# A NEW HINT TO TRANSPORTATION-ANALYSIS OF THE NYC BIKE SHARE SYSTEM

A project report submitted in partial fulfilment of the requirements of the award of the degree of

Bachelor of Engineering in
Computer Science and Engineering

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# TABLE OF CONTENTS

# 1. INTRODUCTION

## 1.1 PROJECT OVERVIEW

Bike share programs have risen in popularity in recent years and have been promoted as a lower carbon alternative to other forms of transit. Interest in bicycle sharing has been growing exponentially over the past decade, resulting in a proliferation of bike share systems in many cities across the world. This can be largely attributed to the successful incorporation of information technology in docking stations and mobile devices as well as improved logistics such as bicycle rebalancing to ensure responsive supply management. Cities often hope bike sharing will bring many benefits such as extending the reach of transit, substituting motorized trips, and encourage non-cyclists to try cycling.

The premise of bicycle sharing is that it is a short-term bike rental system, based on varying timed memberships. Members of the bike share network have access to stations, comprised of a pay-station and multiple bike docks, across the system where bikes can be checked out from one station and returned to another nearest to their destination. The appeal of membership is 24/7 access to an automated bike rental network and utility of bikes without the worry of storage or maintenance. The price system is set to encourage shorter trips, with additional fees for any time used over that maximum. There is evidence that bike share users switch to bike share from motorized transport, such as bus and auto creating the potential for significant reductions in transportation related greenhouse gas or CO2 emissions.

## 1.2 PURPOSE

Citi Bike must know how much increase or decrease they might see in supply and demand for their service in the future. Therefore, this analysis is made to provide an answer to this problem.By this analysis, they can gain a better understanding about the system.This analysis provides many benefits such as it measures data like distance, and helps with tasks such as route planning, expansion of the bicycle sharing system, manufacturing of desired bikes etc.

It makes use of the available dataset precisely and gives accurate data visualizations that can be used to improve the citi bike sharing system.

As more data becomes available, particularly in other areas with identically comprehensive bike sharing systems, a clearer picture of the role of this transport mode in these emergency situations can be better evaluated by this analysis and provide results with an increased accuracy.

By the end of this project, one will:

1.Know the fundamental concepts and can work on IBM Cognos Analytics
2.Gain a broad understanding of plotting different graphs
3.Be able to create meaningful dashboards

The goal of this analysis is to create an operating report of Citi Bike for the year 2018. The following data visualizations are created to understand the report

1.Total Number of Trips

2.What is Customer and subscriber with gender

3.Find the top bike used with respect to trip duration?

4.Calculating the number of bikes used by respective age groups

5.Top 10 Start Station Names with respect to Customer age group

## 2. LITERATURE SURVEY

### 2.1 EXISTING PROBLEM

Bike sharing is an emerging industry and it is very popular in western countries, while people have tried to start the same in India, we will look into some of the stats regarding how many people use bike sharing systems. According to Wikipedia by August 2014 only 600 cities in the world had bike sharing systems and most of them were in western countries with a fleet of about 500000 bicycles with them. There is a sharp increase in Next Bike Cog Bike Share are some of the leading Bike Sharing systems that are currently in operation in the world.

While considering Indian perspective in the Bike Share industry, India has not yet adapted the application of this emerging industry. Currently there are a few bike share systems.

| TITLE | AUTHOR | ALGORITHM | ADVANTAGES | DISADVANTAGES |
|---|---|---|---|---|
| What do trip data reveal about bike-sharing system users? | Elias Willberg, Maria Salonen, Tuuli Toivonen | ANOVA technique with Tukey's pairwise post-hoc tests. | This study shows that most trips are generated by the users, which points in the same direction with recent findings, although less strongly. This indicates broader participation of various groups with varying cycling capabilities. High bike-sharing systems (BSS) use in Helsinki is nevertheless | BSS trip databases are increasingly available, which is not typical of many other cycling data sources. A significant proportion of users did not provide gender information. No data was available to analyze user's economic or social background and |

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| | | | largely generated by a limited group of people, who are disproportionately younger adults and male.The most active user quintile in this study had distinctive temporal and spatial patterns, implying habitual use. | their potential effects on BSS usage patterns. Additional socio-economic variables in trip datasets, such as education, economic background and ethnicity would help to deepen understanding on the inclusiveness of BSSs beyond age, gender and home location. |
| Multi-source Data Analysis for Bike Sharing | Nguyen Thi Hoai Thu, Le Trung Thanh | Machine Learning Regression models 1.Weighted K-Nearest-Neighbor(SWK) 2.Artificial Neural Network (ANN) | SWK-based regression models learn the weights of several meteorological factors and bike usage and use the correlation between consecutive time slots to predict the bike pick-up demand. The ANN is trained by using historical trip records of Bike sharing systems,meteorological data, and Bike trip records.Bike sharing systems help to reduce the traffic congestion, air pollution and noise. | Bike sharing systems face many problems, one of which is the availability imbalance.Due to the fact that movements of customers are highly dynamic,the bike usage is non-stationary, changing markedly with time and location.Therefore ,some stations may be short of available bikes for rent while some are full and do not |

| | | | | |
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| | | | | have enough docks for returned bikes |
| A long-term perspective on the COVID-19: The bike sharing system resilience under the epidemic environment | Hui Bi, Zhirui Ye, Yuhan Zhang, and He Zhud | Complex network analysis,Network dissimilarity: Kullback-Leibler divergence (KL-divergence) ,Multiple regression model of sojourn time | This provides a comparative analysis of bike sharing spatial-temporal mobility patterns and connectivity of the bike sharing usage network, before and during the public health crisis with a macroscopic perspective. Also, a multivariate investigation of user and trip characteristics on BSS is conducted to uncover the difference in the frequency of outdoor and sojourn time between various user communities.<br>This study also finds evidence of the significant gender, age and cycling pattern gaps in response to potential risk. | Due to the impact of the outbreak, BSS registered severe ridership drops, yet it quickly recovered to the pre-pandemic levels within months. The decline of bike sharing usage was felt throughout all the areas during the outbreak.The less densely connected network of bike sharing usage has also resulted in a reduction in users' destination heterogeneity. |
| Bicycle sharing systems demand | Inês Frade, Anabela Ribeiro | Latent Demand Score Method | The methodology provides a coefficient of<br>potential demand for bicycle trips | The trips estimated are not directional (the method considers the total number of |

| | | | | |
|---|---|---|---|---|
| | | | throughout a transportation network (in each arc of the network), based on the influence of generator/attractors points in the city on the number of bicycle trips for all road segments. One of the advantages of this model is that it acts as a geographic information system. | the trips that were generated and attracted), meaning that the method compromises an Origin-Destiny evaluation. |
| Estimating Bike Availability from NYC Bike Share Data | Clif Kranish | Using Pandas to restructure trip records from Citi Bike to estimate the number of bikes available at a station throughout the day. | This study shows how to determine the availability of bikes (and docks). Citi Bike provides a real-time feed of station status with the number of available bikes and docks as a web service. Using the station status information would require writing a program that would periodically query the feed and save the information.However, Citi Bike does provide monthly trip data files with a record for each trip that includes the start and end time and station. It's possible | The number of bikes in the station at the beginning of the month is unknown.It doesn't take into account rebalancing, bikes removed for maintenance or those added to the system. |

| | | | | |
|---|---|---|---|---|
| | | | to use this data to estimate bike availability. | |

## 2.2 REFERENCE


**Burrows; et al. (1999). Gotham. Oxford Press. ISBN 0-19-511634-8.**

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**Bellafante, Ginia (July 12, 2019). "New York Was Supposedly Getting Better for Cyclists. What Happened?". The New York Times. ISSN 0362-4331. Retrieved November 5, 2019.**

## 2.3 PROBLEM STATEMENT DEFINITION

1) The government needs a way to analyze the NYC bike share system so that they can enhance the system and give residents and visitors a fun, safe, affordable and convenient alternative to walking, taxis, buses etc.

2) The goal of this analysis is to create an operating report of Citi Bike for the year 2018.

3) Citi Bike officials are pushing to make the program more robust and to broaden its reach. Financial viability increases with such larger bike-sharing programs. This could be seen by analyzing the total number of trips.

4) The top bikes used with respect to trip duration could be found by this analysis so that more of these bikes can be produced and more users can be attracted.

