bottom top 10 sales by customer the bottom top 10 sales by customer the bottom top 10 sales by artist the bottom top 10 sales by genre the bottom top 10 sales by play list the bottom top 10 sales by customer city the bottom top 10 sales by customer city the bottom top 10 sales by customer city the payment amount by month with mean and EWM the average payment amount by every month and amount payment in all years

PROJECT 2 FULL SOURCE CODE SQL SERVER FOR DATA ANALYTICS AND VISUALIZATION WITH PYTHON GUI This book uses SQL SERVER version of MySQL based Sakila sample database It is a fictitious database

designed to represent a DVD rental store. The tables of the database include film, film_category, actor, customer, rental, payment, and inventory among others. The Sakila sample database is intended to provide a standard schema that can be used for examples in books, tutorials, articles, samples, and so forth. Detailed information about the database can be found on website <https://dev.mysql.com/doc/index-other.html>. In this project, you will develop GUI using PyQt5 to read SQL SERVER database and every table in it. You will read every actor in actor table, read every film in films table, plot case distribution of film release year, film rating, rental duration, and categorize film length. You will plot rating variable against rental_duration variable in stacked bar plots, plot length variable against rental_duration variable in stacked bar plots, read payment table, plot case distribution of Year, Day, Month, Week, and Quarter of payment, plot which year, month, week, days of week, and quarter have most payment amount, read film list by joining five tables: category, film_category, film_actor, film, and actor, plot case distribution of top 10 and bottom 10 actors, plot which film title have least and most sales, plot which actor have least and most sales, plot which film category have least and most sales, plot case distribution of top 10 and bottom 10 overdue customers, plot which customer have least and most overdue days, plot which store have most sales, plot average payment amount by month with mean and EWM, and plot payment amount over June 2005.

PROJECT 3: ZERO TO MASTERY: THE COMPLETE GUIDE TO LEARNING SQL SERVER AND DATA SCIENCE WITH PYTHON GUI

In this project, we provide you with a SQL SERVER version of an Oracle sample database named OT, which is based on a global fictitious company that sells computer hardware including storage, motherboard, RAM, video card, and CPU. The company maintains the product information such as name, description, standard cost, list price, and product line. It also tracks the inventory information for all products including warehouses where products are available. Because the company operates globally, it has warehouses in various locations around the world. The company records all customer information including name, address, and website. Each customer has at least one contact person with detailed information including name, email, and phone. The company also places a credit limit on each customer to limit the amount that customer can owe. Whenever a customer issues a purchase order, a sales order is created in the database with the pending status. When the company ships the order, the order status becomes shipped. In case the customer cancels an order, the order status becomes canceled. In addition to the sales information, the employee data is recorded with some basic information such as name, email, phone, job title, manager, and hire date. In this project, you will write Python script to create every table and insert rows of data into each of them. You will develop GUI with PyQt5 to each table in the database. You will also create GUI to plot case distribution of order date by year, quarter, month, week, and day; the distribution of amount by year, quarter, month, week, day, and hour; the distribution of bottom 10 sales by product; top 10 sales by product; bottom 10 sales by customer; top 10 sales by customer; bottom 10 sales by category; top 10 sales by category; bottom 10 sales by status; top 10 sales by status; bottom 10 sales by customer; city; top 10 sales by customer; city; bottom 10 sales by customer; state; top 10 sales by customer; state; average amount by month with mean and EWM.

average amount by every month amount feature over June 2016 amount feature over 2017 and amount payment in all years

