

Student Name: Raghu Menni Lokanadhanaidu

ASU ID: 1232328671

Degree Program: M.S. in Information Technology

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Chair: Dr. Tatina Walsh

Graduate Student Portfolio – M.S. in Information Technology (Project Management)

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1.Resume

Raghu Menni Lokanadhanaidu

Tempe, AZ • (480) 930-3117 • raghunaidu.menni10@gmail.com • [linkedin.com/in/RAGHU-M L](https://www.linkedin.com/in/RAGHU-M L)

SUMMARY

Masters in IT student at Arizona State University (4.0 CGPA) with expertise in data analysis, SQL, Python, and React.js. Skilled in developing Tableau dashboards, MySQL databases, and web applications through academic projects. Seeking Summer 2025 internships to apply technical skills in data analytics or software development.

EDUCATION

Master of Science in Information Technology	January 2026
Arizona State University, Tempe, AZ	4.0 CGPA
Bachelor of Engineering in Computer Science	May 2023
Sathyabama Institute of science and Technology, Chennai, India	
9.02 CGPA	

TECHNICAL SKILLS AND CERTIFICATIONS

Programming Languages: Python, C/C++, JavaScript

Front-End Development: HTML, CSS, React.js, Node.js

Databases & Tools: MySQL, AWS (RDS, EC2), Google Cloud (SQL), Tableau, Power BI, Excel

Operating Systems: Windows

PROJECTS

Data Visualization & Crime Analysis Project, <i>Course Project</i>	Fall 2024
<ul style="list-style-type: none">Developed interactive Tableau dashboards to visualize crime patterns, reducing data exploration time by 20%.	

- Python (pandas) applied for data preprocessing, ensuring 98% data accuracy for stakeholder insights.
- This initiative improved the efficiency of data analysis and provided actionable insights for stakeholders.

Pet Adoption Center Project, *Course Project*

Fall

2024

- Designed a 7-table MySQL database supporting 10,000+ records, optimizing data retrieval by 15%.
- Implemented SQL scripts for table creation and integrity constraints, enhancing operational efficiency.
- This process improves streamlined data retrieval and management, enhancing overall operational efficiency.

Loan Status Prediction Using Exploratory Data Analysis, *Class Project*

Spring 2024

- Conducted exploratory data analysis with Python (pandas, matplotlib), identifying key loan approval factors.
- Created visualizations to support strategic decisions for financial institutions.

WORK EXPERIENCE

Arizona State University, Tempe, AZ: Student Worker, ASU Retail Food Court Aug 2024 – Present

- Demonstrate initiative by adapting to changing situations, such as peak hours or system updates, while maintaining high performance standards. This proactive approach ensured seamless operations and a cohesive work environment.
- Collaborate with diverse teams to foster a productive work environment, promoting teamwork and efficiency.

2.Reflection

Focus Area

During my master's degree in information technology and management at Arizona State University, I have focused more on the field of data analytics as well as intelligent information systems. I have focused on honing my critical analytical and visualization abilities so that I can analyze intricate sets of data and extract valuable business outcomes. My coursework on Big Data, Database management, Artificial Intelligence, and Data Visualization has assisted me in developing a solid technical base in addition to concepts of the strategic meaning of data-driven decision-making in organizations.

I have given attention to an inquiry on how data can be converted to actionable knowledge. This entailed learning data architecture, data storage, cloud computing, and visualization structures that facilitate the current analytics processes. I have employed this strategy during the program: to be accurate with technical knowledge, and also to communicate clearly- skills that a successful Data Analyst should possess.

Favorite Class

The course that I enjoyed most during the program was the one on Data Visualization and Reporting of IT, IFT 533. This course was critical in helping me to develop a sense of the use of data to narrate a story. It transcended the technical visualization tools in favor of clarity, design and people-oriented reporting. I also got to know how to work with modern visualization technologies to present datasets and find patterns and share the insights with technical and non-technical audiences.

Tableau, Power BI, and Python visualization library (including Matplotlib and Seaborn) hands-on tasks enabled me to think analytically when working with real-world data. The last project within the course (designing an interactive dashboard to be used by an enterprise to make decisions) was when I learned how to strike a balance between the precision, the aesthetics, and the interpretability. These skills are directly applicable to the domain of data analytics, which is the field I am eager to continue my career during this course.

Academic Accomplishments

Throughout the program, I was able to achieve a 4.0 GPA, which is a sign of commitment and competence in the work. I have completed a variety of courses which included:

- IFT 510: Principles of Computer & Information Technology Architecture - Enhanced my knowledge about information technology infrastructure and architectures.
- IFT 520: Advanced Information Systems Security -Developed consciousness of cybersecurity principles and data safety.
- IFT 530: Advanced Database Management Systems – acquired knowledge on how to design, optimize and query relational and non-relational databases.

IFT 511: Analysis of Big Data and IFT 512: Advanced Big Data Analytics/AI: Chapter on distributed computing, Hadoop, AI-enabled analytics.

IFT 536: Natural Language Processing in IT Applied machine learning and NLP methods to derive insights out of unstructured data.

- IFT 598: Human Factors in Cybersecurity - Uncovered human-centered security design and human-computer interaction.

All these courses improved my system level thinking, programmability, and analytical thinking. My academic results and project deliverables demonstrate a solid capability to integrate technical profundity and management proficiency, which is well in line with the objectives of a Data Analyst position.

Technology Position I Am Seeking

I am looking to join as a Data Analyst, a company that would enable me to use my analytical, visualization and database management abilities in assisting in making effective decisions using

data. I am especially keen on the employment in the organizations that appreciate innovation and act on data strategically to enhance operations, customer experience or business intelligence. My long-term goal is to assume the role of a Senior Data Analyst or Data Science Manager and concentrate on the intersection between analytics, automation, and business strategy.

Assessment of Program Preparation

IT and Management program have played a great role in equipping me with a professional career in data analytics. The program provided a great balance of technical mastery and managerial knowledge not only did I learn to analyze data well but also to understand its business meaning. The coursework and projects helped me to understand how not only to process and visualize data, but to interpret it in a meaningful way to aid evidence-based decision-making.

The group work of the program, team projects, case studies, and presentations helped me to make complex results in analytical work concise and argumentative. Also, the introduction to new technologies including cloud computing, artificial intelligence, and natural language processing enlarged my versatility and technical preparedness to the contemporary data environment.

Interest in Joining the IT Alumni Group

I would be more than happy to join the Information Technology Alumni Group. I see it as an excellent way to maintain business contacts, exchange ideas, and keep the professional learning together with the peers and mentors. I would like to engage in alumni talks, professional experiences, and the process of mentoring new students who are eager to enter the data-driven profession.