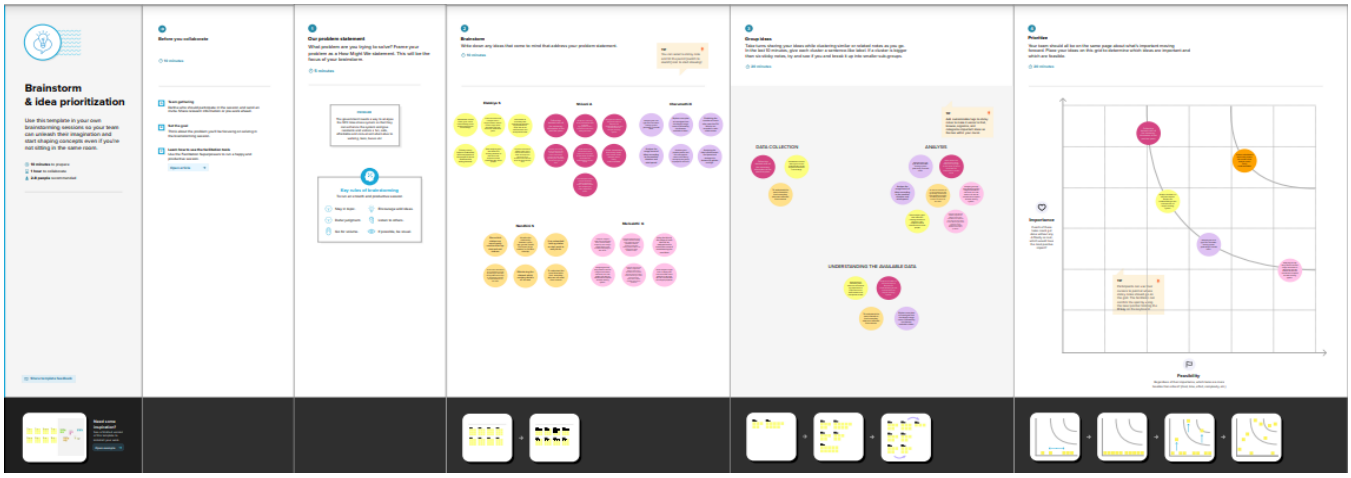
5) With the help of this analysis, the top 10 Start station names with respect to customer age group could be found so that the government can broaden the bike sharing system by increasing the number of bikes in those stations to make them readily available to all the potential users.

6) The gender of the customer as well as the subscriber could be assessed and the number of bikes used by respective age groups could also be computed.

# 3.IDEATION & PROPOSED SOLUTION

## 3.1EMPATHY MAP CANVAS


## 3.2IDEATION AND BRAINSTORMING



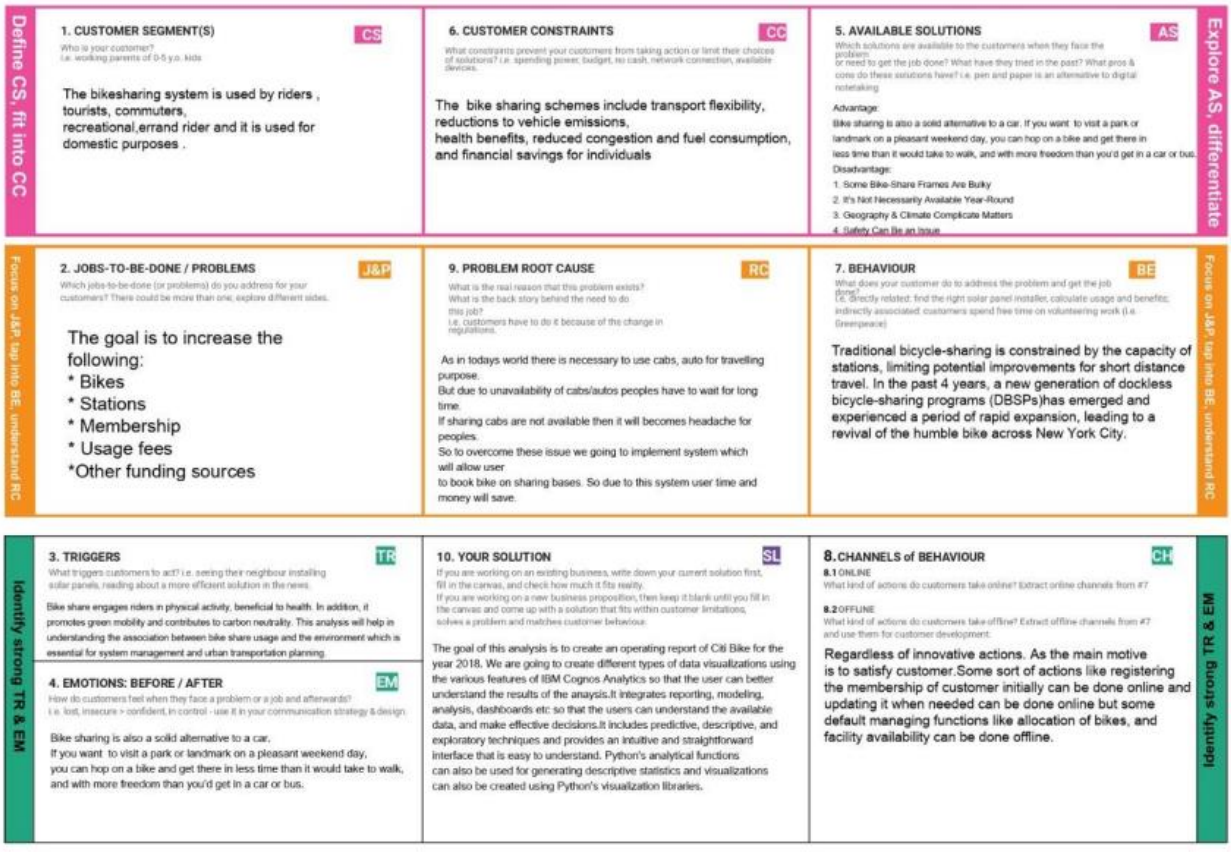
## 3.2 PROPOSED SOLUTION

| S.No. | Parameter | Description |
|---|---|---|
| 1. | Problem Statement (Problem to be solved) | The government needs a way to analyse the NYC bike share system so that they can enhance the system and give residents and visitors a fun, safe, affordable and convenient alternative to walking, taxis, buses etc. |
| 2. | Idea / Solution description | The goal of this analysis is to create an operating report of Citi Bike for the year 2018. We are going to create different types of data visualizations using the various features of IBM Cognos Analytics so that the user can better understand the results of the anaysis.It integrates reporting, modeling, analysis, dashboards etc so that the users can understand the available data, and make effective decisions.It includes predictive, descriptive, and exploratory techniques and provides an intuitive and straightforward interface that is easy to understand. Python's analytical functions can also be used for generating descriptive statistics and visualizations can also be created using Python's visualization libraries. |
| 3. | Novelty / Uniqueness | Our solution gives faster results,reduces maintenance due to complete report coverage, and improved decision making - our reports and dashboards present the data in easily-understood formats. |
| 4. | Social Impact / Customer Satisfaction | Bike share engages riders in physical activity, beneficial to health. In addition, it promotes green mobility and contributes to carbon neutrality. This analysis will help in understanding the association between bike share usage and the environment which is essential for system management and urban transportation planning. |
| 5. | Business Model (Revenue Model) | This analysis might show that bike share is a relatively inexpensive and quick-to-implement urban transportation option compared to other transportation modes. The relative cost of launching a bike share |

| | | |
|---|---|---|
| | | system is less than investments in other transportation infrastructure,such as public transit and highways. |
| 6. | Scalability of the Solution | This analysis presents evidence of the possible contribution of bike sharing systems to a more resilient transport system, as it can quickly provide alternative transport options to urban residents.As more data becomes available, particularly in other areas with identically comprehensive bike sharing systems, a clearer picture of the role of this transport mode in these emergency situations can be better evaluated by this analysis and provide results with an increased accuracy. |

## 3.4PROBLEM SOLUTION FIT

**Project Title:** A new hint to transportation Analysis of the NYC bike share system **Project Design Phase-I - Solution Fit Template** **Team ID:** PNT2022TMID 23401



# 4.REQUIREMENT ANALYSIS

## 4.1FUNCTIONAL REQUIREMENT

Following are the functional requirements of the proposed solution

| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task) |
|---|---|---|
| FR-1 | Collection of user data | Lyft citi bike's official website provides the data to help with analysis, development, visualization etc. Data is collected from these published files. |
| FR-2 | Analysing the user data | This data is used as input for creating various types of visualizations and analysis is done and a dashboard is created. |
| FR-3 | Display the data | The dashboard is used to display the top bike used with respect to trip duration, top 10 Start Station Names with respect to customer age group, to find the customer and subscriber with gender, to find total number of trips & calculating the number of bikes used by respective age groups. |