FOUR PROJECTS: PREDICTION AND FORECASTING USING MACHINE LEARNING WITH PYTHON Vivian

Siahaan,Rismon Hasiholan Sianipar,2022-05-25 PROJECT 1 GOLD PRICE ANALYSIS AND FORECASTING USING MACHINE LEARNING WITH PYTHON The challenge of this project is to accurately predict the future adjusted closing price of Gold ETF across a given period of time in the future The problem is a regression problem because the output value which is the adjusted closing price in this project is continuous value Data for this study is collected from November 18th 2011 to January 1st 2019 from various sources The data has 1718 rows in total and 80 columns in total Data for attributes such as Oil Price Standard and Poor s S Blast Furnace Slag component 2 Fly Ash component 3 Water component 4 Superplasticizer component 5 Coarse Aggregate Fine Aggregate component 7 Age and Concrete compressive strength To perform regression on concrete compressive strength you will use Linear Regression Random Forest regression Decision Tree regression Support Vector Machine regression Na ve Bayes regression K Nearest Neighbor regression Adaboost regression Gradient Boosting regression Extreme Gradient Boosting regression Light Gradient Boosting regression Catboost regression and MLP regression To perform clustering you will use K Means algorithm The machine learning models used predict clusters as target variable are K Nearest Neighbor classifier Random Forest classifier Naive Bayes classifier Logistic Regression classifier Decision Tree classifier Support Vector Machine classifier LGBM classifier Gradient Boosting classifier XGB classifier and MLP classifier Finally you will plot boundary decision distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy PROJECT 4 DATA SCIENCE FOR SALES ANALYSIS FORECASTING CLUSTERING AND PREDICTION WITH PYTHON The dataset used in this project is from Walmart which is a renowned retail corporation that operates a chain of hypermarkets Walmart has provided a data combining of 45 stores including store information and monthly sales The data is provided on weekly basis Walmart tries to find the impact of holidays on the sales of store For which it has included four holidays weeks into the dataset which are Christmas Thanksgiving Super bowl Labor Day In this project you are going to analyze forecast weekly sales perform clustering and predict the resulting clusters The dataset covers sales from 2010 02 05 to 2012 11 01 Following are the attributes in the dataset Store the store number Date the week of sales Weekly_Sales sales for the given store Holiday_Flag whether the week is a special holiday week 1 Holiday week 0 Non holiday week Temperature Temperature on the day of sale Fuel_Price Cost of fuel in the region CPI Prevailing consumer price index and Unemployment Prevailing unemployment rate To perform regression on weekly sales you will use Linear Regression Random Forest regression Decision Tree regression Support Vector Machine regression Na ve Bayes regression K Nearest Neighbor regression Adaboost regression Gradient Boosting regression Extreme Gradient Boosting regression Light Gradient Boosting regression Catboost regression and MLP regression To perform clustering you will use K

Means algorithm The machine learning models used predict clusters as target variable are K Nearest Neighbor classifier Random Forest classifier Naive Bayes classifier Logistic Regression classifier Decision Tree classifier Support Vector Machine classifier LGBM classifier Gradient Boosting classifier XGB classifier and MLP classifier Finally you will plot boundary decision distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

FOUR PROJECTS: MySQL and SQLite For Data Science with Python GUI Vivian Siahaan, Rismon Hasiholan Sianipar, 2022-06-29

PROJECT 1 SQLITE AND DATA SCIENCE QUERIES AND VISUALIZATION WITH PYTHON GUI In this project you will develop GUI with PyQt5 to utilize Push Button Combo Box Table Widget Line Edit and Widget read and create SQLite database and every table in it plot case distribution of film release year film rating rental duration and categorize film length plot rating variable against rental_duration variable in stacked bar plots plot length variable against rental_duration variable in stacked bar plots read payment table plot case distribution of Year Day Month Week and Quarter of payment plot which year month week days of week and quarter have most payment amount read film list by joining five tables category film_category film_actor film and actor plot case distribution of top 10 and bottom 10 actors plot which film title have least and most sales plot which actor have least and most sales plot which film category have least and most sales plot case distribution of top 10 and bottom 10 overdue costumers plot which customer have least and most overdue days plot which store have most sales plot average payment amount by month with mean and EWM and plot payment amount over June 2005 This project uses the Sakila sample database which is a fictitious database designed to represent a DVD rental store The tables of the database include film film_category actor film_actor customer rental payment and inventory among others You can download the SQLite from <https://dev.mysql.com/doc/sakila/en>

