Information Technology Project Management

Graduate Portfolio

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Resume

Aishwarya Ramaiah Kumar

Education

Master of Science in information technology   Graduating May 2023
(Information Systems Management Concentration)

Arizona State University, Tempe, Arizona, USA   GPA: 4 /4

Technical Concepts

Data Visualization, Introducing AI into Cybersecurity, Adv DB Management Systems,

Data in Cloud,Cloud Architecture, Systems Administration of UNIX.

Technical Skills

Programming Languages:	Java, Python, C, C++, C#.
Web Technologies:	JavaScript, React JS, Bootstrap, HTML, CSS
Frameworks:	Django, Spring, Spring Boot, Apache Spark
Tools:	Tableau, GIT, AWS, Informatica, ServiceNow, Docker, ORM
Database:	MySQL, MangoDB, PostgreSQL, Couchbase

Professional Work Experience

Associate Software Engineer- Iprimofocus, Bangalore, India   Mar 2018 – Mar 2020
Technologies: MS SQL Server, HTML5, CSS, ServiceNow, Informatica, jQuery, AJAX

- Created an elastic application that uses AWS EC2, SQS, S3 resources to provide image-recognition as a service.
- Implemented a front-end web-tier and back-end app-tier EC2 instances using Python, Flask, AWS, SDK, boto3 whichallows the users to upload images and process the images.
- Built an auto-scaling controller service that elastically scales in/out app-tier instances in proportion to the load.

Other Work Experience

Data Verifier/ Student Supervisor – Arizona State University   Fall 2021 - Spring 2023

- Utilized Microsoft Office, SQL, and Python to verify student data, ensuring the accuracy of information entered into the database with an average accuracy rate of 98%.
- Administered a database of over 10,000 student records, ensuring the quality and accuracy of data with a 99% data accuracy rate.

Projects

Recipe Sharing Platform

Technologies: AWS Instances, SQS, S3, Spring Boot

- Designed and implemented the database schema for the platform using PostgreSQL, which improved the platform's query performance by 30%.
- Developed RESTful APIs using Django REST framework that enabled the platform's functionality, including authentication, data management, and search. Tested the API by sending 50000 requests concurrently using postman.
- Implemented web tier and app tier in a way that there is no dependency on each other and makes the system loosely coupled.
- Worked on the testing of the platform to ensure its quality standards. Created over 100 unit tests, integration tests, and end-to-end tests to ensure that the platform was bug-free and performed well under load.

Data Pipeline for Customer Behavior Analysis

Technologies: Python, Numpy, Pandas, scikit-Learn

- Designed and built a data pipeline to collect and process customer behavior data from more than 5 data sources, including website logs, social media platforms, and customer support tickets.
- Cleaned and transformed more than 10,000 rows of data into a structured format, reducing data redundancy by 30%.

IBookstore Database System

Technologies: Java, Springboot, DBMS

- Developed a relational database that efficiently managed a collection of 500 books, 100 authors, 50

publishers, 1000 customers, and 5000 orders.

- Established relationships between tables using foreign keys, including many-to-many relationships between 200 Books and 100 Authors, and between 5000 Books and 1000 Orders.

- Optimized database performance by indexing and tuning queries, resulting in a 20% increase in query speed.

Overview

My graduate portfolio is the record of my accomplishments from my two years Masters in the prestigious Institution like Arizona State University for which I am very proud to be a part of and this portfolio has three most important projects of mine which are my accomplishments which can be considered as added gems my Arizona State University's Crown. While I am very much interested in becoming Data Engineer and to work in the fields of Data Science. These projects which I worked on during the tenure of my Master's and my course work really did help me understanding my career goals better and aligned perfectly my interests.

IFT 530: Advanced Database Management System - Library Management System

Our project focused on Library Management Systems such as Arizona State University's Library, which aims to simplify the process of book record-keeping where it saves the time of Library User's, book transactions, and book holder data in libraries. By using this system, users can easily check the availability of books in the library, check the location of books in the specific places, and members will have a unique ID for instance Emplid ID of the students to access their membership details as it identifies the individuals quickly by saving time for the students, Library users and employer's who work for the library.

The primary functions of this system are to keep track of borrow and return dates of books in the daya base, manage the inventory of books by adding or removing them, and organize book details by genre, author, and publisher in the Library bookshelves. Moreover, the system also allows the creation of user records for both members and non-members and employee information which the employers can access at any point of time to retrieve the data during the requirement. The entities involved in the model are the library, its employees, books, clients, authors, and publishers.

IFT 598 : Data Visualization – Dashboard on Personal indicators of heart disease.

The dataset we chose for our project is related to personal indicators of heart disease, obtained from Kaggle. We selected this dataset due to the widespread prevalence of heart disease across all age groups and its significant impact on mortality rates. According to CDC, almost half of Americans have at least one of the primary risk factors for heart disease. The risk factors include high blood pressure, high cholesterol, smoking, diabetes, obesity, lack of physical exercise, and excessive alcohol consumption. Detecting and preventing the most significant causes of heart disease is crucial in healthcare. With the help of machine learning techniques, patterns in the data can be identified to predict a patient's status. We implemented the data on the dashboard based on different factors of risk of heart disease.

IFT 598 : Data in Cloud – Asteroid Impact Prediction

In this project we figure out the safest spot on Earth if we there was an asteroid which was to hit the planet earth. We do make use of services such as AWS. Asteroids, which are rock-like objects, orbit the Sun and follow a similar path as planets, despite being much smaller. The number of asteroids present in our solar system is vast, with most of them located in the asteroid belt situated between Mars and Jupiter. Some asteroids, called Trojan asteroids, orbit in front of and behind Jupiter. Those asteroids that pose a threat to Earth are called Near-Earth Objects (NEOs), and NASA actively monitors them. So with this project we were able to figure out the safest spot on the earth with the help of AWS service utilized exam.

Accomplishments

Accomplishment 1 : 530 – Advanced Database Management System

You can purchase books in paperback or digital form at a library. In order to keep track of who borrowed a book and when they were supposed to return it, libraries today are responsible for maintaining databases for all students, as well as for the teaching and non-teaching staff of the institution. Considering that all of these documents and databases were formerly handled manually.

Our project proposal is Library Management Systems. The main problem with manually retaining records was that they were unreliable and it took a lot of time and effort to trace a book Additionally, it was impossible to maintain track of every book that was issued and returned while still providing central access to them.