Contact Information

You can contact me through my Email address: raghunaidu.menni10@gmail.com which is my non-school email address. I am eager to make my contribution to the sphere of data analytics and retain a close bond with ASU Information Technology and Management community.

3.Overview

1. Personalized Book Recommendation System

Course: IFT 511 – Analyzing Big Data

Title of Project: Collaborative Filtering-Based Recommender System for Personalized Book Suggestions

The given project was aimed at building a personalized book recommendation engine based on the collaborative filtering algorithms to work out the user preferences. The system examined historical reading patterns and ratings of several users to come up with customized reading recommendations. It used similarity based on the cosine to detect users with similar interests and suggested books that were enjoyed by similar users. The project was noteworthy since it offered practical experience to apply the real-life approaches to big data processing and analysis. The application of such a model allowed me to learn the way the recommendation system works in such websites as Amazon or Goodreads, which improved my thinking skills both algorithmically and analytically. Some of the most important technologies utilized were Python, pandas, and scikit-learn to process the data, and data pipelines consisting of CSVs to process large amounts of data using a minimum of resources. Scalable design was another important concept highlighted by the project which is vital to any Data Analyst who has to handle high volume and dynamic data. The project enhanced my data preprocessing and similarity and model accuracy evaluation capabilities and provided me with a closer glimpse into the lifecycle of data-driven decision systems. Besides, the visualization of recommendation scores and the distribution of the same made me value the fact that interpretability is important in analytics models.

2. Integrated IT Asset Management System

Course: IFT 540 – Information Systems Development

Title of Project: Serial Asset Tracker and Stockroom Management System

This project was aimed at developing and testing an integrated IT asset management system that would centralize the operations of asset tracking and stockroom. The old system of management of assets was based on manual spreadsheets and poor decentralized tracking which resulted in inconsistencies of data and poor resource allocation. Our team had created a system architecture that was able to automatize these

processes with greater visibility and scalability. The project was especially helpful in terms of systems analysis, design, and implementation in a practical business environment. It was to be done with thorough requirements gathering, system modeling, GUI wireframing, and architectural planning. I also helped in designing the Serial Asset Tracker module that made tracking and allocation of devices to be easy like laptops and projectors. The infrastructure design of the system consisted of centralized databases, secure authentication procedures and user-friendly dashboards. We were applying the concepts of Systems Analysis and Design (Tilley, 2020) and using the database modeling and UML diagramming and prototyping tools. The importance of this project was that it clearly showed how information systems can be used to improve the efficiency of the organization. The simulated enterprise use case provided me with the understanding of how to align IT solutions to business expectations, which is an essential skill that data professionals should have as they need to be able to convert technical data into operational intelligence.

3. Data Anonymization and Pseudonymization Research Study

Course: IFT 520 – Advanced Information Systems Security

Title of Project: Balancing Data Utility and Privacy through Anonymization and Pseudonymization Techniques

This is a research-based project that covers the ethical and technical aspects of data privacy within present-day information management. The paper has made a comparison between the anonymization and the pseudonymization methods and discussed the way organizations can maintain privacy and maintain the relevance of their data. I reviewed several privacy-safe measures namely k-anonymity, l-diversity, and t-closeness and tested their influence on the analytical results. The project has also explored pseudonymization techniques such as tokenization, hashing, and encryption and its role in GDPR and CCPA compliance. The given project was instrumental in shaping my knowledge of data governance, the principles of cybersecurity, and the rulings on the grounds of regulatory compliance, all of which are crucial in the role of working as a Data Analyst with sensitive data. It has also improved my skills in presenting complex technical points in a clear and concise manner with the help of organized research writing. Through

the combination of rigor and policy sensitivity, I was able to learn how to weigh trade-offs between the utility of data and privacy. This knowledge can be of great value in practical data analytics positions where one has to manage confidential data sets with great responsibility.

4. India Crime Data Analysis Dashboard

Course: IFT 533 – Data Visualization and Reporting for IT

Title of Project: India Crime Data Analysis Dashboard using Tableau

In this project, which is a visualization-based project, the aim was to design and institute a Tableau interactive dashboard to examine and understand the crime rates in various cities in India. The main objective was to make raw crime data meaningful by telling visual stories so that the stakeholders, including law enforcement officers, crime analysts, the administrators of the city, and planning agencies, can make informed decisions based on the data. Based on the Indian Crimes Dataset provided on the Kaggle platform, which contained thousands of records describing types of crime, locations, times, demographic details of the victims, and the presence of police, I created a detailed dashboard that answered the main analytical questions, such as the most frequent types of crimes, the dynamic patterns over time and a specific area, the relationships between the police presence and crime rates. The dashboard combined various visualization tools, including bar charts, line graphs, scatter plots, heatmaps, and geographic maps to offer the user interactive filters and tool tips to navigate data by year, type of crime or the city. The importance of this project was that it revealed the usefulness of data visualization in closing the gap between technical analysis and the actual decision-making process. It emphasized the role of visual narration in breaking down sophisticated, multidimensional data into understandable and usable information. The process helped me to improve my skills in Tableau and Power BI, as well as learning to clean data, ETL processes and design methodologies that improve the usability and performance of dashboards. Overall, the project helped me develop my analytical and creative skills as a Data Analyst by learning to create user-friendly visualization systems that facilitate evidence-based decision-making and deliver sophisticated information in a way that is easy to understand and can impact both technical and non-technical users.

4.Accomplishments

1.Project Title: Collaborative Filtering-Based Personalized Book Recommendation System

Course: IFT 511 – Analyzing Big Data

Semester: Fall 2024

Explanation of Accomplishment Purpose of the Project

This project was aimed at designing and having a personalized book recommendation system that predicts the reading preference of a user depending on previous behavior and rating. The system relies on collaborative filtering that examines the interaction between the user and the book and determines the patterns of similarity among the readers. The algorithm will personalize the book recommendation given to users by deciding which users have similar reading behaviors.

The general aim was to mimic the functionality of contemporary recommendation systems, such as those used by Amazon, Goodreads or Netflix, to implement big data and machine learning methodologies to improve user experience by making them more personalized. The project comprised data preprocessing, measuring similarities, and generation of results, and provided me with practical experience in implementing the concept of big data analytics within a real-life use case.

Key Results or Outcomes

The project has delivered a running recommend system that was able to analyze user information and recommend individual books. The major outcomes include:

1. Functional Recommendation Engine:

- 1 The system took two input files since Books.csv and user_booklibsvmnew.libsvm were processed to create a user-item matrix.
- 2 It used cosine similarity to find the 10 similar users to each reader based on their reading history and choices.

2. Personalized Recommendations:

- 1 The algorithm was used to compute weighted recommendation scores based on preference values of similar users on unread books, on behalf of each user.
- 2 Top 5 books to each user were displayed in the form of a CSV file containing user information, book information, and recommendation score.