## 4.2NONFUNCTIONAL REQUIREMENT

Following are the nonfunctional requirements of the proposed solution

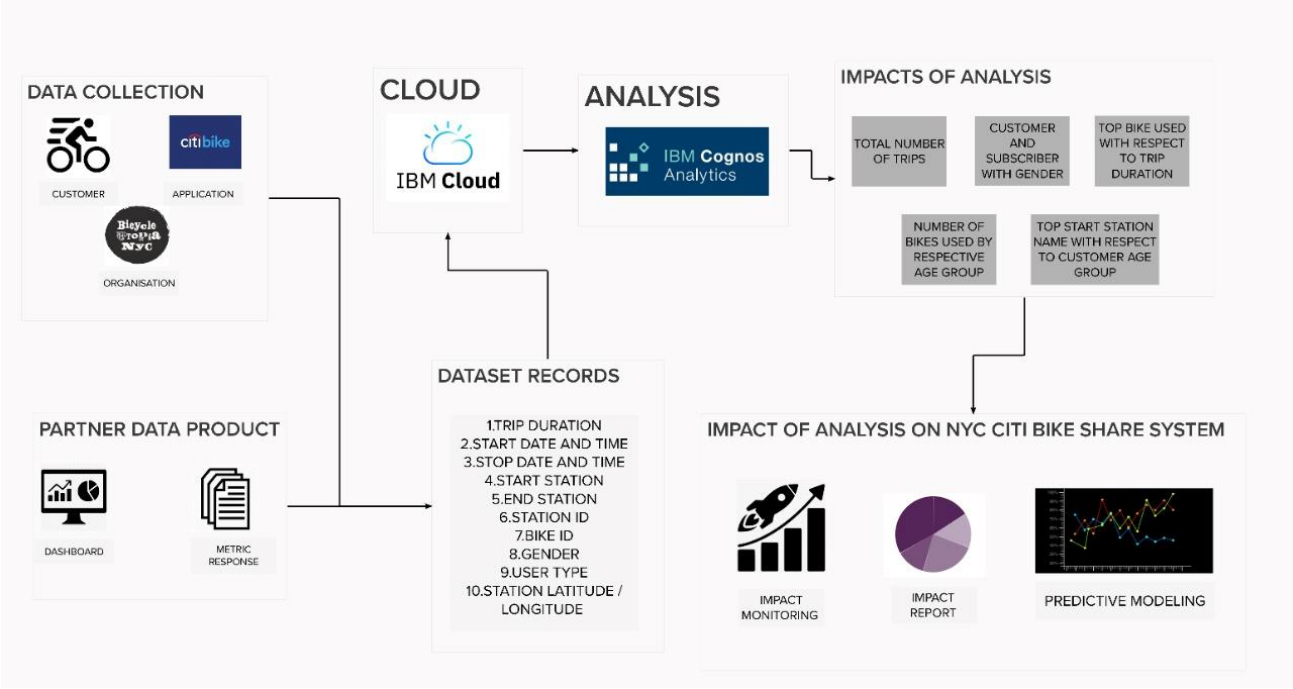
| FR No. | Non-Functional Requirement | Description |
|---|---|---|
| NFR-1 | **Usability** | This dashboard provides an easily understandable report which facilitates many people and tourists who use bicycles to complete their work and enjoy themselves. It provides many benefits such as measures data like distance, and help with tasks such as route planning, expansion of the bicycle sharing system, manufacturing of desired bikes etc.The benefits of Bicycle sharing systems could be reduced vehicle emissions, reduces energy consumption, improve health benefits, financial savings for individuals, reduced congestion and fuel consumption. |

| | | |
|---|---|---|
| NFR-2 | **Security** | The citi bike usage data is secured with appropriate caution as crucial decisions will be made based on this data. We can restrict access to this data and the visualization reports. |
| NFR-3 | **Reliability** | This analysis provides a reliable and an efficient way to grasp on the performance of the citi bike sharing system in the year 2018. It makes use of the available dataset precisely and gives accurate data visualizations that can be used to improve the citi bike sharing system. |
| NFR-4 | **Performance** | Performance of bike sharing system is defined as operational efficiency and spatial effectiveness of bike sharing system. The operational efficiency of bike sharing system aims at understanding the characteristics of public bike users, and evaluating the conditions of bike lanes from the perspective of public bike users.The effectiveness of bike sharing system dashboard aims at analyzing the characteristics of bike stations, and accessibility between bike stations and other facilities. The evaluation results can be used to improve the public bicycle sharing program. |
| NFR-5 | **Availability of bikes** | A bicycle-sharing system is a shared transport service where bicycles are available for shared use by individuals for a short-term at low or zero cost.The programs themselves include both docking and dockless systems, where docking systems allow users to borrow a bike from a dock and return at another node or dock within the system — and dockless systems, which offer a node-free system relying on smart technology. In either format, systems may incorporate smartphone web mapping to locate available bikes and docks. |
| NFR-6 | **Scalability** | This analysis presents evidence of the possible contribution of bike sharing systems to a more resilient transport system,as it can quickly provide alternative transport options to urban residents.As more data becomes available, particularly in other areas with identically comprehensive bike sharing systems, a clearer picture of the role of this transport mode in these emergency situations can be better evaluated by this analysis and provide results with an increased accuracy. |

## 5.PROJECT DESIGN

A data flow diagram is traditional visual representation of the information flow with in a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how enters and leaves the system, what changes the information and when data is stored.

## 5.1DATA FLOW DIAGRAM



# 5.2USER STORIES

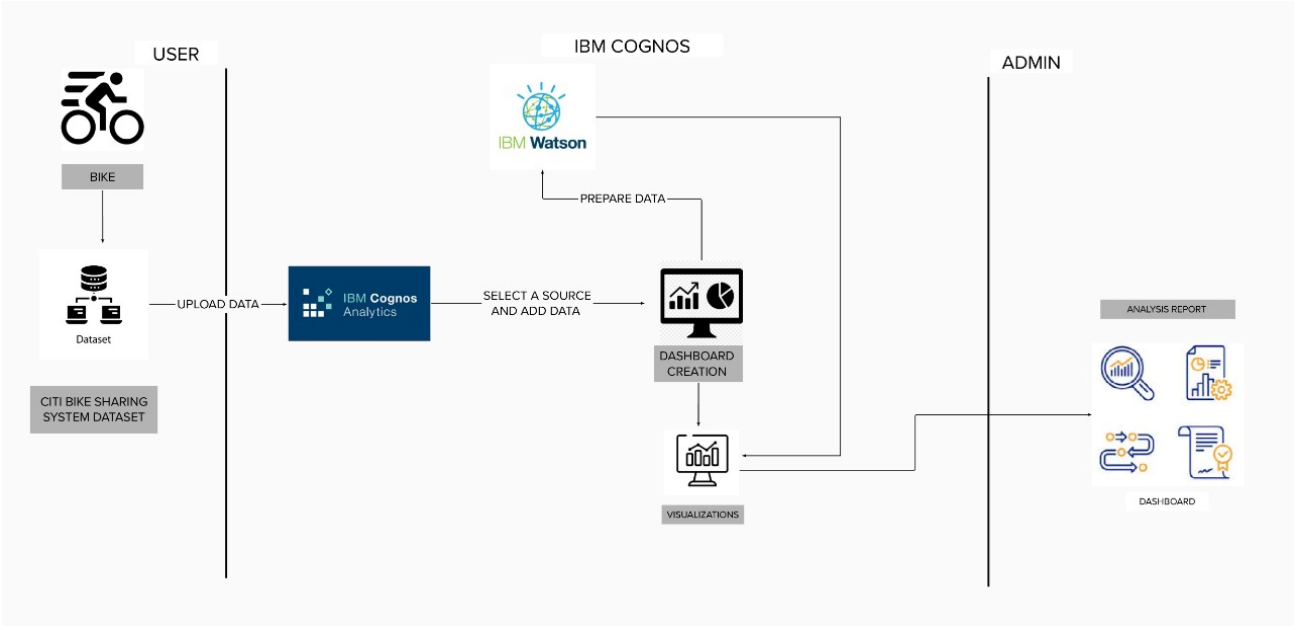
**User Stories**

Use the below template to list all the user stories for the product.