PROJECT 2 MYSQL AND DATA SCIENCE QUERIES AND VISUALIZATION WITH PYTHON GUI In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of film release year film rating rental duration and categorize film length plot rating variable against rental_duration variable in stacked bar plots plot length variable against rental_duration variable in stacked bar plots read payment table plot case distribution of Year Day Month Week and Quarter of payment plot which year month week days of week and quarter have most payment amount read film list by joining five tables category film_category film_actor film and actor plot case distribution of top 10 and bottom 10 actors plot which film title have least and most sales plot which actor have least and most sales plot which film category have least and most sales plot case distribution of top 10 and bottom 10 overdue costumers plot which customer have least and most overdue days plot which store have most sales plot average payment amount by month with mean and EWM and plot payment amount over June 2005 This project uses the Sakila sample database which is a fictitious database designed to represent a DVD rental store The tables of the database include

film film_category actor film_actor customer rental payment and inventory among others You can download the MySQL from <https://dev.mysql.com/doc/sakila/en>

PROJECT 3 MYSQL FOR DATA ANALYSIS AND VISUALIZATION WITH PYTHON GUI In this project you will use the Northwind database which is a sample database that was originally created by Microsoft and used as the basis for their tutorials in a variety of database products for decades The Northwind database contains the sales data for a fictitious company called Northwind Traders which imports and exports specialty foods from around the world The Northwind database is an excellent tutorial schema for a small business ERP with customers orders inventory purchasing suppliers shipping employees and single entry accounting The Northwind dataset includes sample data for the following Suppliers Suppliers and vendors of Northwind Customers Customers who buy products from Northwind Employees Employee details of Northwind traders Products Product information Shippers The details of the shippers who ship the products from the traders to the end customers Orders and Order_Details Sales Order transactions taking place between the customers the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by supplier top 10 sales by supplier bottom 10 sales by customer country top 10 sales by customer country bottom 10 sales by supplier country top 10 sales by supplier country average amount by month with mean and ewm average amount by every month amount feature over June 1997 amount feature over 1998 and all amount feature

PROJECT 4 SQLITE FOR DATA ANALYSIS AND VISUALIZATION WITH PYTHON GUI In this project you will use SQLite version of Northwind database which is a sample database that was originally created by Microsoft and used as the basis for their tutorials in a variety of database products for decades The Northwind database contains the sales data for a fictitious company called Northwind Traders which imports and exports specialty foods from around the world The Northwind database is an excellent tutorial schema for a small business ERP with customers orders inventory purchasing suppliers shipping employees and single entry accounting The Northwind dataset includes sample data for the following Suppliers Suppliers and vendors of Northwind Customers Customers who buy products from Northwind Employees Employee details of Northwind traders Products Product information Shippers The details of the shippers who ship the products from the traders to the end customers Orders and Order_Details Sales Order transactions taking place between the customers the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by supplier top 10 sales by supplier bottom 10 sales by customer country top 10 sales by customer country bottom 10 sales by supplier country top 10 sales by supplier country average amount by month with mean and ewm average amount by every month amount feature over June 1997 amount feature over 1998 and all amount feature

ANALYSIS AND PREDICTION PROJECTS USING MACHINE LEARNING AND DEEP LEARNING WITH PYTHON Vivian Siahaan, Rismon Hasiholan Sianipar, 2022-02-17