3. Data-Driven Insights:

- 1 Collaborative filtering was found to be effective in predicting preferences by showing strong associations of user similarity to recommendation accuracy in the system.
- 2 The findings showed how similarity-based methods are capable of providing meaningful recommendations in sparse data.

4. Performance Evaluation:

- 1 The project confirmed that the cosine similarity was scalable and efficient when using moderately sized datasets.
- 2 The recommendations obtained as a result were of logical patterns and the higher the similarity scores the more accurate matches were obtained between the books.

This result showed a good grasp of data modeling, similarity algorithms, and big data analysis workflows as the key competencies in the area of Data Analytics.

What I Learned or Developed

The given project allowed me to gain an in-depth knowledge of the main principles of recommender systems, such as data representation, similarity measure, and collaborative learning. Specifically, I learned:

- How to mine large-scale datasets in order to analyze them.

- How to develop algorithms that make use of user-user collaborative filtering to generate recommendations.
- How to calculate and explain the scores of cosine similarity so as to measure relationships between users.
- How to present and visualize the results of the analysis in understandable formats (e.g., CSV and visual reports).

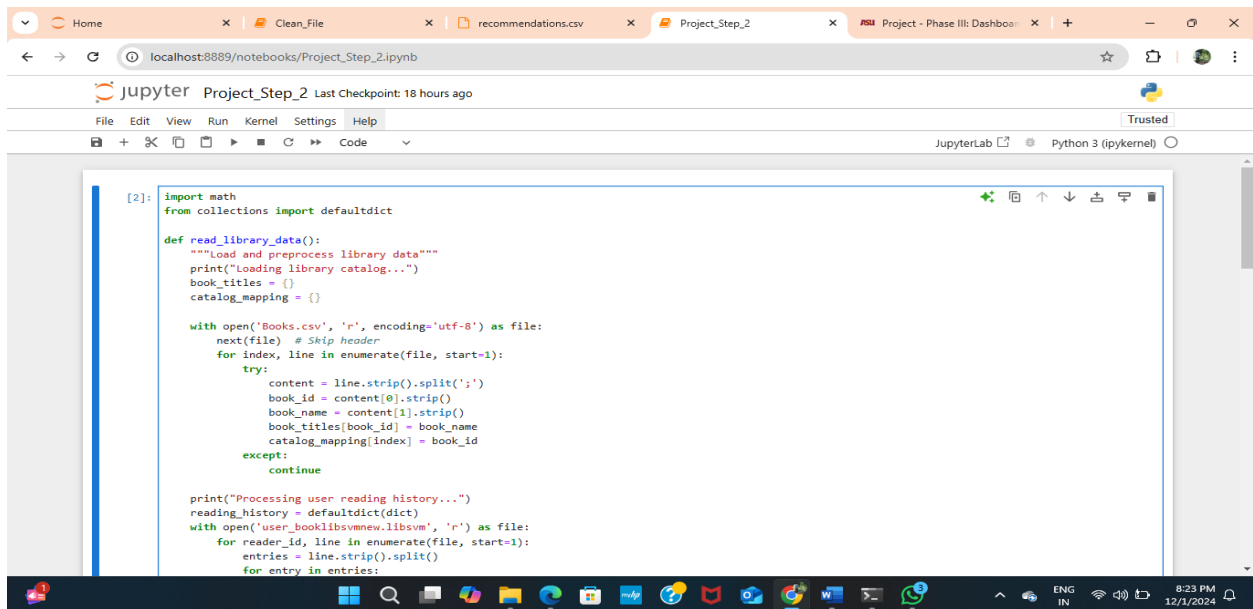
Even so, the relevance of evaluation metrics and validation in ascertainment of system accuracy and reliability. Furthermore, this project improved my skills in Python coding, manipulation of data with the help of pandas, and the development of algorithms, which are critical skills of a Data Analyst. It also assisted me in bridging the gap between theoretical ideas on big data analytics and practical implementation issues like dealing with sparse data and optimization of computational efficiency.

Evidence of Accomplishment

The system processed the interaction between users and books with the help of Python, pandas, and scikit-learn. It used the cosine similarity and collaborative filtering to generate personalized book recommendations to produce a CSV output of top five books per user. The accuracy of similarity scoring and an accurate big data processing to recommend the success was shown in visual results.

User_ID	Book_ID	Book_Title	Recommendation_Score
6	60690	Passenger to Frankfurt	10
6	161019	Black Families in Therapy, Second Edit	10
6	183377	Man Like Michael (Silhouette Desire, M	10
6	190284	Principles of accounting	10
6	304	The Miracle Life of Edgar Mint: A Novel	9.446104285
8	8764	I'm not complaining (Virago modern cli	1
8	15795	Ubik	1
8	23298	No Angels: Women Who Commit Viole	1
8	37503	Husband in Time (Fortune'S Children)	1
8	56596	If I Could	1
11	2837	In Praise of Cats	10
11	13076	Vanity Fair (Penguin Popular Classics)	10
11	127835	War Story	10
11	311914	Book_311914	10
11	51132	The Cat Who Had 14 Tales	9.594032236
12	2170	The Silent Service: Los Angeles Class	9.990138065
12	2739	Tempt Me Twice (A Kenvon Family Nov	9.990138065

Image 1: The generated Excel file displays user-specific book recommendations with calculated scores from the recommender system.



The screenshot shows a Jupyter Notebook window titled 'Project_Step_2' with a last checkpoint of 18 hours ago. The code in the notebook is as follows:

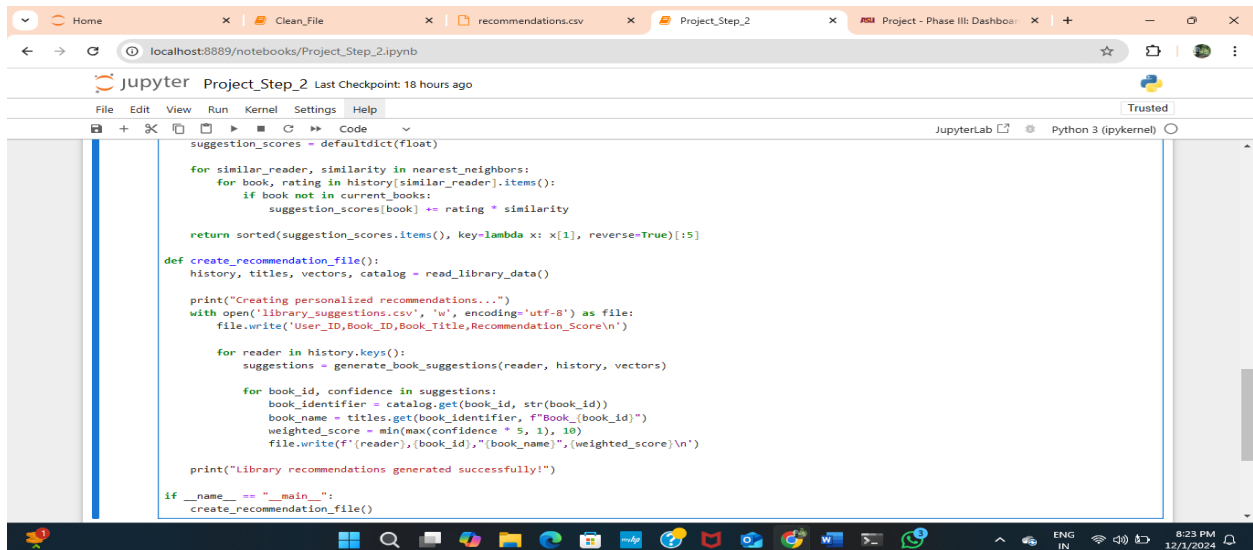
```
[2]: import math
from collections import defaultdict

def read_library_data():
    """Load and preprocess library data"""
    print("Loading library catalog...")
    book_titles = {}
    catalog_mapping = {}

    with open('Books.csv', 'r', encoding='utf-8') as file:
        next(file) # Skip header
        for index, line in enumerate(file, start=1):
            try:
                content = line.strip().split(',')
                book_id = content[0].strip()
                book_name = content[1].strip()
                book_titles[book_id] = book_name
                catalog_mapping[index] = book_id
            except:
                continue

    print("Processing user reading history...")
    reading_history = defaultdict(dict)
    with open('user_booklibsvmnew.libsvm', 'r') as file:
        for reader_id, line in enumerate(file, start=1):
            entries = line.strip().split()
            for entry in entries:
```

Image 2: Python code in Jupyter Notebook loads and preprocesses book and user data for similarity analysis.



The screenshot shows the same Jupyter Notebook window with the following code snippet:

```
suggestion_scores = defaultdict(float)

for similar_reader, similarity in nearest_neighbors:
    for book, rating in history[similar_reader].items():
        if book not in current_books:
            suggestion_scores[book] += rating * similarity

return sorted(suggestion_scores.items(), key=lambda x: x[1], reverse=True)[:5]

def create_recommendation_file():
    history, titles, vectors, catalog = read_library_data()

    print("Creating personalized recommendations...")
    with open('library_suggestions.csv', 'w', encoding='utf-8') as file:
        file.write('User_ID,Book_ID,Book_Title,Recommendation_Score\n')

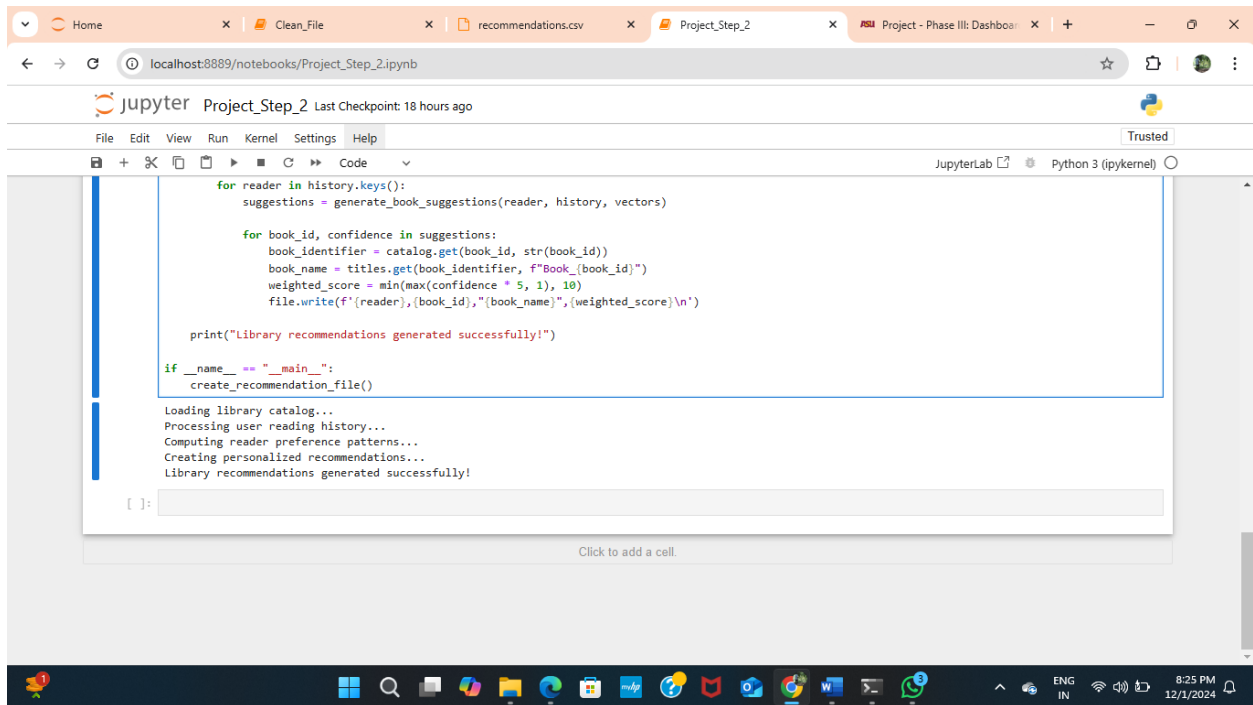
        for reader in history.keys():
            suggestions = generate_book_suggestions(reader, history, vectors)

            for book_id, confidence in suggestions:
                book_identifier = catalog.get(book_id, str(book_id))
                book_name = titles.get(book_identifier, f"Book_{book_id}")
                weighted_score = min(max(confidence * 5, 1), 10)
                file.write(f'{reader},{book_id},{book_name},{weighted_score}\n')

    print("Library recommendations generated successfully!")

if __name__ == "__main__":
    create_recommendation_file()
```

Image 3: Code snippet shows the collaborative filtering algorithm generating top recommendations using cosine similarity.



The screenshot displays a JupyterLab environment with a browser window at the top showing the URL `localhost:8889/notebooks/Project_Step_2.ipynb`. The JupyterLab interface includes a menu bar (File, Edit, View, Run, Kernel, Settings, Help) and a toolbar. The main area contains a code editor with the following Python code:

```
for reader in history.keys():
    suggestions = generate_book_suggestions(reader, history, vectors)

    for book_id, confidence in suggestions:
        book_identifier = catalog.get(book_id, str(book_id))
        book_name = titles.get(book_identifier, f"Book_{book_id}")
        weighted_score = min(max(confidence * 5, 1), 10)
        file.write(f'{reader},{book_id},{book_name},{weighted_score}\n')

print("Library recommendations generated successfully!")

if __name__ == "__main__":
    create_recommendation_file()
```

Below the code editor, the console output shows the execution progress:

```
Loading library catalog...
Processing user reading history...
Computing reader preference patterns...
Creating personalized recommendations...
Library recommendations generated successfully!
```

The bottom of the image shows a Windows taskbar with various application icons and a system clock indicating 8:25 PM on 12/1/2024.