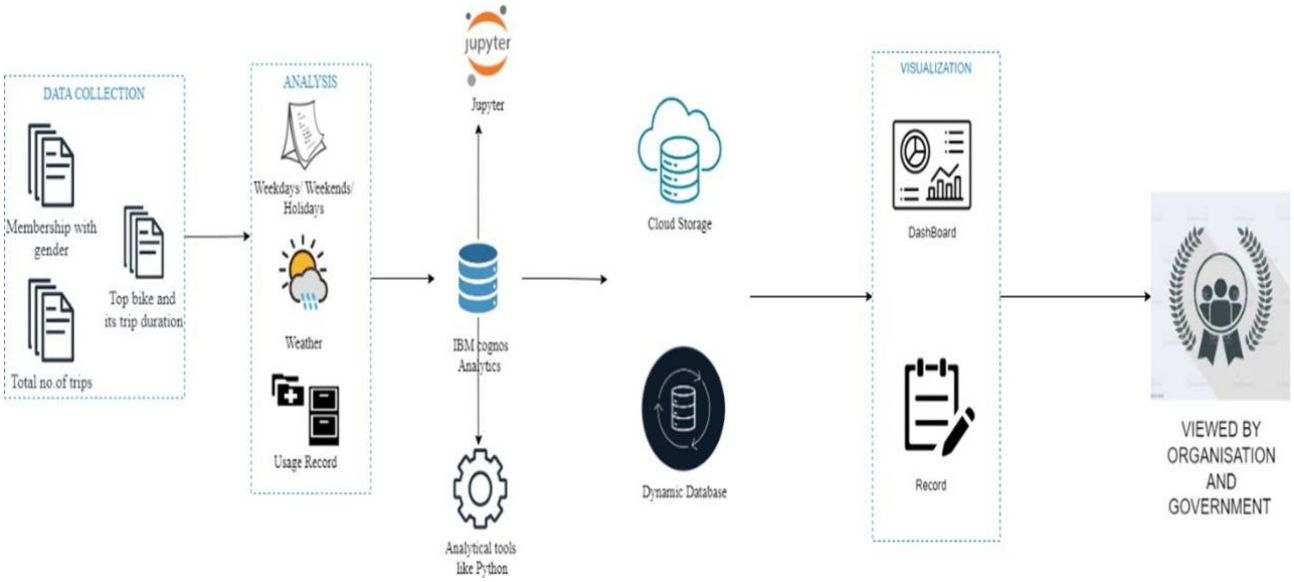
| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|---|---|---|---|---|---|---|
| Customer, Analysts, Organizations, Government | Collection of user data | USN-1 | Lyft citi bike's official website provides the data to help with analysis, development, visualization etc. Data is collected from these published files. | I can access the data on Lyft citi bike's official website | High | Sprint-1 |
| | Analysing the user data | USN-2 | This data is used as input for creating various types of visualizations and analysis is done and a dashboard is created | I can view the analysis of the citi bike | High | Sprint-1 |
| | Dashboard | USN-3 | The dashboard is used to display the top bike used with respect to trip duration, top 10 Start Station Names with respect to customer age group, to find the customer and subscriber with gender, to find total number of trips & calculating the number of bikes used by respective age groups. | I can register & access the dashboard with login | High | Sprint-2 |

## 5.3 SOLUTION AND TECHNICAL ARCHITECTURE

## TECHNICAL ARCHITECTURE :



## SOLUTION ARCHITECTURE :



# PROJECT PLANNING AND SCHEDULING

## 6.1 SPRINT PLANNING AND ESTIMATION

**Product Backlog, Sprint Schedule, and Estimation (4 Marks)**

Use the below template to create product backlog and sprint schedule

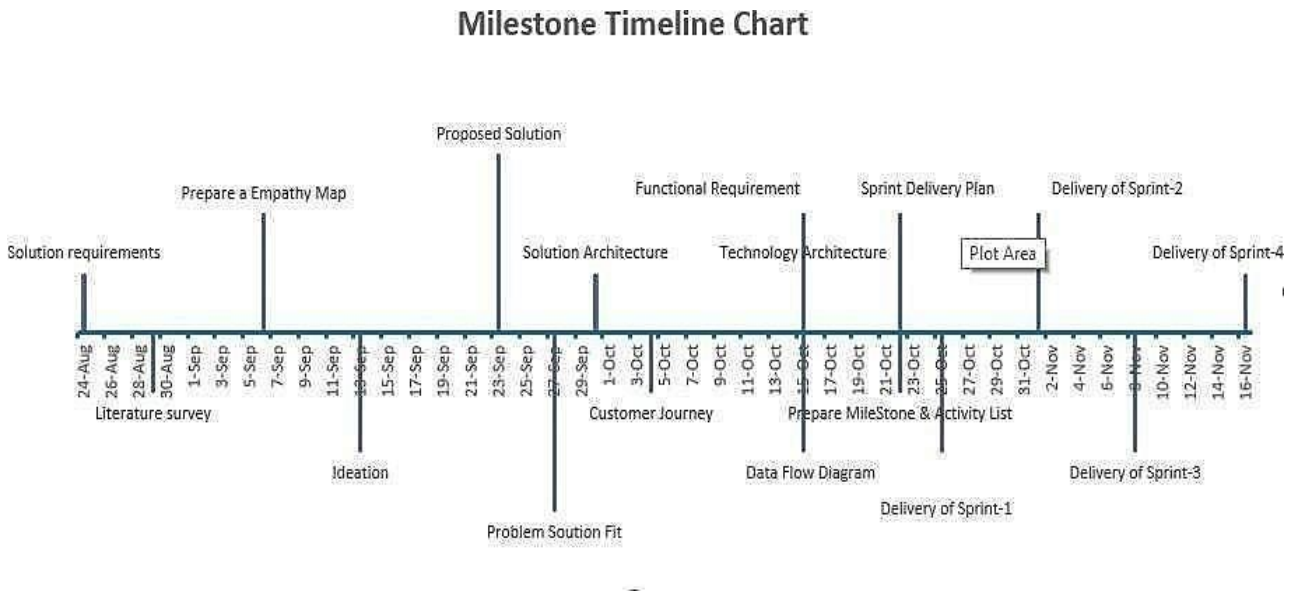
| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-1 | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | 2 | High | Charumathi.K ,Nandhini.S |
| Sprint-1 | | USN-2 | As a user, I will receive confirmation email once I have registered for the application | 2 | High | Shivani.A, Elekkiya.S, Nandhini.S |
| Sprint-1 | | USN-3 | As a user, I can register for the application through Gmail | 2 | Medium | Marisakthi.G, Charumathi.K |
| Sprint-2 | Login | USN-4 | As a user, I can log into the application by entering email & password | 2 | High | Charumathi.K ,Nandhini.S, Elekkiya.S |

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-2 | Collection of user data | USN-5 | I can access and collect the citi bike share system data from Lyft citi bike's official website that has the published files. | 2 | Medium | Charumathi.K ,Marisakthi.G, Nandhini.S |
| Sprint-2 | | USN-6 | I can use the citi bike share system data for analysis purposes | 5 | High | Charumathi.K ,Shivani.A |
| Sprint-3 | Analysing the user data | USN-7 | The data is used as input for creating various types of visualizations and analysis is done. I can view the analysis of the citi bike | 8 | High | Marisakthi.G, Elekkiya.S, Shivani.A |
| Sprint-3 | Dashboard | USN-8 | I can register & access the dashboard created based on the analysis by logging in | 3 | Medium | Nandhini.S, Marisakthi.G, Elekkiya.S |
| Sprint-3 | | USN-9 | As a user I can view the dashboard that displays the top bike used with respect to trip duration | 5 | High | Elekkiya.S |
| Sprint-4 | | USN-10 | As a user I can view the dashboard that displays the top 10 Start Station Names with respect to customer age group | 5 | High | Shivani.A |
| Sprint-4 | | USN-11 | As a user I can view the dashboard that displays the customer and subscriber with respect to gender | 5 | High | Marisakthi.G |
| Sprint-4 | | USN-12 | As a user I can view the dashboard that displays the total number of trips | 5 | High | Nandhini.S |

**Milestone Timeline Chart:**

A milestone schedule, or milestone chart, is a timeline that uses milestones to divide a project schedule into major phases. Due to its simplicity, it's used when project

managers or sponsors need to share an overview of the project schedule with stakeholders or team members without going over every detail.



## 6.2 SPRINT DELIVERY SCHEDULE

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-1 | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | 2 | High | Charumathi. K,Nandhini.S |
| Sprint-1 | | USN-2 | As a user, I will receive confirmation email once I have registered for the application | 2 | High | Shivani.A, Elekkiya.S, Nandhini.S |
| Sprint-1 | | USN-3 | As a user, I can register for the application through Gmail | 2 | Medium | Marisakthi.G, Charumathi. K |
| Sprint-2 | Login | USN-4 | As a user, I can log into the application by entering email & password | 2 | High | Charumathi. K,Nandhini.S , Elekkiya.S |
| Sprint-2 | Collection of user data | USN-5 | I can access and collect the citi bike share system data from Lyft citi bike's official website that has the published files. | 2 | Medium | Charumathi. K,Marisakthi. G, Nandhini.S |
| Sprint-2 | | USN-6 | I can use the citi bike share system data for analysis purposes | 5 | High | Charumathi. K,Shivani.A |
| Sprint-3 | Analysing the user data | USN-7 | The data is used as input for creating various types of visualizations and analysis is | 8 | High | Marisakthi.G, Elekkiya.S, Shivani.A |