We are developing library administration systems that will only be accessible to authorized users, enabling a fully digital library service. As a result, it will be much simpler to enter book records and find out information about books, book transactions, and book holders. This method allows customers to check the number of books in the library and issue books to themselves. Customers and employees each have a unique perspective on this system. A special ID that enables identification will be supplied to customers who have purchased memberships.

The importance of BMS lies in how much simpler public and university bookstores will find it to keep track of patrons/students as well as books. Additionally, it will make it easier to track a book that has already been released. ASU has many libraries, thus this will help maintain a consolidated record that will be helpful for students in figuring out which library holds the needed book

Library Management System has the following major functions:

- To change the number of books in the books inventory

- To keep track of and figure out when to return borrowed books

- Keeping track of each book's inventory, which will include details like its quantity, its description, and a classification based on the kind of book and its location

- A transactional record for the issued books is being marinated

- Establishing user records that include information on both members and guest users.

A model or blueprint is constructed to specify how data is organized, sorted, and modified in a database. The design takes into account a variety of elements, including where data will be stored, how it will be categorized, and how data from various database tables will interact.

Context

A library is a collection of various informational resources. These add-ons had created a distinct group of readers, students, and others who could consult or borrow the book more readily.

The library Database Management System is used to quickly locate books and gain access to journals. Traditional library processes are automated by the library automation system, which also lightens the workload of library staff.

It guarantees the consistency and accuracy of the data. People started to place a higher value on information, and technology transformed what information consumers expected from libraries. It assigns the librarian both a choice and a duty.

The integrated library system is used to perform more complicated tasks and enables staff to manage library resources more effectively, saving time and effort.

A library management system can help staff and patrons operate more effectively. Additionally, it makes it simpler for staff to organize books and keep track of those that have been borrowed, renewed, and not returned.

You may quickly reduce the workforce by employing a library management system while still storing various manual files electronically. A lot of data may be stored on one system, which reduces the need for manual files.
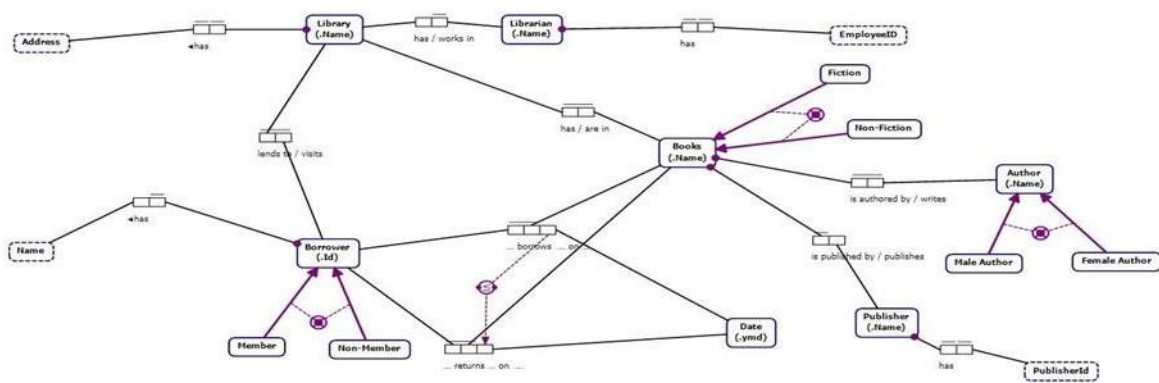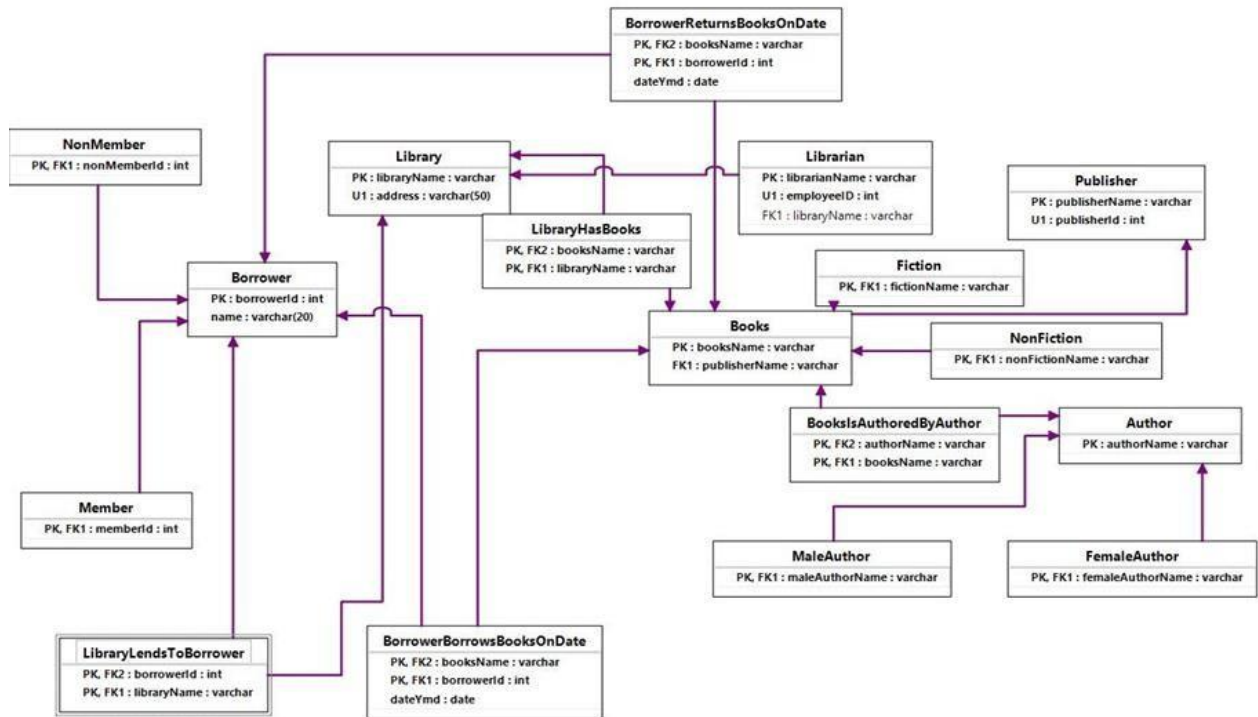

The ORM   Diagram:

The project management tool for our library is depicted in the image below. As you can see, a library has been established with a name, an address, and subcategories for books, employees, and clients. Each subtype of an entity has its own subtypes; for example, an employee's name and employee ID, a customer's name, member status, and nonmember status, and a book's genre, author, publisher, and ID, as well as a link to a customer's account for dates to store.