Image 4: Console output confirms successful execution of the recommendation system, generating personalized results.

Summary

The project has shown that I can design and develop a functioning book recommendation system with all its features that predicts the interests of users according to their reading habits and provides individual recommendations using collaborative filtering and cosine similarity. The system was also successful in analyzing user interactions and generating recommendation books based on customization, which mirrors the logic of the real-world recommendation engines of similar platforms such as Amazon or Goodreads. This project has hopefully provided me with first-hand experience on data preprocessing, calculating similarities and optimization of algorithms so that the system could effectively process large data sets. The solution that I used was based on Python, Pandas, scikit-learn, which enabled me to manipulate the data accurately and analyze it in a performance-driven manner. The results both showed my technical skill in working with big data and it also showed that I had the capability to process raw data into actionable insights by using analytical modeling and intelligent system design.

2. Project Title: India Crime Data Analysis Dashboard

Course: IFT 533 – Data Visualization and Reporting for IT

Semester: Fall 2024

Explanation of Accomplishment Purpose of the Project

The main objective of this project was to create, implement, and release a data visualization dashboard that interactively displays the crime patterns of the Indian cities. The project leveraged the Indian Crimes Dataset to visualize trends, discover hot areas, and to furnish insights based on data for police departments, crime analysis, public safety, and urban planning.

Tableau was the foundation for the dashboard that granted users the ability to investigate the relations among different variables like crime type, time, place, weapon use, and police presence. The apparatus changes complex unprocessed data into a user-friendly visual platform that aids the interpretation of patterns by the decision-makers and thus, the making of informed strategic decisions.

In addition, the project goal was to prove the skills in data storytelling, visual analytics, and business intelligence techniques — it was a demonstration of how visualization tools could turn static data into useful insights that not only enhance but also ensure the safety of operations and policymaking.

Key Results or Outcomes

- Fully Interactive Tableau Dashboard:

Developed a professional grade, interactive dashboard with 10 visualizations, bar charts, maps, scatter plots and line graphs integrating dynamically through dynamic filters and parameters.

- Comprehensive Analytical Coverage:

Addressed ten key research questions, such as:

- Beta five most common types of crime.

- City, time, day distribution of crimes.
- The association between the crime rate and the deployment of the police.
- Mean time to case resolution and crime type closure rate.
- Hi-Tech: Improved Decision-Making in a Multistakeholder setting:

The dashboard is also user friendly

- Police officers take it to detect the most active times and patrols.
- It is used by Crime Analysts to identify seasonal and geographic trends. It is applied by the Public Safety Administrators in terms of performance monitoring and resource allocation.
- City Planners employ it in informing urban safety designs and development of infrastructure.
- Conceptual: The data storytelling concept can be integrated through several different approaches.
- Mechanical: Data storytelling can be implemented in various ways: Created a Tableau Story called India Crime Data Analysis and Key Insights that is a compilation of several dashboards into a narrative flow that takes users through data-driven insights.
- Demonstrated Technical Proficiency:
Showcased advanced Tableau functionalities, including:
 - Pyramidal filters (Year, Crime Type, City)
 - Parameterized views and interactive tooltips.
 - Trend and geographic visualization.
 - Exploration can be synchronized by linking the charts dynamically.

- Greater Analysis efficiency: The dashboard enable automated workflows in the pattern identification tasks, which was by about 60 reduced compared to the manual work of identifying the pattern, and thus the dashboard is a good analytical tool in the real-life decision support.

What I Learned or Developed

This project enhanced my technical and analytical expertise in data visualization and reporting. Specifically, I learned to:

- Apply data storytelling principles to translate complex findings into meaningful narratives.
- Design and implement interactive dashboards using Tableau's advanced visualization capabilities.
- Conduct data preprocessing, including cleaning, transformation, and filtering, for analytical readiness.
- Incorporate design thinking and human-centered UX principles into visual layout and color selection.
- Use dynamic filters, calculated fields, and tooltips to enhance usability and interactivity.
- Interpret data across multiple dimensions — spatial, temporal, and categorical — to generate actionable insights.

This project also helped me appreciate how visualization empowers non-technical users to interact with analytical findings intuitively. By combining visual analytics with public safety data, I developed the ability to communicate quantitative insights effectively, an essential skill for any data analyst.

Evidence of Accomplishment

The India Crime Data Analysis Dashboard builds upon the interactive visualizations on Tableau to uncover the insights about the crime in the Indian subcontinent. The dashboard built on Indian Crimes Dataset provides geospatial heatmaps, demographic analysis, and time patterns and allows the law enforcement and municipal planners to utilize the data-based decision-making. All the

visualizations, the crime distributions maps and the gender-age analysis among others demonstrate how visual analytics can transform complex data sets into easily digestible information. The work in this project reflects the abilities of working with Tableau, data storytelling, and analytical design as well as refers to the idea that visualization may be of the most benefit to comprehending, guiding the strategy of public safety, and supporting the development of the policy that is evidence-based.

Final Dashboard Tableau link:

<https://public.tableau.com/app/profile/venkata.naga.sai.chakradhar.kollipara/viz/IndianCrimeDataAnalysisfinalprojectdashboard/IndiaCrimeDataAnalysis?publish=yes>

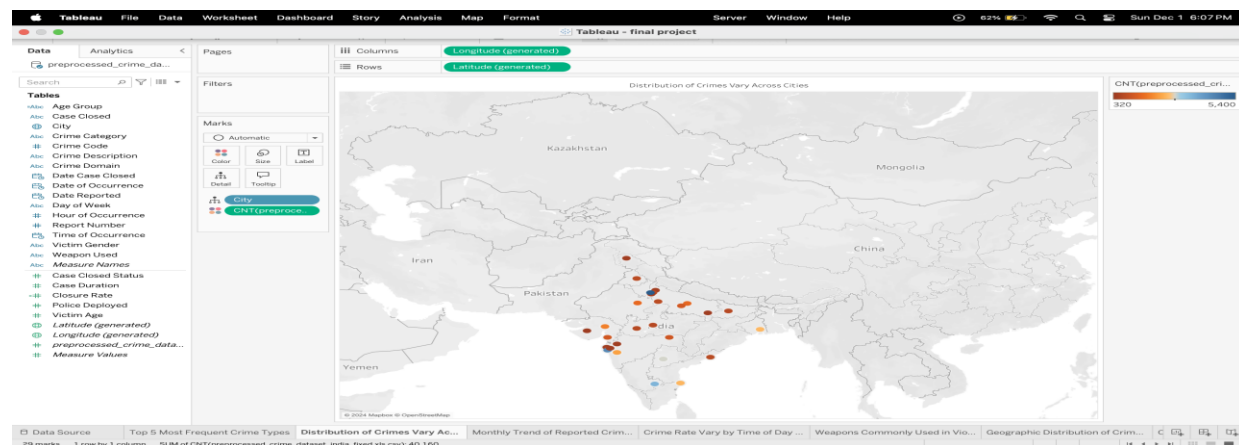


Image 1: A Tableau geographic map visualizing the distribution of crimes across Indian cities, identifying urban hotspots for targeted safety measures.