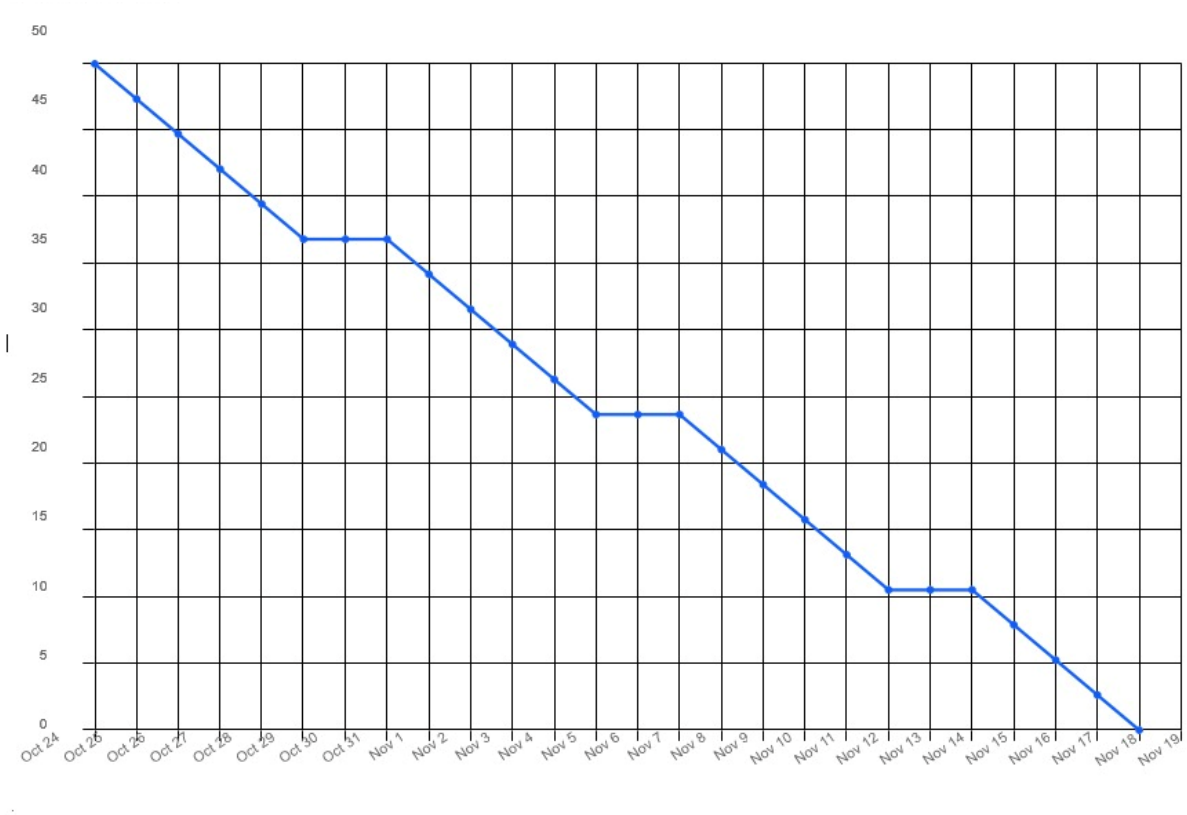
| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| | | | done. I can view the analysis of the citi bike | | | |
| Sprint-3 | Dashboard | USN-8 | I can register & access the dashboard created based on the analysis by logging in | 3 | Medium | Nandhini.S, Marisakthi.G, Elekkiya.S |
| Sprint-3 | | USN-9 | As a user I can view the dashboard that displays the top bike used with respect to trip duration | 5 | High | Elekkiya.S |
| Sprint-4 | | USN-10 | As a user I can view the dashboard that displays the top 10 Start Station Names with respect to customer age group | 5 | High | Shivani.A |
| Sprint-4 | | USN-11 | As a user I can view the dashboard that displays the customer and subscriber with respect to gender | 5 | High | Marisakthi.G |
| Sprint-4 | | USN-12 | As a user I can view the dashboard that displays the total number of trips | 5 | High | Nandhini.S |

**Project Tracker, Velocity & Burndown Chart: (4 Marks)**

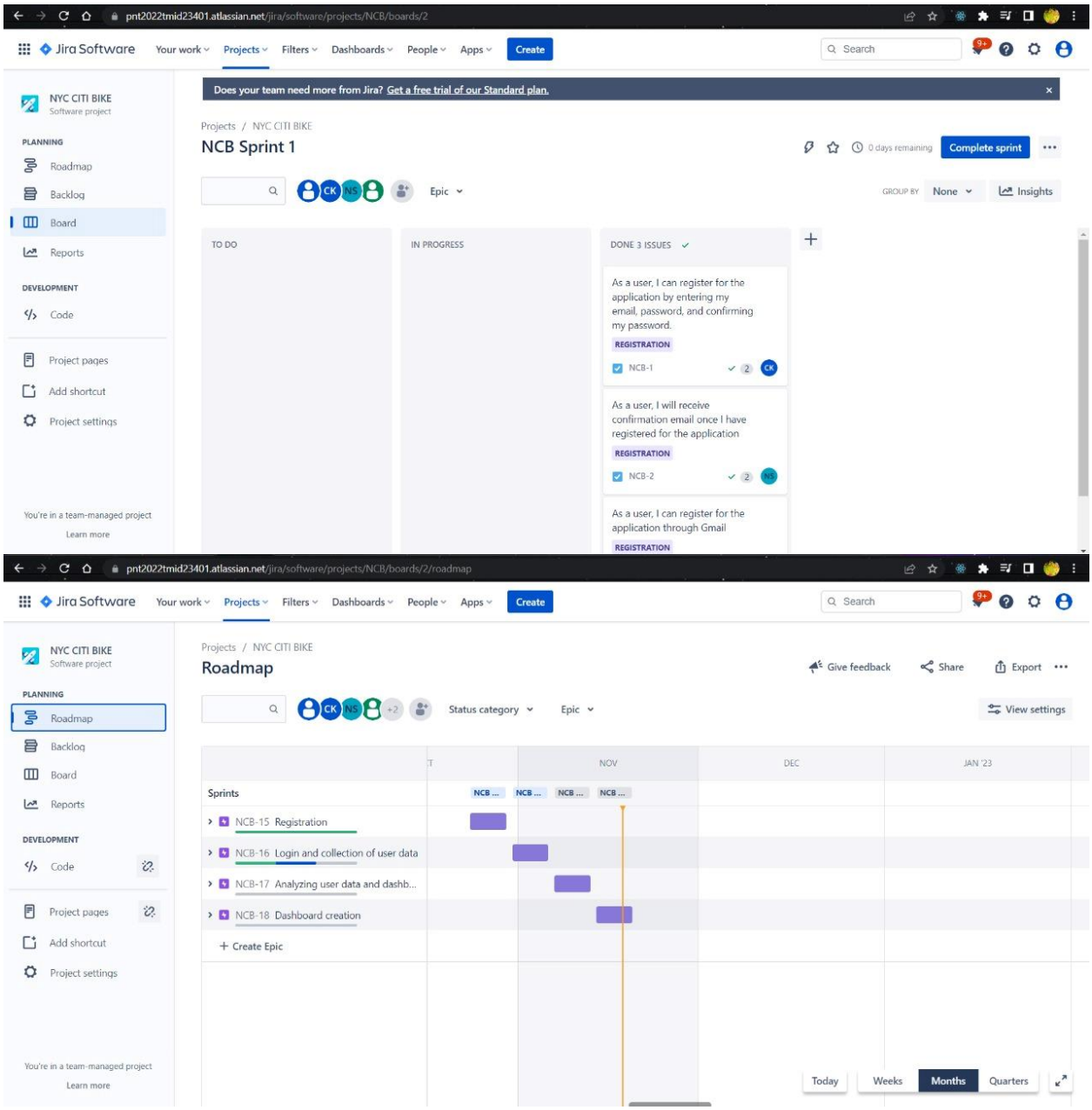
| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|---|---|---|---|---|---|---|
| Sprint-1 | 6 | 6 Days | 24 Oct 2022 | 29 Oct 2022 | 5 | |
| Sprint-2 | 9 | 6 Days | 31 Oct 2022 | 05 Nov 2022 | 7 | |