The following are the recognized entities for our project on a book store management system:

- **Employee:** Basic employer information includes the name and employee ID references in the employee entity. It has a one-to-many connection with the library since each employee can only work for one library, even if a library might have many employees.
- **Library:** Name and address of the store are references in the library entity.

- **Customer:**The necessary information must be submitted in order to issue a book, and the Member and Non-Member client entities contain references such name and id. There is a many-to-many link between this and libraries. A big number of libraries allow for the borrowing of items by a large number of patrons, and a large number of libraries allow for the visitation of a large number of patrons.
- **Books:** There are three names associated with books: Author, Book, and Publisher. Books are divided into two subtypes: fiction and non-fiction. This is a many-to-many relationship with the library. Many libraries have vast collections of books, and many libraries have large collections of books.
- **Publisher:** Properties like the publisher ID and name will be included in the publisher entity. It has a one-to-many link with books. While a single publisher can publish several books, they can only publish one book at a time.
- **Author:** The author object will have attributes like the author's name and separate fields for male and female authors. There is a many-to-many link between books and writers in that many authors can publish many books, and vice versa.

Relational Database Diagaram:

The relational View of our project is depicted in the image below. Relational view, which was taken from the ORM diagram above, has 18 tables, each of which is connected to the others through primary and foreign keys.

Summarizing the Project:

For this project, an Object-Role modeling diagram from which the relational model view was formed was created using the Conceptual Schema Design Procedure. Then, we wrote SQL code and implemented it using SQL Server Management Studio on MS SQL, building a database master, schema Schema1, and tables bookshop, employee, Author, Books, Publisher, and customer, and adding data into them. In order to put particular protocols on the database, we then applied the required constraints. Then, we added triggers, which cause a planned action to take place in response to a given occurrence. Additionally, we created stored procedures to improve the SQL scripts' reuse.

Then, we built a Couchbase NoSQL database and two Buckets: employee and bookshop. After indexing and putting data on the Query service, we constructed datasets on both buckets and

connected Query service data with Analytics service data. To execute SQL++ queries, including creating a JOIN over nested documents, we used the Analytics API. By keeping track of patron information and maintaining books along with author and publisher data in an employee-run library, we were able to successfully address the difficulties raised in the first proposal.

Conclusion

We utilized MSSQL and Couchbase to build SQL and NoSQL databases for our project, respectively. Through this process, we were able to distinguish the disparities between NoSQL and SQL.

SQL databases follow a rigid, predefined schema with a table-based data structure. On the other hand, NoSQL databases do not require a schema, providing greater flexibility when dealing with unstructured data. SQL queries create a collection of rows with identical columns in each row, while N1QL organizes data into key-value pairs, particularly for large collections of free-form text. N1QL offers data reshaping by incorporating statement-attributes into the desired result-object structure. Common relational database engines like Microsoft SQL Server, PostgreSQL, and MySQL use CRUD operations for data manipulation, and queries are typically written in raw SQL. However, NoSQL relies on REST APIs and CRUD activities to retrieve data. While RDBMS scales vertically, NoSQL scales horizontally.

This knowledge can be applied to develop a GUI-based program that offers customized portals for users based on their access privileges.

References**:**

1. https://docs.couchbase.com/server/current/introduction/intro.html

2. https://www.couchbase.com/sql-plus-plus-for-sql-users

Accomplishment 2 - IFT 598 : Data Visualization Dashboard on Personal indicators of heart disease.

Introduction

We chose a dataset from Kaggle that includes personal indicators of heart disease, as this disease is increasingly common and affects people of all ages. According to the CDC, almost half of all Americans have at least one of the three primary risk factors for heart disease, making it one of the leading causes of mortality in the US. Risk factors include high blood pressure, high cholesterol, smoking, diabetes, obesity, lack of exercise, and excessive alcohol consumption. Detecting and preventing these risk factors is critical for healthcare. With machine learning, we can find patterns in the data that can be used to predict a patient's status.

Other data scientists have used this dataset to test various machine learning techniques, including logistic regression, SVM, and random forest. However, because the classes are not balanced, traditional model application strategies may not be effective. Adjusting weights or under-sampling may improve results. An app based on this dataset, using a logistic regression model, has been developed and is available at https://heart-condition-checker.herokuapp.com/.

The data is sourced from the CDC and the Behavioral Risk Factor Surveillance System (BRFSS), which collects annual telephone survey data on the health of Americans. The dataset includes data from 2020, the most recent available as of today.

The project was divided into three phases :

Phase 1 : Selection of the topic

Phase 2 : Questions for the dataset which are supposed to work on and planning the factors to implement in the dash board.

Phase 3: Implementation of the dataset and the characteristic factors which we have worked on the dashboard.

Number of Rows and Columns:

There are 401,958 rows and 18 columns in it. There are 9 Boolean columns, 5 text format columns, and 4 decimal format columns. There were many factors (columns) that directly or indirectly influence heart disease in this dataset, so we decided to pick the most key factors (Columns) and clean them up so they could be used in machine learning applications.

Dataset attributes and Column data types:

- **Heart Disease**: Defines the value of the respondents having heart disease. Heart Disease is a **Categorial** data type attribute. It has the values like yes or no only.

- **BMI**: Body Mass Index values of respondents in decimal format from 12 to 94.8. BMI is the **ratio** data type attribute.

- **Smoking:** The value is based on the answers yes or no given by respondents to questions like have you smoked at least 100 cigarettes or 5 cigarette packets in your entire life? Smoking is the **categorical** data type attribute.

- **Stroke:** The stroke column is filled with values like yes or no for the question was hit by a stroke ever in their life? The stroke is the **categorical** data type attribute.

- **Alcohol Drinking:** The respondents are asked if they are Heavy drinkers (adult men having more than 14 drinks per week and adult women having more than 7 drinks per week. The responses are recorded as yes or no. Alcohol drinking in **categorical** attribute.

- **Physical health**: About the respondent's physical health including physical illness and injury, for how many days during the past months did they suffered is considered and the input is taken in decimal points up to 30.0. Hence, Physical health is a **ratio** data type attribute.

- **Mental Health:** This has the values given by respondents about their mental health, gauging the decimal value up to 30.0 for how many days during the past month (about 4 and a half weeks) was your mental health not good? Mental health is a **ratio** data type attribute.