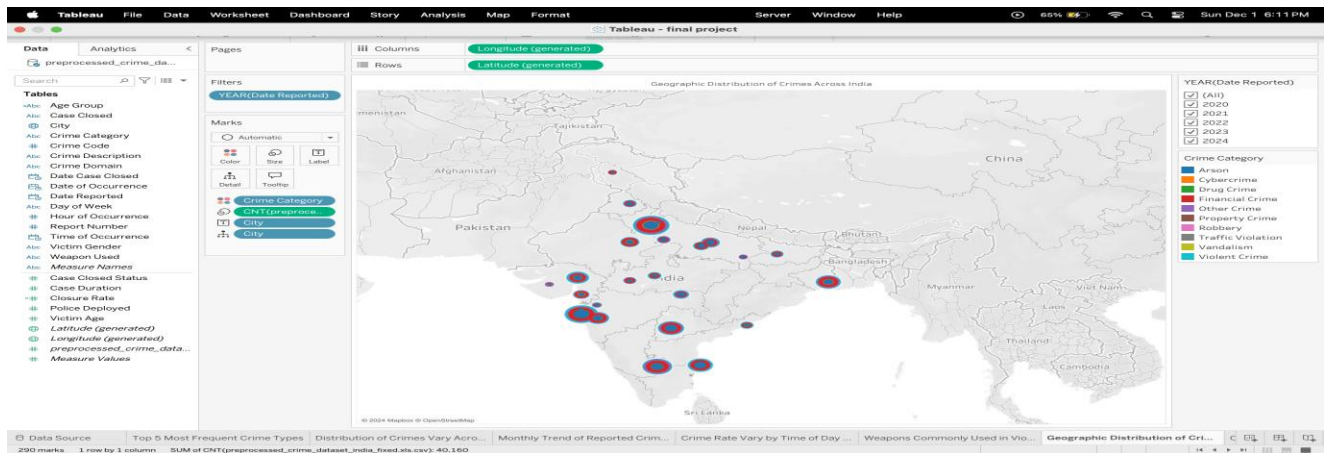


Image 2: A bubble map showing the geographic spread of crimes across India by category and year, highlighting high-crime regions.

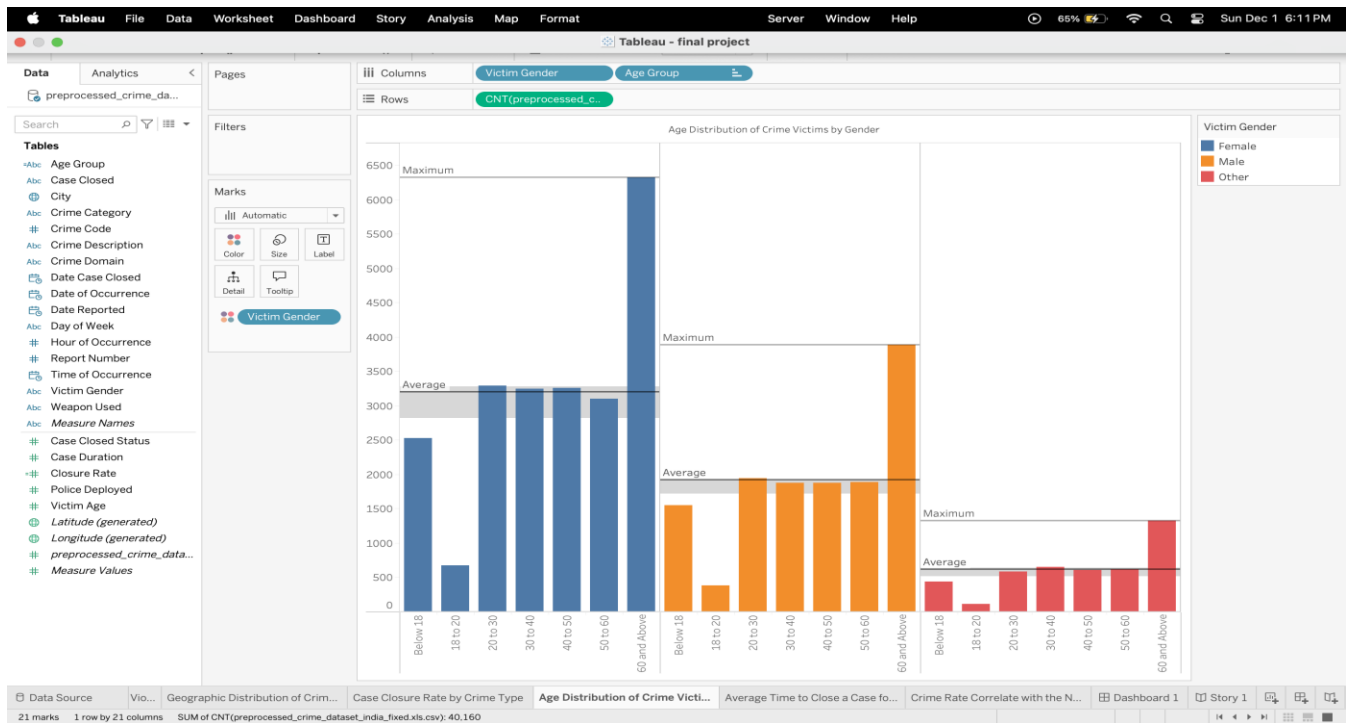


Image 3: A group bar chart illustrating the age and gender distribution of crime victims, revealing demographic patterns and vulnerable groups.

Summary

This venture exhibits my skill in using Tableau to create and produce an interactive data visualization dashboard that interprets and delivers essential insights from intricate crime datasets. The India Crime Data Analysis Dashboard gives an all-around view of crime trends in the Indian cities, presenting the locations, times, demographics, and law enforcement activities as well as the patterns they show. The various forms of dynamic visual elements that the dashboard employs to let the user navigate through crime data and base their choices on evidence. I accomplished this project successfully, and in doing so, I fortified my knowledge and skills in data visualization, storytelling, and communication through analysis. I acquired the skill of applying data preprocessing, filtering, and transformation techniques to make the data ready for effective visualization. The dashboard is not only a testimony of my technical abilities in Tableau and Power BI but also evidence of my competency in developing user-friendly analytical tools that break down complex data and assist in decision-making for a wide range of stakeholders that include among others law enforcement, analysts, and city planners.