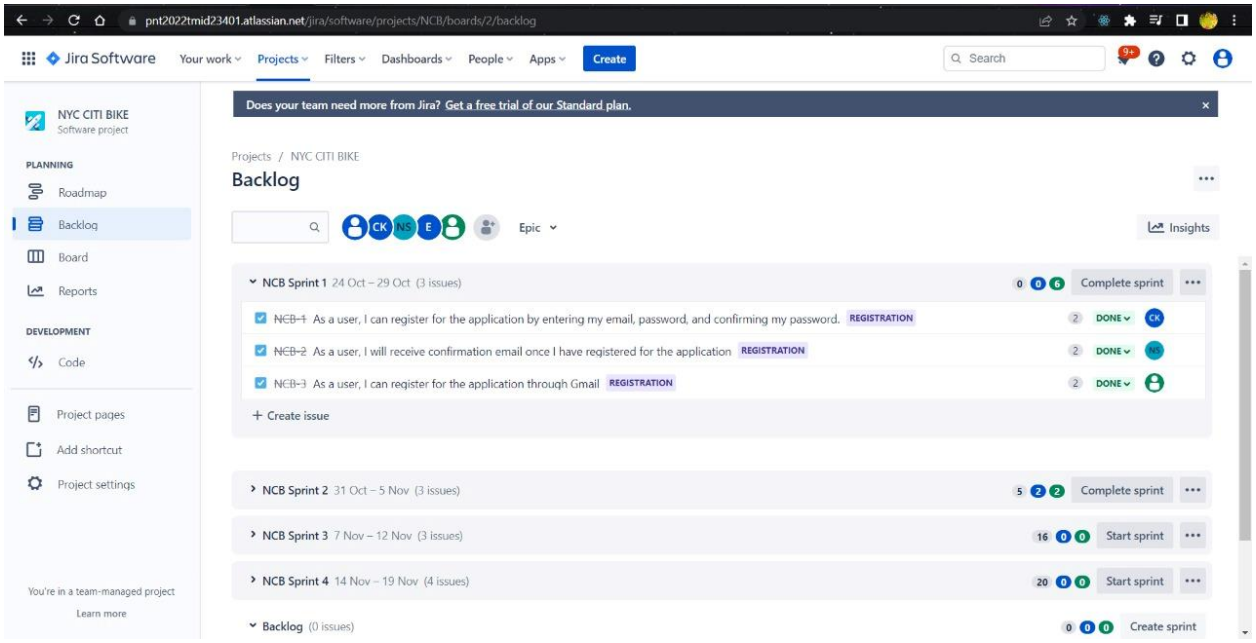
| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|---|---|---|---|---|---|---|
| Sprint-3 | 16 | 6 Days | 07 Nov 2022 | 12 Nov 2022 | 10 | |
| Sprint-4 | 20 | 6 Days | 14 Nov 2022 | 19 Nov 2022 | 25 | |

| Sprint | Average Velocity |
|---|---|
| Sprint-1 | 0.833 |
| Sprint-2 | 2.500 |
| Sprint-3 | 3.333 |
| Sprint-4 | 1.666 |



## 6.3 REPORT FROM JIRA

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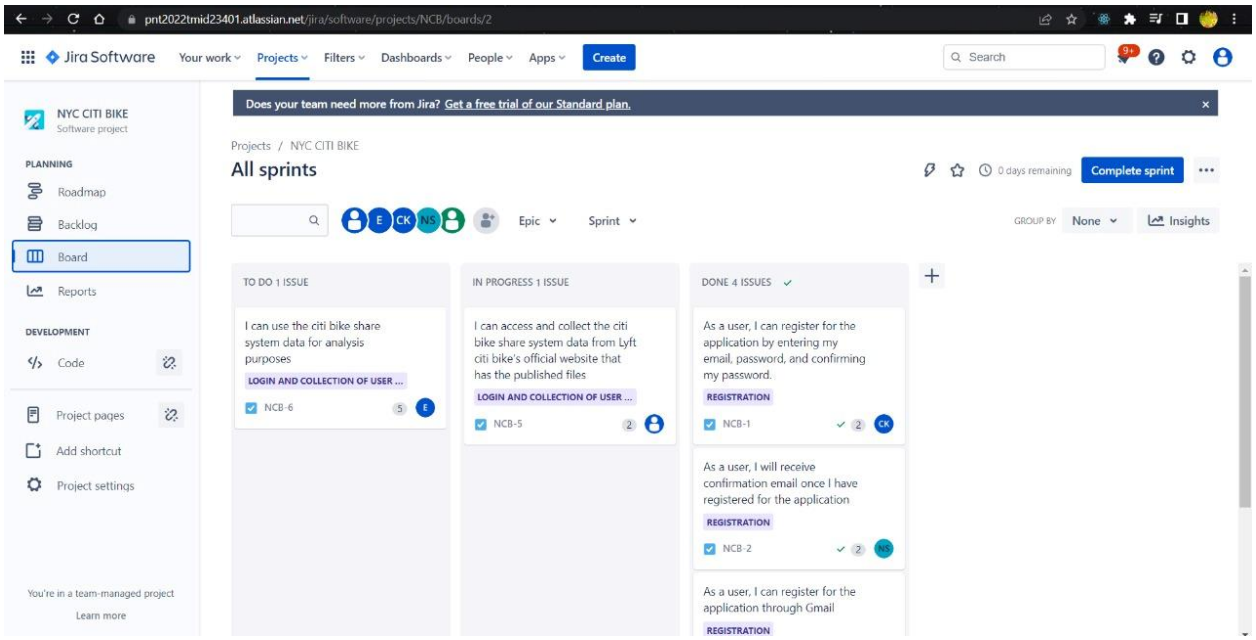
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
NYC CITI BIKE
Software project
PLANNING
Roadmap
Backlog
Board
Reports
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
You're in a team-managed project
Learn more
Does your team need more from Jira? Get a free trial of our Standard plan.
Projects / NYC CITI BIKE
Backlog
Epic
Insights
NCB Sprint 1 24 Oct – 29 Oct (3 issues)
Complete sprint
NCB-1 As a user, I can register for the application by entering my email, password, and confirming my password. REGISTRATION
NCB-2 As a user, I will receive confirmation email once I have registered for the application REGISTRATION
NCB-3 As a user, I can register for the application through Gmail REGISTRATION
DONE
+ Create issue
NCB Sprint 2 31 Oct – 5 Nov (3 issues)
NCB Sprint 3 7 Nov – 12 Nov (3 issues)
Start sprint
NCB Sprint 4 14 Nov – 19 Nov (4 issues)
Backlog (0 issues)
Create sprint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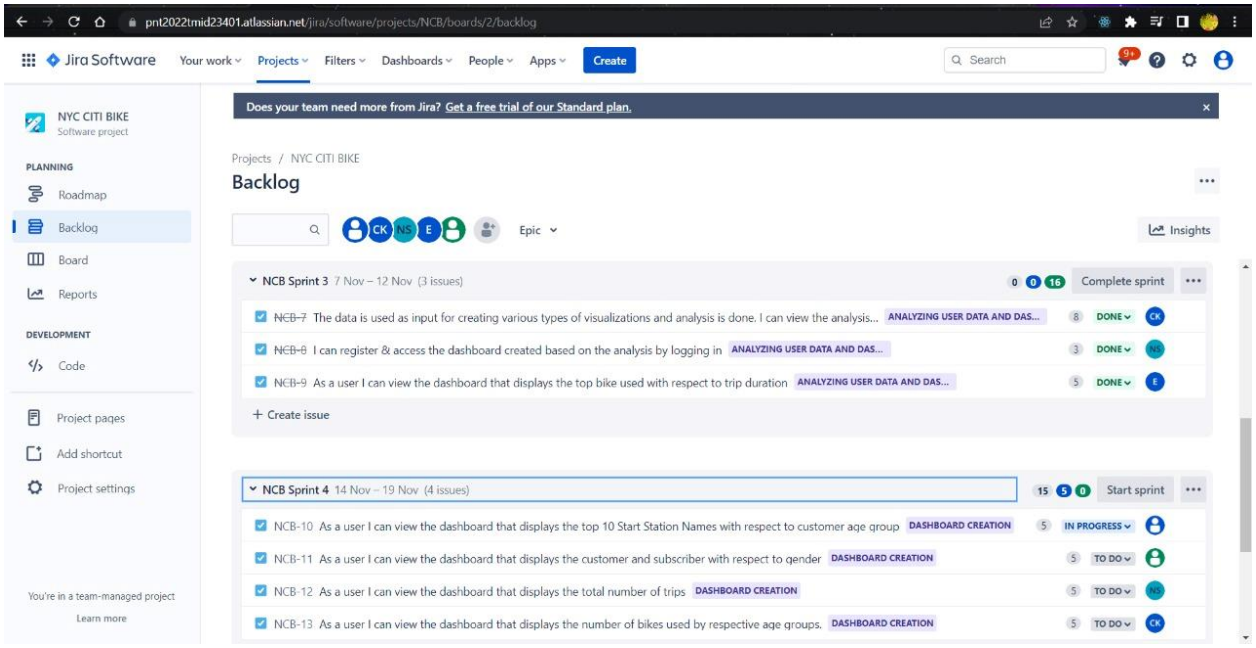
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
NYC CITI BIKE
Software project
PLANNING
Roadmap
Backlog
Board
Reports
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
You're in a team-managed project
Learn more
Does your team need more from Jira? Get a free trial of our Standard plan.
Projects / NYC CITI BIKE
All sprints
0 days remaining
Complete sprint
Epic
Sprint
GROUP BY
None
Insights
TO DO 1 ISSUE
I can use the citi bike share system data for analysis purposes
LOGIN AND COLLECTION OF USER ...
NCB-6
IN PROGRESS 1 ISSUE
I can access and collect the citi bike share system data from Lyft citi bike's official website that has the published files
LOGIN AND COLLECTION OF USER ...
NCB-5
DONE 4 ISSUES
As a user, I can register for the application by entering my email, password, and confirming my password.
REGISTRATION
NCB-1
As a user, I will receive confirmation email once I have registered for the application
REGISTRATION
NCB-2
As a user, I can register for the application through Gmail
REGISTRATION