PROJECT 1 DEFAULT LOAN PREDICTION BASED ON CUSTOMER BEHAVIOR Using

Machine Learning and Deep Learning with Python In finance default is failure to meet the legal obligations or conditions of a loan for example when a home buyer fails to make a mortgage payment or when a corporation or government fails to pay a bond which has reached maturity A national or sovereign default is the failure or refusal of a government to repay its national debt The dataset used in this project belongs to a Hackathon organized by Univ AI All values were provided at the time of the loan application Following are the features in the dataset Income Age Experience Married Single House_Ownership Car_Ownership Profession CITY STATE CURRENT_JOB_YRS CURRENT_HOUSE_YRS and Risk_Flag The Risk_Flag indicates whether there has been a default in the past or not The machine learning models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine Adaboost LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D Finally you will plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy PROJECT 2 AIRLINE PASSENGER SATISFACTION Analysis and Prediction Using Machine Learning and Deep Learning with Python The dataset used in this project contains an airline passenger satisfaction survey In this case you will determine what factors are highly correlated to a satisfied or dissatisfied passenger and predict passenger satisfaction Below are the features in the dataset Gender Gender of the passengers Female Male Customer Type The customer type Loyal customer disloyal customer Age The actual age of the passengers Type of Travel Purpose of the flight of the passengers Personal Travel Business Travel Class Travel class in the plane of the passengers Business Eco Eco Plus Flight distance The flight distance of this journey Inflight wifi service Satisfaction level of the inflight wifi service 0 Not Applicable 1 5 Departure Arrival time convenient Satisfaction level of Departure Arrival time convenient Ease of Online booking Satisfaction level of online booking Gate location Satisfaction level of Gate location Food and drink Satisfaction level of Food and drink Online boarding Satisfaction level of online boarding Seat comfort Satisfaction level of Seat comfort Inflight entertainment Satisfaction level of inflight entertainment On board service Satisfaction level of On board service Leg room service Satisfaction level of Leg room service Baggage handling Satisfaction level of baggage handling Check in service Satisfaction level of Check in service Inflight service Satisfaction level of inflight service Cleanliness Satisfaction level of Cleanliness Departure Delay in Minutes Minutes delayed when departure Arrival Delay in Minutes Minutes delayed when Arrival and Satisfaction Airline satisfaction level Satisfaction neutral or dissatisfaction The machine learning models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D Finally you will plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy PROJECT 3 CREDIT CARD CHURNING CUSTOMER ANALYSIS

AND PREDICTION USING MACHINE LEARNING AND DEEP LEARNING WITH PYTHON The dataset used in this project consists of more than 10 000 customers mentioning their age salary marital_status credit card limit credit card category etc There are 20 features in the dataset In the dataset there are only 16 07% of customers who have churned Thus it s a bit difficult to train our model to predict churning customers Following are the features in the dataset Attrition_Flag Customer_Age Gender Dependent_count Education_Level Marital_Status Income_Category Card_Category Months_on_book Total_Relationship_Count Months_Inactive_12_mon Contacts_Count_12_mon Credit_Limit Total_Revolving_Bal Avg_Open_To_Buy Total_Amt_Chng_Q4_Q1 Total_Trans_Amt Total_Trans_Ct Total_Ct_Chng_Q4_Q1 and Avg_Utilization_Ratio The target variable is Attrition_Flag The machine learning models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D Finally you will plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

PROJECT 4 MARKETING ANALYSIS AND PREDICTION USING MACHINE LEARNING AND DEEP LEARNING WITH PYTHON

This data set was provided to students for their final project in order to test their statistical analysis skills as part of a MSc in Business Analytics It can be utilized for EDA Statistical Analysis and Visualizations Following are the features in the dataset ID Customer s unique identifier Year_Birth Customer s birth year Education Customer s education level Marital_Status Customer s marital status Income Customer s yearly household income Kidhome Number of children in customer s household Teenhome Number of teenagers in customer s household Dt_Customer Date of customer s enrollment with the company Recency Number of days since customer s last purchase MntWines Amount spent on wine in the last 2 years MntFruits Amount spent on fruits in the last 2 years MntMeatProducts Amount spent on meat in the last 2 years MntFishProducts Amount spent on fish in the last 2 years MntSweetProducts Amount spent on sweets in the last 2 years MntGoldProds Amount spent on gold in the last 2 years NumDealsPurchases Number of purchases made with a discount NumWebPurchases Number of purchases made through the company s web site NumCatalogPurchases Number of purchases made using a catalogue NumStorePurchases Number of purchases made directly in stores NumWebVisitsMonth Number of visits to company s web site in the last month AcceptedCmp3 1 if customer accepted the offer in the 3rd campaign 0 otherwise AcceptedCmp4 1 if customer accepted the offer in the 4th campaign 0 otherwise AcceptedCmp5 1 if customer accepted the offer in the 5th campaign 0 otherwise AcceptedCmp1 1 if customer accepted the offer in the 1st campaign 0 otherwise AcceptedCmp2 1 if customer accepted the offer in the 2nd campaign 0 otherwise Response 1 if customer accepted the offer in the last campaign 0 otherwise Complain 1 if customer complained in the last 2 years 0 otherwise and Country Customer s location The machine and deep learning models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support