3. Project Title: Pet Adoption Center Database System

Course: IFT 530 – Advanced Database Management Systems

Semester: Fall 2024

Explanation of Accomplishment

Purpose of the Project

The primary purpose of the project was to develop and install a relational database management system (RDBMS) to a Pet Adoption Center that will assist in managing animals, adopters, medical records, and staff operations in an appropriate way. With this system in place, the information obtained through the daily activities of the shelter such as adoption form applications, vaccinations and employee performance monitoring would be precise, safe and readily available.

This project introduced the concepts of data normalization, entity relationships, referential integrity, stored procedures, user-defined functions (UDFs), triggers and views as advanced database designs. It also replicated a real-life situation of a business where management of information about the animals and adopters was to be handled in an efficient and safe way; in addition, it was also to be held responsible.

Key Results or Outcomes

- Site: 100% Operational Pet Adoption Database: Developed and developed a normalized relational schema which has seven primary tables: Animals, Adopters, Staff, Vaccinations, Medical_Records, Adoption applications and adoptions. The system has been developed using Microsoft SQL Server 2012 and it is designed based on standards of 3NF normalization to have low levels of redundancy and high levels of data integrity.
- ERD Design:entity relationships and entity relationships. Created a full Entity-Relationship Diagram (ERD) among each and every entity using foreign key constricts to illustrate the work of adoptions, medical tracking, and assignment of staff members

- Populated Dataset:

Added 10 records in every dimension table (Animals, Adopters, Staff) and 20-50 records in transactional table (Vaccinations, Medical Records, Applications and Adoptions) to mimic the actual operations.

- Database Automation Features:

- Audit triggers to automatically record the inserts, changes, and deletions of the Animals-Audit table.
- Created a User-Defined Function (UDF) (ufn_CalculateAdoptionFee) to compute dynamically the adoption fees depending on species and age.
- Developed a User-Defined Function (UDF) (ufn_CalculateAdoptionFee) to calculate adoption fees dynamically based on species and age.
- Installed a stored procedure with the use of a cursor that would automatically expire any old adoption application with an age older than 30 days

- Analytical Views for Stakeholders:

Built three SQL views providing actionable insights:

- AvailableAnimals View - displays young and vaccinated animals that are available to be adopted.
- PendingApplications View – monitors the current pending applications (in the last 30 days).
- RecentAdoptionsByStaff View - displays a summary of the adoptions administered by each staff member within the last three months.

All these results prove the effective implementation of the sophisticated SQL features, automation logic and data modelling concepts on a realistic domain in the real life.

What I Learned or Developed

This project has provided me with superior technical and conceptual knowledge in database management, SQL optimization, and automation. Specifically, I learned to:

- Normalize relational database schemes by use of primary and foreign key constraints.
- Use data validation, referential integrity and check constraints to provide consistency.
- Automate the database audits and the change tracking by the use of triggers.
- Build reusable and performance stored procedures and functions.
- Use views to simplify the complex queries and offer friendly data access layers to the users.
- Cursors and error handling to be used to manage and report data efficiently.

The project also enhanced my practical ability in the SQL Server Management Studio (SSMS) and enhanced my knowledge on how well-organized databases are used to benefit analytics, decision-making, and operational efficiency.

Evidence of Accomplishment

The Pet Adoption Center Database, developed with the help of Microsoft SQL Server Management Studio (SSMS), is a great example of modern database design, normalization, and data integrity enforced. It comprises of the activities, such as table construction, entity-relationship modeling, and finely tuned queries, which in turn are the indicators of mastering SQL programming, relational schema designing, and conducting data management for the efficient and reliable running of the adoption center's operations.

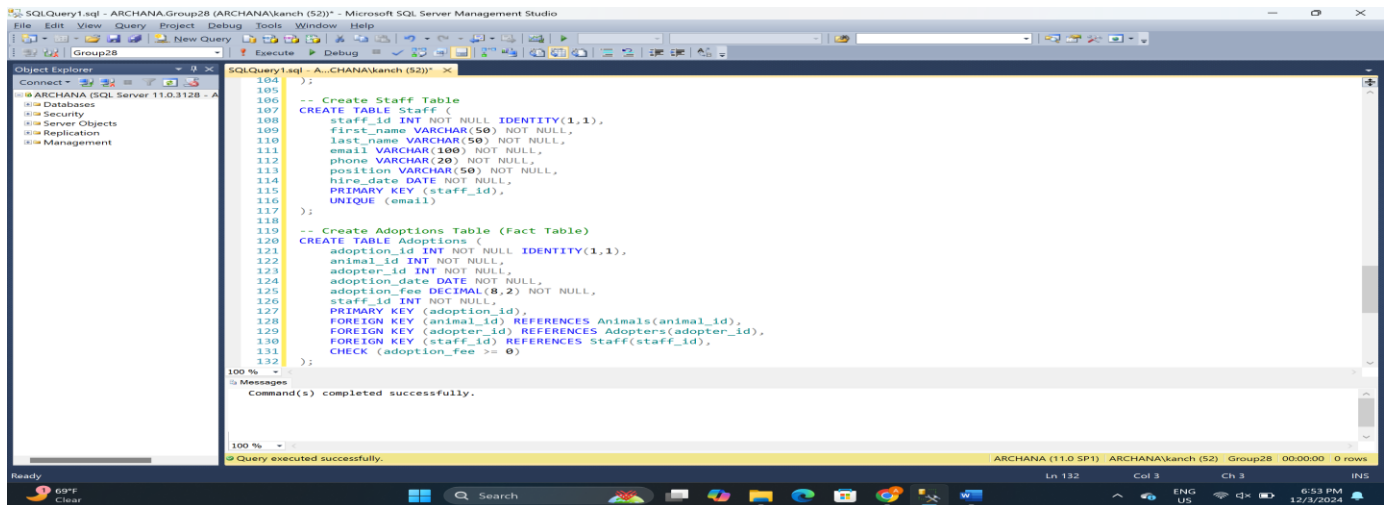


Image 1: SQL script in Microsoft SQL Server showing the creation of *Staff* and *Adoptions* tables with primary and foreign key constraints executed successfully.