pnt2022tmid23401.atlassian.net/jira/software/projects/NCB/boards/2/backlog
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
NYC CITI BIKE
Software project
PLANNING
Roadmap
Backlog
Board
Reports
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
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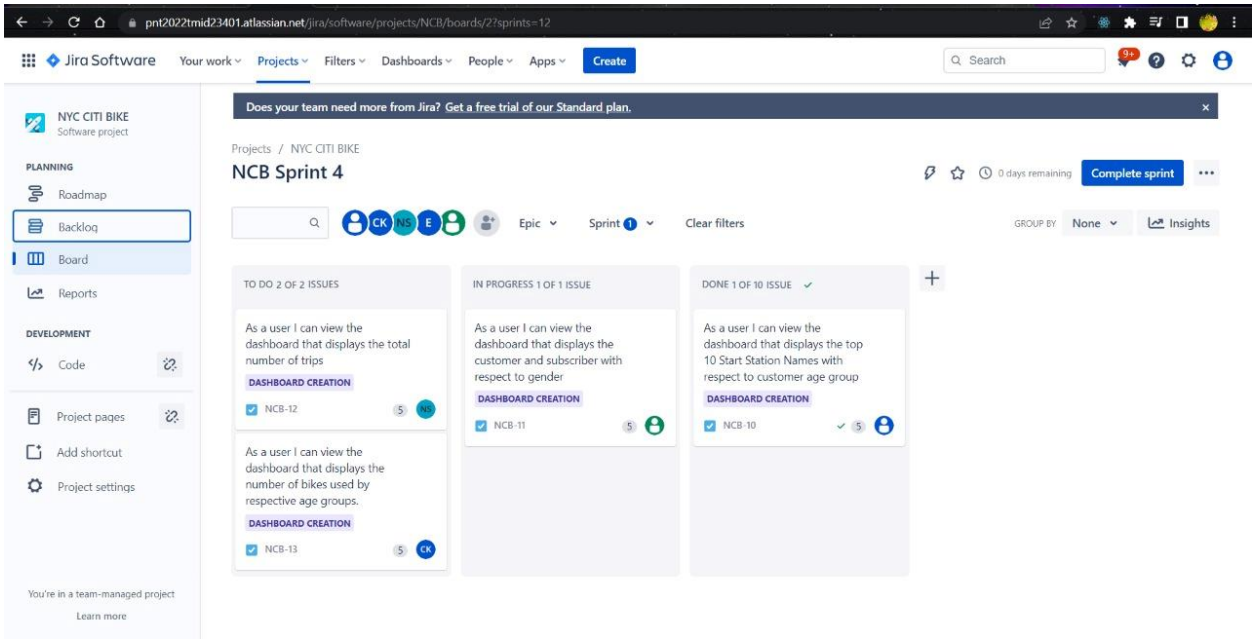
Projects / NYC CITI BIKE
Backlog
Epic
Insights
NCB Sprint 3 7 Nov – 12 Nov (3 issues)
Complete sprint
NCB-7 The data is used as input for creating various types of visualizations and analysis is done. I can view the analysis...
ANALYZING USER DATA AND DAS...
DONE
NCB-8 I can register & access the dashboard created based on the analysis by logging in
ANALYZING USER DATA AND DAS...
DONE
NCB-9 As a user I can view the dashboard that displays the top bike used with respect to trip duration
ANALYZING USER DATA AND DAS...
DONE
+ Create issue
NCB Sprint 4 14 Nov – 19 Nov (4 issues)
Start sprint
NCB-10 As a user I can view the dashboard that displays the top 10 Start Station Names with respect to customer age group
DASHBOARD CREATION
IN PROGRESS
NCB-11 As a user I can view the dashboard that displays the customer and subscriber with respect to gender
DASHBOARD CREATION
TO DO
NCB-12 As a user I can view the dashboard that displays the total number of trips
DASHBOARD CREATION
TO DO
NCB-13 As a user I can view the dashboard that displays the number of bikes used by respective age groups.
DASHBOARD CREATION
TO DO


pnt2022tmid23401.atlassian.net/jira/software/projects/NCB/boards/2?sprints=12
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
NYC CITI BIKE
Software project
PLANNING
Roadmap
Backlog
Board
Reports
DEVELOPMENT
Code
Project pages
Add shortcut
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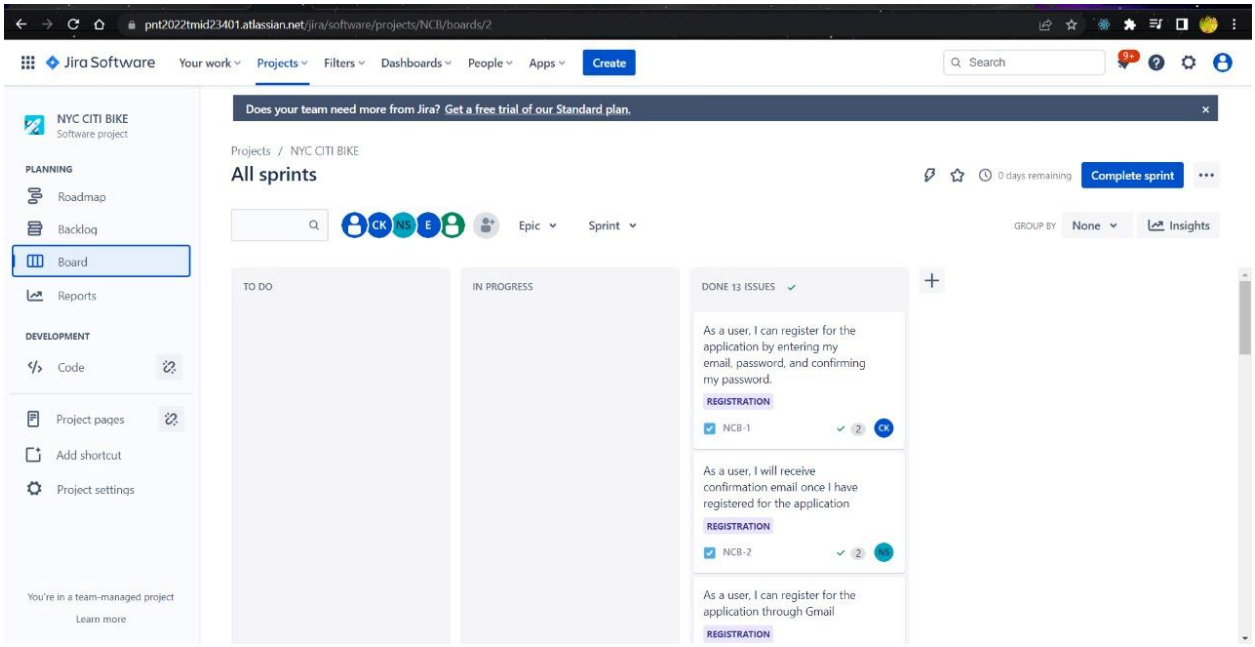
Projects / NYC CITI BIKE
NCB Sprint 4
0 days remaining
Complete sprint
Epic
Sprint 1
Clear filters
GROUP BY
None
Insights
TO DO 2 OF 2 ISSUES
As a user I can view the dashboard that displays the total number of trips
DASHBOARD CREATION
NCB-12
As a user I can view the dashboard that displays the number of bikes used by respective age groups.
DASHBOARD CREATION
NCB-13
IN PROGRESS 1 OF 1 ISSUE
As a user I can view the dashboard that displays the customer and subscriber with respect to gender
DASHBOARD CREATION
NCB-11
DONE 1 OF 10 ISSUE
As a user I can view the dashboard that displays the top 10 Start Station Names with respect to customer age group
DASHBOARD CREATION
NCB-10