Vector Machine LGBM classifier Gradient Boosting XGB classifier MLP classifier and CNN 1D Finally you will plot boundary decision ROC distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

PROJECT 5 METEOROLOGICAL DATA ANALYSIS AND PREDICTION USING MACHINE LEARNING WITH PYTHON

Meteorological phenomena are described and quantified by the variables of Earth's atmosphere temperature air pressure water vapour mass flow and the variations and interactions of these variables and how they change over time Different spatial scales are used to describe and predict weather on local regional and global levels The dataset used in this project consists of meteorological data with 96453 total number of data points and with 11 attributes columns Following are the columns in the dataset Formatted Date Summary Precip Type Temperature C Apparent Temperature C Humidity Wind Speed km/h Wind Bearing degrees Visibility km Pressure millibars and Daily Summary The machine learning models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine LGBM classifier Gradient Boosting XGB classifier and MLP classifier Finally you will plot boundary decision distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

DATA ANALYSIS PROJECTS WITH MYSQL, SQLITE, POSTGRESQL, AND SQL SERVER USING PYTHON GUI

Vivian Siahaan, Rismon Hasiholan Sianipar, 2022-10-26

PROJECT 1 FULL SOURCE CODE POSTGRESQL AND DATA SCIENCE FOR PROGRAMMERS WITH PYTHON GUI

This project uses the PostgreSQL version of MySQL based Sakila sample database which is a fictitious database designed to represent a DVD rental store The tables of the database include film film_category actor film_actor customer rental payment and inventory among others You can download the database from <https://dev.mysql.com/doc/sakila/en> In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of film release year film rating rental duration and categorize film length plot rating variable against rental_duration variable in stacked bar plots plot length variable against rental_duration variable in stacked bar plots read payment table plot case distribution of Year Day Month Week and Quarter of payment plot which year month week days of week and quarter have most payment amount read film list by joining five tables category film_category film_actor film and actor plot case distribution of top 10 and bottom 10 actors plot which film title have least and most sales plot which actor have least and most sales plot which film category have least and most sales plot case distribution of top 10 and bottom 10 overdue customers plot which store have most sales plot average payment amount by month with mean and EWM and plot payment amount over June 2005

PROJECT 2 FULL SOURCE CODE MYSQL FOR STUDENTS AND PROGRAMMERS WITH PYTHON GUI

In this project we provide you with a MySQL version of an Oracle sample database named OT which is based on a global fictitious company that sells computer

hardware including storage motherboard RAM video card and CPU The company maintains the product information such as name description standard cost list price and product line It also tracks the inventory information for all products including warehouses where products are available Because the company operates globally it has warehouses in various locations around the world The company records all customer information including name address and website Each customer has at least one contact person with detailed information including name email and phone The company also places a credit limit on each customer to limit the amount that customer can owe Whenever a customer issues a purchase order a sales order is created in the database with the pending status When the company ships the order the order status becomes shipped In case the customer cancels an order the order status becomes canceled In addition to the sales information the employee data is recorded with some basic information such as name email phone job title manager and hire date In this project you will write Python script to create every table and insert rows of data into each of them You will develop GUI with PyQt5 to each table in the database You will also create GUI to plot case distribution of order date by year quarter month week and day the distribution of amount by year quarter month week day and hour the distribution of bottom 10 sales by product top 10 sales by product bottom 10 sales by customer top 10 sales by customer bottom 10 sales by category top 10 sales by category bottom 10 sales by status top 10 sales by status bottom 10 sales by customer city top 10 sales by customer city bottom 10 sales by customer state top 10 sales by customer state average amount by month with mean and EWM average amount by every month amount feature over June 2016 amount feature over 2017 and amount payment in all years