- **General Health:** The respondents are asked if their general health is either good or very good. General health is a **categorical** data type attribute.

- **Sex:** The values are either male or female. It is a **categorical** data type attribute.

- **Race:** The values like white, Black, Hispanic, and American Indian/Alaskan Native are recorded from respondents. The race is **categorial** data type attributes.

- **Age Category:** The age category is a **ratio** data type attribute. The age of respondents was recorded if female or male.

- **Diabetic:** The respondents were asked the question if they had diabetics or not. The response was recorded in yes, no, borderline diabetics format. Diabetics is a **categorical** value.

- **Physical Activity:** The answers from respondents were recorded in yes or no format. It is recorded yes if the adults reported they do physical activity or exercise during the past month other than their regular job, otherwise, it is no. Physical attribute is a **categorical** attribute.

- **Sleep Time**: The sleep hours of the respondents are recorded on an average for about 24 hours. The values are recorded in the decimal format of 1 to 24 hours. Sleep time is a **ratio** data type attribute.

- **Asthma:** The values of yes or no were recorded after asking if they ever had asthma or not. Asthma is a **categorical** data type attribute.

- **Kidney Disease:** Based on the yes or no answers of the respondent that if they had any kidney diseases such as kidney stones, bladder infection, or incontinence. Kidney disease is the **categorical** data type attribute.

- **Skin Cancer:** Respondents were asked if they ever had skin cancer. The values were recorded in yes or no format. Skin cancer is a **categorical** data type.

- **Different Walking**: The respondent's answers were recorded to questions like do they have serious difficulty in walking or climbing stairs? The values are taken in yes or no format. The Different walking column is a **categorical** data type attribute.

What can be visualized using this dataset:

We can use this dataset for different visualizations and gain important information. Some examples are:

- We can find out who is more prone for heart disease
- Which age grouped people need to take precautions from getting heart disease.
- Effects of all habits like drinking, smoking, sleepless nights, no exercise and bad mental health can be visualized.

Visualization Tools used for this project

We used tableau Software for creating and visualizing the charts, later included all the charts in a single Dashboard. Tableau is the most widely used data visualization tool. It is easy to implement, creating interactive visualization is simple, scripting languages are also supported, works with huge datasets and mobile devices are also supported.

Data Preprocessing

Our dataset was downloaded from Kaggle, an online site for datasets. This Dataset used to contain a lot of missing and null values but with the help of python programming language and Panda's library, we imported the dataset file to the data frame which is a CSV file and removed Null and empty Values. Finally, Altered the dataset without missing values and connected to tableau for creating the Visualizations.

List of Final Questions

1. Visualizing the heart disease for Different Age categories?
2. Respondents who are affected with heart disease.
3. How is heart disease affected by Various sleep timings and Health Condition?
4. How is age category, physical activity and heart disease related?
5. Which race is most affected by heart disease?

6. Which gender is most prone to heart disease?

7. How is heart disease affected for Gender and Race?

8. How much will skin cancer be responsible for heart disease among males and females?

9. How are smoking and alcohol drinking contributing to heart disease?

10. How does BMI affect heart disease for a person?

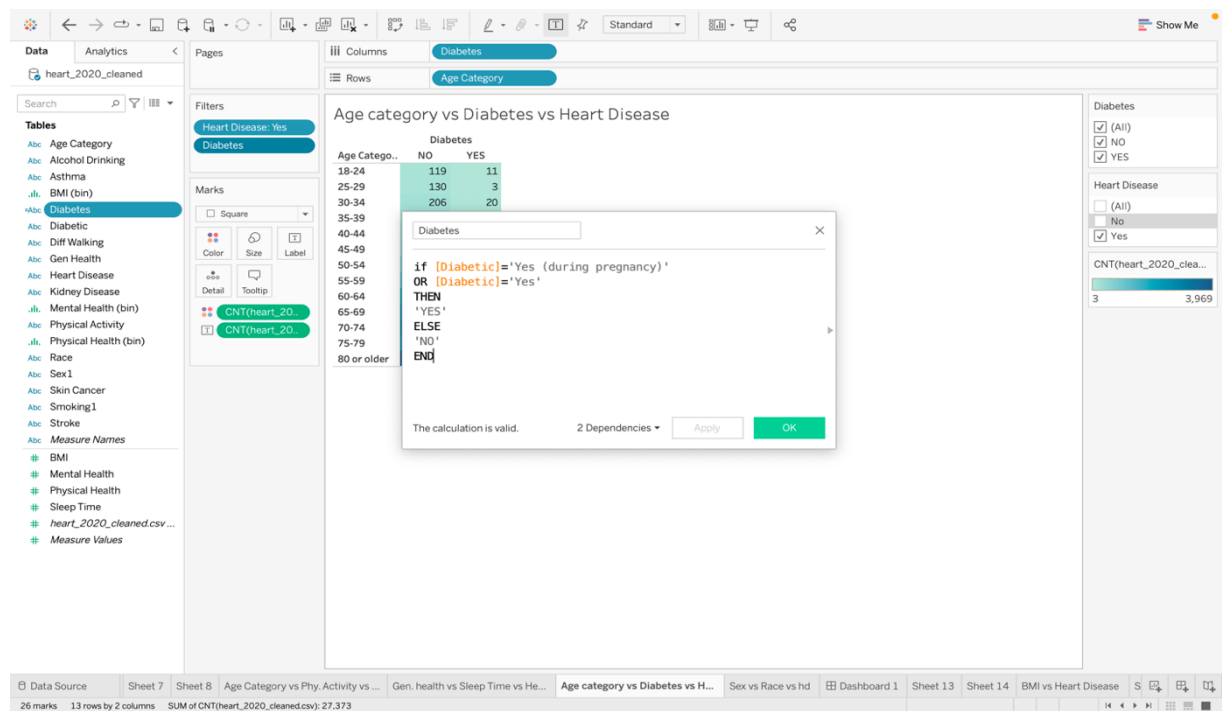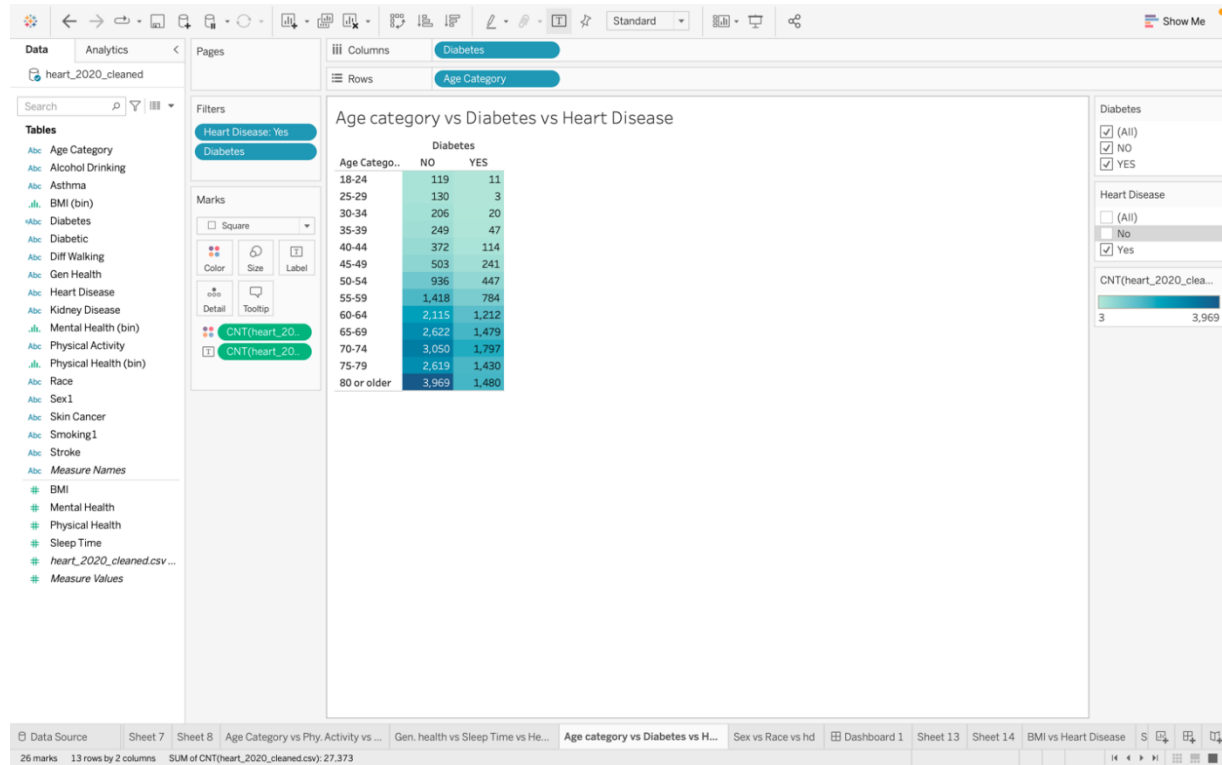11. How are diabetes, age, and heart disease-related?