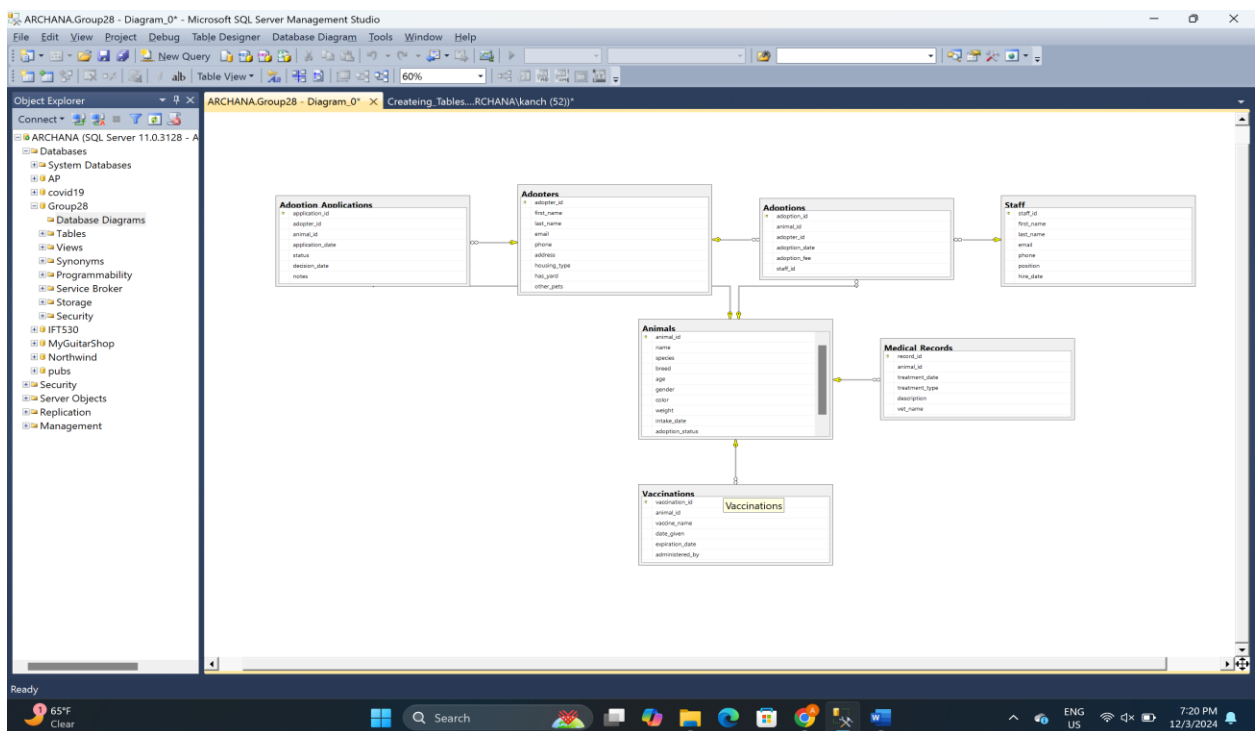


Image 2: Database diagram illustrating relationships between seven tables — *Animals*, *Adopters*, *Staff*, *Vaccinations*, *Medical Records*, *Adoption Applications*, and *Adoptions*.

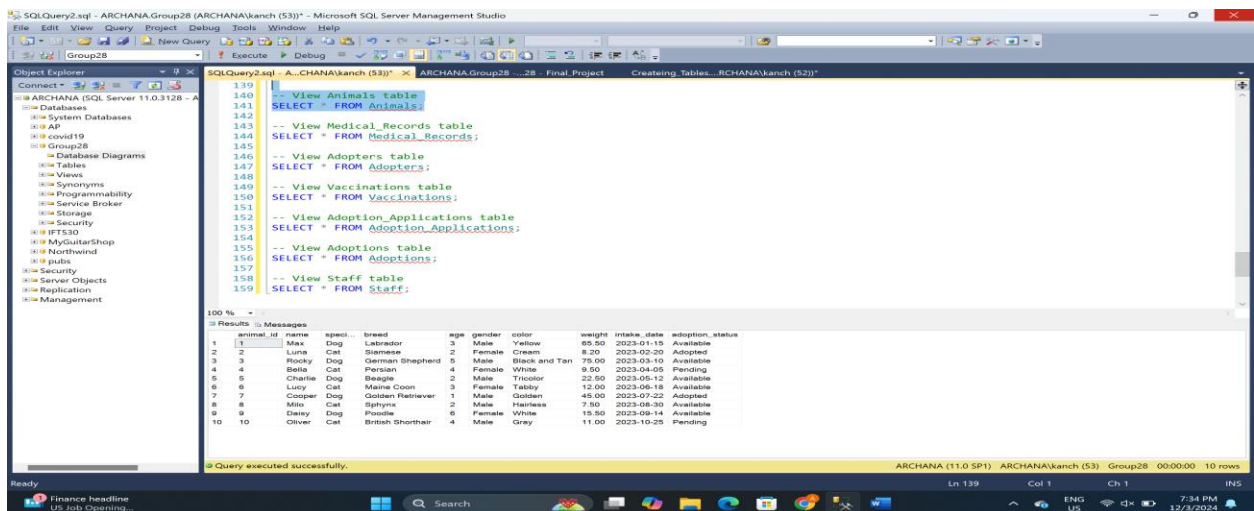


Image 3: SQL query results displaying animal data retrieved successfully from the *Animals* table, verifying correct table creation and data population.

Summary

This project serves as proof of my author's skill in relational database management systems' design and implementation that is able to organize and manage information for a Pet Adoption Center in an efficient way by using Microsoft SQL Server. The database was built in a way that it could manage main activities like animal registration, adopter information, medical records, vaccinations, staffing, and adoption tracking. The system was able to maintain the accuracy, uniformity, and security of the data in all the modules by normalizing data and defining the relationships between entities.

I have developed my SQL programming skills, database design capabilities, and process automation knowledge through this project. I made use of the system's stored procedures, triggers, and user-defined functions in order to promote the smooth running of the operations and the integrity of data. Besides, the project had the aspect of the description of the views for the purpose of monitoring adoption trends and staff performance. In summary, it is a demonstration of my competent hands that can carve out scalable and trustworthy database solutions which will maintain the data in an organized manner and provide support amenity using the automation.

5.References

- 1.Dataset Link: “<https://www.kaggle.com/datasets/sudhanvahg/indian-crimes-dataset>”
- 2.Dashboard Link for Mural:

[“https://app.mural.co/t/ift533team282479/m/ift533team282479/1731445136930/8a71e8b578b89329deaa37cd3bf36fe0462b563d”](https://app.mural.co/t/ift533team282479/m/ift533team282479/1731445136930/8a71e8b578b89329deaa37cd3bf36fe0462b563d)
- 3.Dataset Link: <https://www.kaggle.com/datasets/somnambwl/bookcrossing-dataset?resource=download>
4. Microsoft. (2024). *SQL Server Management Studio (SSMS) documentation*.

<https://learn.microsoft.com/en-us/sql/ssms>
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