PROJECT 3 ZERO TO MASTERY THE COMPLETE GUIDE TO LEARNING SQLITE AND PYTHON GUI

In this project we provide you with the SQLite version of The Oracle Database Sample Schemas that provides a common platform for examples in each release of the Oracle Database The sample database is also a good database for practicing with SQL especially SQLite The detailed description of the database can be found on <http://luna.ext.oracle.com/server/112/e10831/diagrams.htm> insertedID0 The four schemas are a set of interlinked schemas This set of schemas provides a layered approach to complexity A simple schema Human Resources HR is useful for introducing basic topics An extension to this schema supports Oracle Internet Directory demos A second schema Order Entry OE is useful for dealing with matters of intermediate complexity Many data types are available in this schema including non scalar data types The Online Catalog OC subschema is a collection of object relational database objects built inside the OE schema The Product Media PM schema is dedicated to multimedia data types The Sales History SH schema is designed to allow for demos with large amounts of data An extension to this schema provides support for advanced analytic processing The HR schema consists of seven tables regions countries locations departments employees jobs and job_histories This book only implements HR schema since the other schemas will be implemented in the next books

PROJECT 4 FULL SOURCE CODE SQL SERVER FOR STUDENTS AND DATA SCIENTISTS WITH PYTHON GUI

In this project we provide you with the SQL SERVER version of SQLite sample database named chinook The chinook sample

database is a good database for practicing with SQL especially PostgreSQL The detailed description of the database can be found on <https://www.sqlitetutorial.net/sqlite-sample-database/> The sample database consists of 11 tables The employee table stores employees data such as employee id last name first name etc It also has a field named ReportsTo to specify who reports to whom customers table stores customers data invoices The artist table stores artists data It is a simple table that contains only the artist id and name The album table stores data about a list of tracks Each album belongs to one artist However one artist may have multiple albums The media_type table stores media types such as MPEG audio and AAC audio files genre table stores music types such as rock jazz metal etc The track table stores the data of songs Each track belongs to one album playlist the distribution of amount by year quarter month week day and hour the bottom top 10 sales by employee the bottom top 10 sales by customer the bottom top 10 sales by customer the bottom top 10 sales by artist the bottom top 10 sales by genre the bottom top 10 sales by play list the bottom top 10 sales by customer city the bottom top 10 sales by customer city the bottom top 10 sales by customer city the payment amount by month with mean and EWM the average payment amount by every month and amount payment in all years

Control Engineering in Development Projects Olis Rubin, 2016-03-31 This practical new guide to designing control systems gives readers a virtual experience into the complex engineering problems that may occur during the design and development process This book gives engineers guidance in their journey to obtain a greater understanding of the thought processes involved in designing and developing successful control systems for radar flight control and several other applications This constructive new resource takes engineers through various phases of project development Clear examples and case studies are presented throughout demonstrating various management styles Readers discover a variety of challenges that could occur during actual projects This book represents a unique contribution to the technical literature on control system design by illustrating principles in the language of control engineering with copious figures It presents methodical procedures for setting up simulation models used for integrating controls systems with hardware in order to reduce errors

5 FIVE DATA SCIENCE PROJECTS FOR ANALYSIS, CLASSIFICATION, PREDICTION, AND SENTIMENT ANALYSIS WITH PYTHON GUI

Vivian Siahaan, Rismon Hasiholan Sianipar, 2022-04-29 PROJECT 1 SUPERMARKET SALES ANALYSIS AND PREDICTION USING MACHINE LEARNING WITH PYTHON GUI The dataset used in this project consists of the growth of supermarkets with high market competitions in most populated cities The dataset is one of the historical sales of supermarket company which has recorded in 3 different branches for 3 months data Predictive data analytics methods are easy to apply with this dataset Attribute information in the dataset are as follows Invoice id Computer generated sales slip invoice identification number Branch Branch of supercenter 3 branches are available identified by A B and C City Location of supercenters Customer type Type of customers recorded by Members for customers using member card and Normal for without member card Gender Gender type of customer Product line General item categorization groups Electronic accessories Fashion accessories Food