Dashboard Plots

The Dashboard plots were plotted for the above categories with various kinds of graphs which are available such as pie chart, bar graph, line graph and so on. For representing various factors which risk the indivdual's heart. Few of the examples are displayed below.
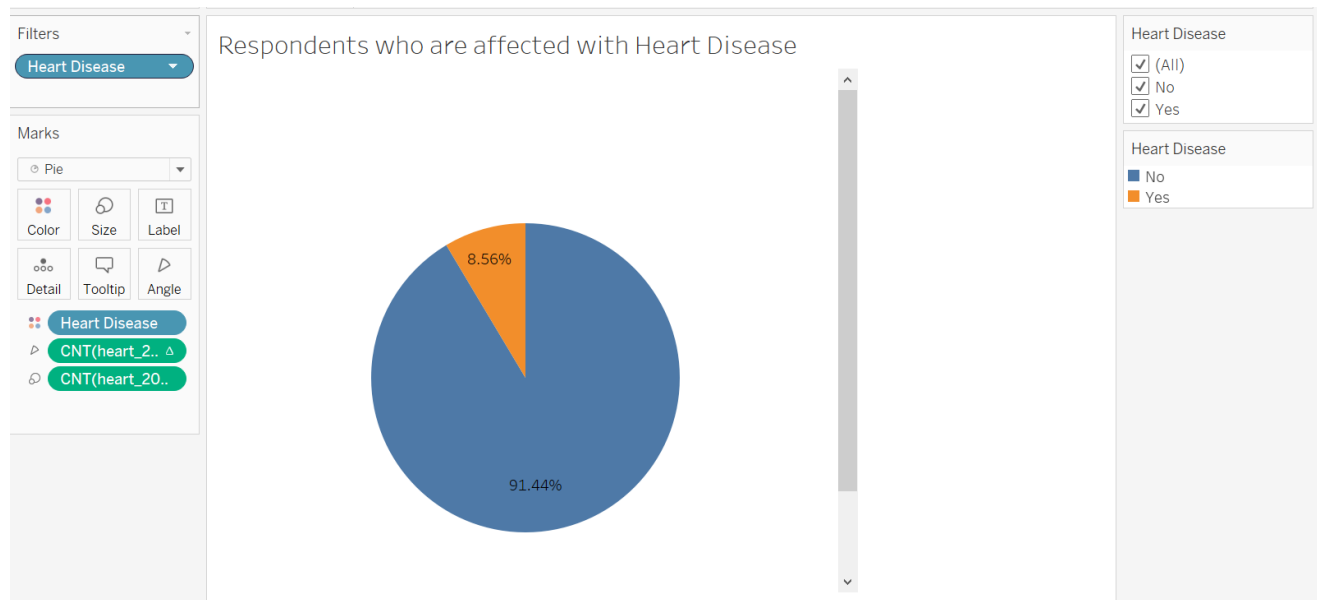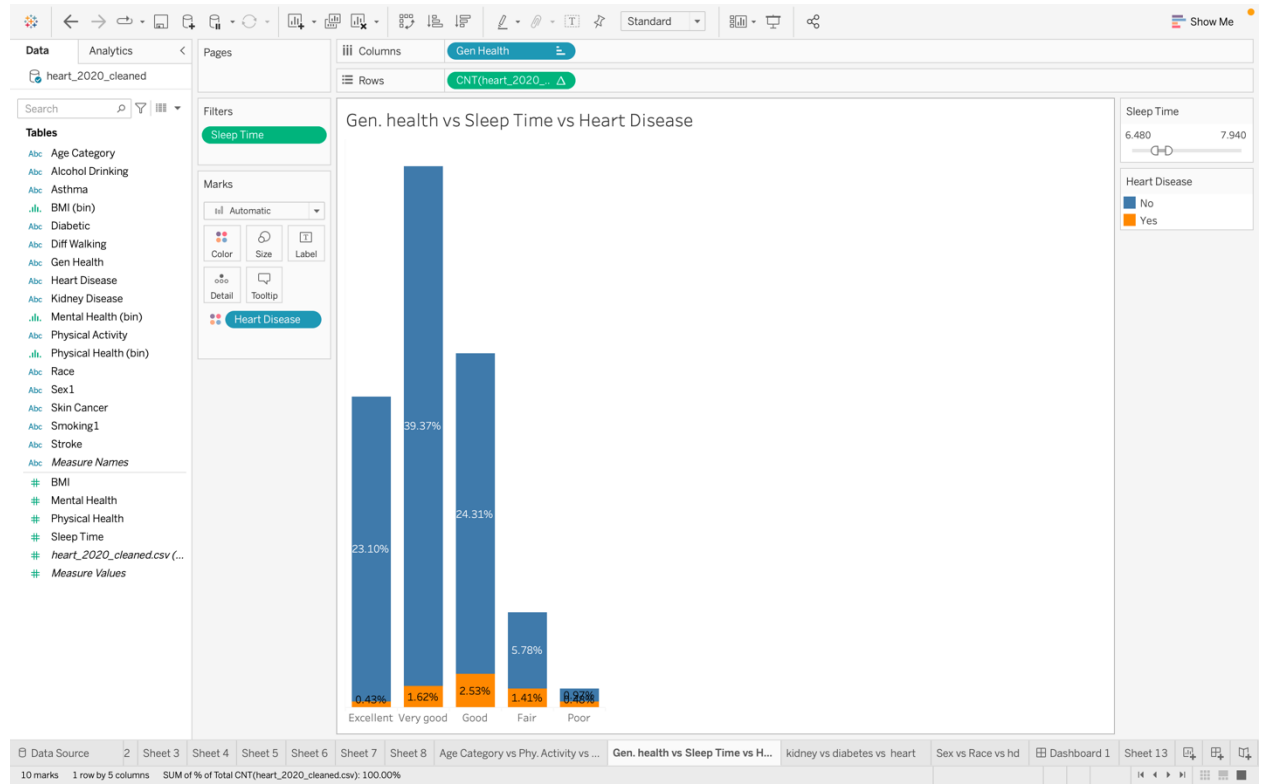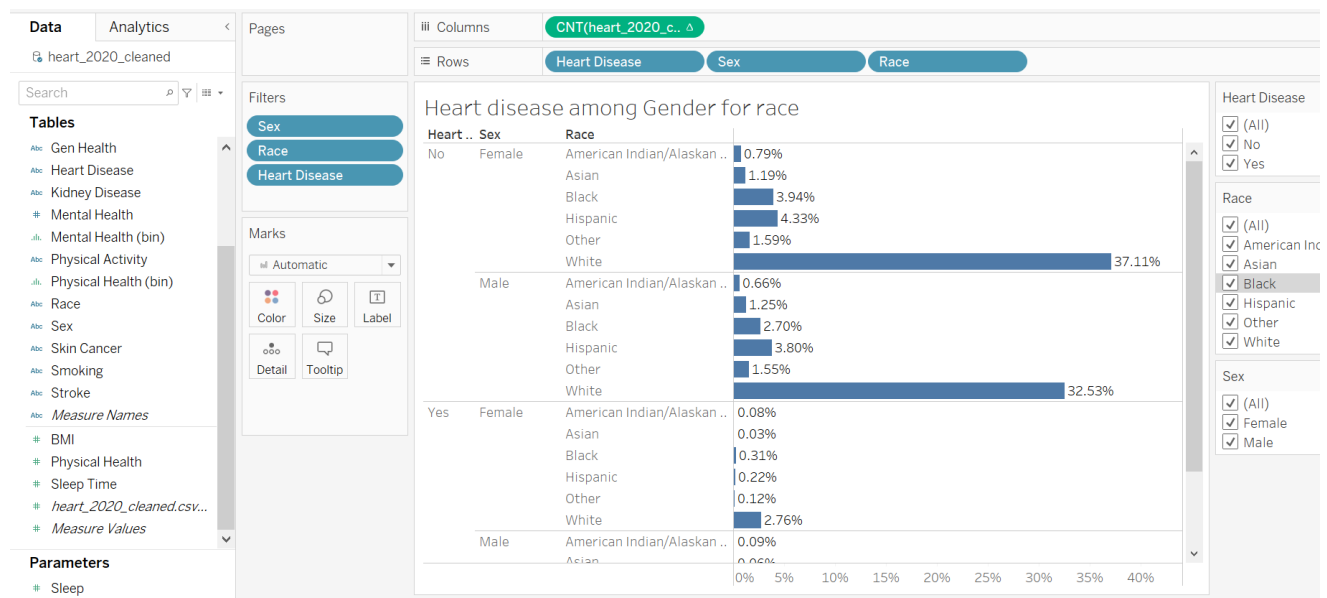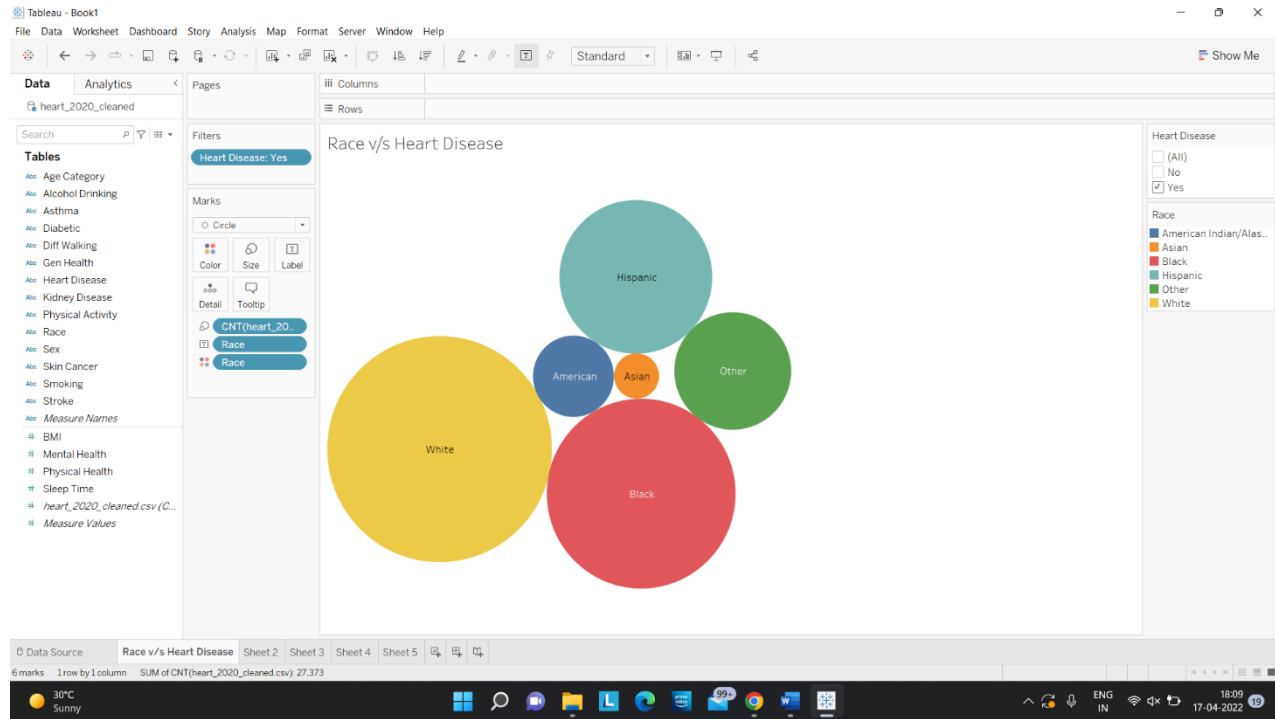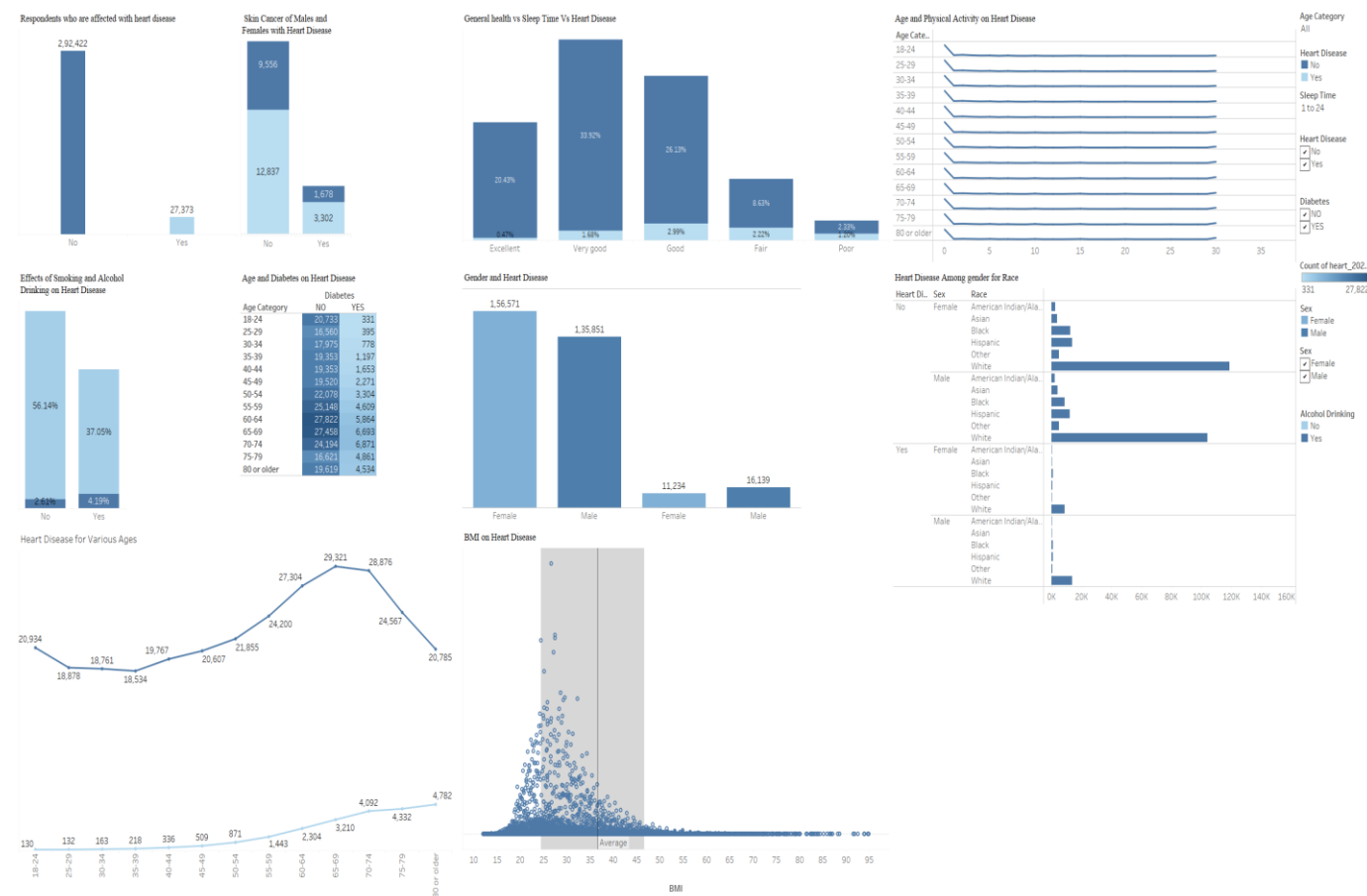
Phase 3: Final Dashboard implementation