and beverages Health and beauty Home and lifestyle Sports and travel Unit price Price of each product in Quantity Number of products purchased by customer Tax 5% tax fee for customer buying Total Total price including tax Date Date of purchase Record available from January 2019 to March 2019 Time Purchase time 10am to 9pm Payment Payment used by customer for purchase 3 methods are available Cash Credit card and Ewallet COGS Cost of goods sold Gross margin percentage Gross margin percentage Gross income Gross income and Rating Customer stratification rating on their overall shopping experience On a scale of 1 to 10 In this project you will perform predicting rating using machine learning The machine learning models used in this project to predict clusters as target variable are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine LGBM Gradient Boosting XGB and MLP Finally you will plot boundary decision distribution of features feature importance cross validation score and predicted values versus true values confusion matrix learning curve performance of the model scalability of the model training loss and training accuracy

PROJECT 2 DETECTING CYBERBULLYING TWEETS USING MACHINE LEARNING AND DEEP LEARNING WITH PYTHON GUI As social media usage becomes increasingly prevalent in every age group a vast majority of citizens rely on this essential medium for day to day communication Social media s ubiquity means that cyberbullying can effectively impact anyone at any time or anywhere and the relative anonymity of the internet makes such personal attacks more difficult to stop than traditional bullying On April 15th 2020 UNICEF issued a warning in response to the increased risk of cyberbullying during the COVID 19 pandemic due to widespread school closures increased screen time and decreased face to face social interaction The statistics of cyberbullying are outright alarming 36 5% of middle and high school students have felt cyberbullied and 87% have observed cyberbullying with effects ranging from decreased academic performance to depression to suicidal thoughts In light of all of this this dataset contains more than 47000 tweets labelled according to the class of cyberbullying Age Ethnicity Gender Religion Other type of cyberbullying and Not cyberbullying The data has been balanced in order to contain 8000 of each class The models used in this project are K Nearest Neighbor Random Forest Naive Bayes Logistic Regression Decision Tree Support Vector Machine Adaboost LGBM classifier Gradient Boosting XGB classifier LSTM and CNN Three feature scaling used in machine learning are raw minmax scaler and standard scaler Finally you will develop a GUI using PyQt5 to plot cross validation score predicted values versus true values confusion matrix learning curve decision boundaries performance of the model scalability of the model training loss and training accuracy

PROJECT 3 HIGHER EDUCATION STUDENT ACADEMIC PERFORMANCE ANALYSIS AND PREDICTION USING MACHINE LEARNING WITH PYTHON GUI The dataset used in this project was collected from the Faculty of Engineering and Faculty of Educational Sciences students in 2019 The purpose is to predict students end of term performances using ML techniques Attribute information in the dataset are as follows Student ID Student Age 1 18 21 2 22 25 3 above 26 Sex 1 female 2 male Graduated high school type 1 private 2 state 3 other Scholarship type 1 None 2 25% 3 50% 4 75% 5 Full Additional work 1 Yes 2 No

Regular artistic or sports activity 1 Yes 2 No Do you have a partner 1 Yes 2 No Total salary if available 1 USD 135 200 2 USD 201 270 3 USD 271 340 4 USD 341 410 5 above 410 Transportation to the university 1 Bus 2 Private car taxi 3 bicycle 4 Other Accommodation type in Cyprus 1 rental 2 dormitory 3 with family 4 Other Mother s education 1 primary school 2 secondary school 3 high school 4 university 5 MSc 6 Ph D Father s education 1 primary school 2 secondary school 3 high school 4 university 5 MSc 6 Ph D Number of sisters brothers if available 1 1 2 2 3 3 4 4 5 5 or above Parental status 1 married 2 divorced 3 died one of them or both Mother s occupation 1 retired 2 housewife 3 government officer 4 private sector employee 5 self employment 6 other Father s occupation 1 retired 2 government officer 3 private sector employee 4 self employment 5 other Weekly study hours 1 None 2

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