The Dashboard contains all the visualizations that we made. This Dashboard can be used by doctors to plan the treatment based on the analysis done by the visualizations. Scientists can use this for research and development purposes. They can explore and relate many health factors. Also, nutritionists can use this dashboard to create a balanced diet plan for the consultants who approach them based on their health conditions, and age factors.

Dashboard Users

The Heart Disease dataset is helpful to a variety of professionals related to the medical field. Exploring and visualizing the dataset will help advancement in research and hopefully advance the clinical diagnosis and early detection and

treatment of heart diseases.

The prospective users of our dashboard include:

- **Doctors**: The doctors can use the dataset to plan the course of treatment, when the patient has been admitted to the hospital based on his history. Considering factors like diabetes, kidney disease and physical health is important to reach a conclusion.
- **Scientists**: scientists can use it for research and development to predict/analysis the reason/likeliness of a heart disease. The relation between various health factors can also be explored using the dashboard.
- **Nutritionists**: Depending on their health conditions, people will have varying restrictions when it comes to diet. A nutritionist can customize the dietary options available for heart patients based on various parameters.

References:

1. Mural link

https://app.mural.co/t/ganashreeannaiah1476/m/ganashreeannaiah1476/1649192100047/e984f8d0c8b88e28c0992e6135bec14e6e07c587?sender=u830f511c5b1894991f8d3803

2. Selected Dataset Link

https://www.kaggle.com/datasets/kamilpytlak/personal-key-indicators-of-heart-disease

3. Dashboard Link:

https://public.tableau.com/app/profile/ganashree.naganahalli.annaiah/viz/Heart_Disease_Project/Dashboard1?publish=yes

Accomplishment 3

IFT 598 : Data in Cloud – Asteroid Impact Prediction

Description

Stone-like articles called asteroids circle the Sun. Even though space rocks are far more modest than planets, they regardless circle the Sun in a similar way. The quantity of space rocks in our nearby planet group is colossal. The super space rock belt, which is in the middle of between the circles of Mars and Jupiter, is where a large portion of them are found. Space rocks periodically travel before Jupiter and sometimes toward its rear. They are known as Trojan space rocks. Space rocks that approach the Earth in peril are known as Close to Earth Items, or NEOs for short. NASA watches out for NEOs. The introduction of our nearby planet group abandoned space rocks (King's, https://www.tandfonline.com/doi/full/10.1080/00396330802456502).

Space rocks, some of the time known as minor planets, are stony remainders of the beginning phases of the development of our planetary group, which happened generally 4.6 quite a while back. There are 1,113,527 known asteroids altogether (King's, https://www.tandfonline.com/doi/full/10.1080/00396330802456502).

The vitally space rock belt, which circles our Sun among Mars and Jupiter, may contain most of this antiquated space junk. Vesta, the biggest space rock, has a width of 329 miles (530 kilometers), yet space rocks however small as 33 feet seem to be extremely normal (10 meters). The all out mass of all space rocks is not exactly the moon's mass on The planet (King's, https://www.tandfonline.com/doi/full/10.1080/00396330802456502).

Problem

What would the safest spot-on Earth be, if an asteroid were to hit the Earth?

Literature

Apophis isn't the main sizable, possibly risky asteroid that is circumnavigating the Earth. There are additionally bigger space rocks moving near Earth that can possibly cause far more prominent annihilation. Fortunately, greater things are in a more uncommon manner. The quantity of items one-10th the size of Apophis is right multiple times more than the quantity of articles multiple

times its size, while only 100th as many items are multiple times its size. Apophis is around 23 meters across, in this manner space rocks are about one-10th that size. They are sufficiently enormous to go through the World's climate however not large enough to bring on any harm. As a place of correlation, the fantastic 1,200 expansive Meteor Pit in Arizona is remembered to have been made around a long time back by a space rock with a measurement of about 46 meters. Researchers foresee that such space rock impacts just happen once each thousand years (NASA, solarsystem.nasa.gov/asteroids-comets-and-meteors/asteroids/in-depth).

Aws service used

Object capacity is a component of Amazon S3 (Simple Storage Service), which considers the internet putting away and recovery of any measure of information from any spot. Through a web administrations interface, it gives this capacity. It ensures 99.9 percent object solidness and 99.99 percent object accessibility while being worked for designers to make web-scale registering simpler. Furthermore, it has a capacity limit of up to 5 terabytes (Amazon, https://www.tandfonline.com/doi/full/10.1080/00396330802456502).

Things on Amazon S3 are coordinated in buckets. The primary stockpiling units in S3 are containers, and each item should be kept in a pail. S3's principal capabilities, like its all-connection points and APIs, can be utilized with either buckets or single objects (Amazon, https://www.tandfonline.com/doi/full/10.1080/00396330802456502).

Snapshots:

Impact of each Asteroid

Asteroid Impact with respective to Velocity and possible impact

Conclusion:

For this evaluation, we have the chance to choose the probable effects of each space rock. The model has to be advanced in order to locate the safe area in the event that a space rock impacts the planet. This enterprise may grow significantly by including more elements, such as oncoming cools and the world's climate at the time of the space rock hit. The two biggest challenges we ran into while working on the assignment were the problem of articulation and information collection. Information collecting is anticipated to search several locations for the appropriate information.According to NASA's Jet Propulsion Lab, there is a 96 percent chance that asteroid 2017 PDC will collide with Earth in 2027. Despite having a width that varies between 100 and 250 meters, the 2017 PDC Space Rock is capable of wreaking havoc. (NASA, solarsystem.nasa.gov/asteroids-comets-and-meteors/asteroids/in-depth).

References

- King's. (n.d.). Asteroid threat? the problem of planetary defence. Taylor & Francis. Retrieved December 4, 2022, from https://www.tandfonline.com/doi/full/10.1080/00396330802456502

- NASA. "In Depth | Asteroids – NASA Solar System Exploration." NASA Solar System Exploration, 3 Dec. 2022, solarsystem.nasa.gov/asteroids-comets-and-meteors/asteroids/in-depth.

- Amazon. "What Is Amazon S3? - Amazon Simple Storage Service." What Is Amazon S3? - Amazon Simple Storage Service, docs.aws.amazon.com/AmazonS3/latest/userguide/Welcome.html . Accessed 4 Dec. 2022.

- *What Can I Run · System Requirements Test*. (n.d.). PCGameBenchmark. https://www.pcgamebenchmark.com/

- *Asteroid Impacts*. (2021, June 20). Kaggle. https://www.kaggle.com/datasets/shrushtijoshi/asteroid-impacts

Reflection

My portfolio displays the technical abilities I've developed over the previous two years in my master's degree. While I was in charge of my own education, I am appreciative of the advice and criticism I got from my professors, staff advisers, coworkers, and classmates.

 I also want to thank my family and friends for their encouragement and support whilst I was studying. I've worked on a variety of projects during my master's program that have

 enhanced my programming knowledge and capacity for critical thought. The project development process has presented me with a variety of difficulties, ranging from defining user-friendly issue statements to putting effective solutions into place.

 Yet the conversations I had with my instructors and teaching assistants were crucial in helping me develop my critical thinking skills and get through these challenges. Once I join the field, I'll carry these lessons with me, and the projects I finished have given me the assurance to take on any new programming challenges that may arise.