pnt2022tmid23401.atlassian.net/jira/software/projects/NCB/boards/2
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
NYC CITI BIKE
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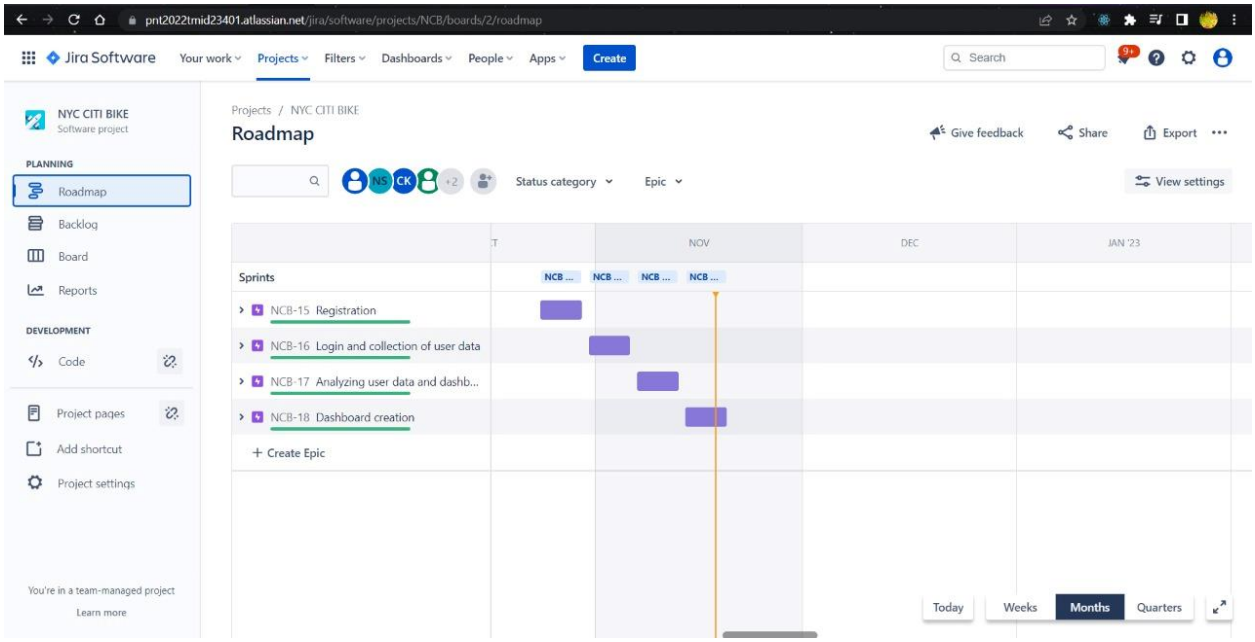
Projects / NYC CITI BIKE
All sprints
0 days remaining
Complete sprint
Epic
Sprint
GROUP BY
None
Insights
TO DO
IN PROGRESS
DONE 13 ISSUES
As a user, I can register for the application by entering my email, password, and confirming my password.
REGISTRATION
NCB-1
As a user, I will receive confirmation email once I have registered for the application
REGISTRATION
NCB-2
As a user, I can register for the application through Gmail
REGISTRATION


pnt2022tmid23401.atlassian.net/jira/software/projects/NCB/boards/2/roadmap
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
NYC CITI BIKE
Software project
PLANNING
Roadmap
Backlog
Board
Reports
DEVELOPMENT
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Project pages
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Projects / NYC CITI BIKE
Roadmap
Give feedback
Share
Export
Status category
Epic
View settings
NOV
DEC
JAN '23
Sprints
NCB-15 Registration
NCB-16 Login and collection of user data
NCB-17 Analyzing user data and dashb...
NCB-18 Dashboard creation
Create Epic
Today
Weeks
Months
Quarters

## 7.CODING & SOLUTIONING (Explain the features added in the project along with code)

### 7.1FEATURE

People use bike-share for various reasons. Some who would otherwise use their own bicyclehave concerns about theft or vandalism, parking or storage, and maintenanc**e.**

The Citi Bike System Data page describes the information provided. The specific information for each ride is:

- Trip Duration (seconds)
- Start Time and Date
- Stop Time and Date
- Start Station Name
- End Station Name
- Station ID
- Station Lat/Long
- Bike ID
- User Type (Customer = 24-hour pass or single ride user; Subscriber = Annual Member)
- Gender (Zero=unknown; 1=male; 2=female)
- Year of Birth

### 7.2FEATURE

### EASY INSTALLATION

- Stations install in under an hour
- Solar powered and wireless
- No digging or roadwork required

**BUSINESS PLAN**

◊ NYC Bike share pays for all system costs- revenues from users and sponsorship

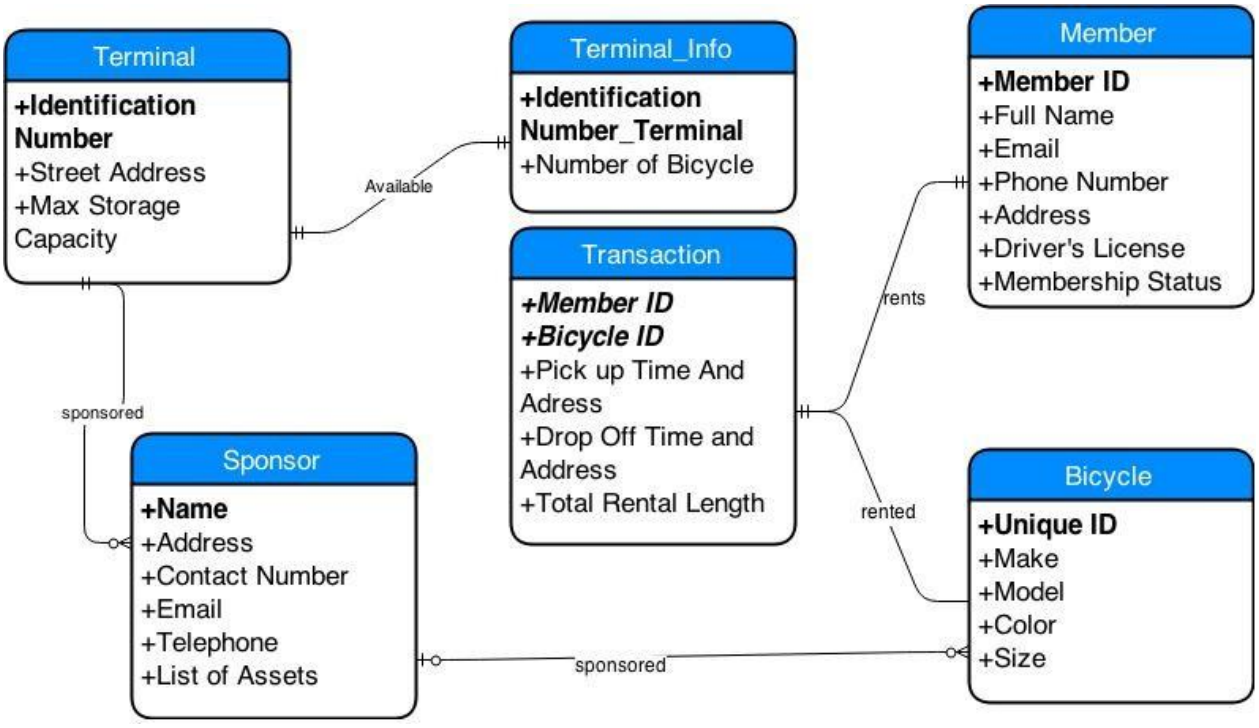
◊ Sponsorship in NYC is highly valued

◊ Profit split 50/50 between NYC Bike Share and the City

◊ Bike Share in NYC will help spread the word about safe, respectful cycling

## 7.3 DATABASE SCHEMA

The database schema is the structure of a database described in a formal language supported by the database management system. The term "schema" refers to the organization of data as a blueprint of how the database is constructed.



## 8.TESTING

Testing is the process of evaluating and verifying that a software product or application does what it is supposed to do. The benefits of testing include preventing bugs, reducing development costs and improving performance.

### 8.1 TEST CASES

Test case includes information such as test steps, expected results and data while a test scenario only includes the functionality to be tested.

- ◊ UI Test Cases for Bike
- ◊ Positive Test Cases for Bike
- ◊ Negative Test Cases for Bike

**UI Test Cases for Bike**

- ◊ Verify that design and dimension of the application are as per the specifications.
- ◊ Verify that the different colors used in the bike are of the correct shades as per thespecifications.
- ◊ Verify that the weight of the bike is as per the specifications.
- ◊ Check the material used in different parts of the bike – outer body, tires, seat, etc.

**Positive Test Cases for Bike**

- ◊ Check if the bike is of type electric start, manual start or both.
- ◊ Verify that the bike starts smoothly using the available options.
- ◊ Check the amount of force to kick-start the bike.

◊ Verify that bike runs smoothly and attain desired speed when accelerated.

◊ Verify that the maximum speed attained by bike is as per the specification.

**Negative Test Cases for Bike**

◊ Check if the bike starts when fuel other than prescribed fuel is filled in the bike.

◊ Check the condition of the bike when tires are filled with pressure less or more than specified.

◊ Check the condition of the bike when both the tires have different air pressure.

◊ Check the bike's condition when it is ridden at high speed on first gear only.

## 8.2 USER ACCEPTANCE TESTING

User Acceptance Testing (UAT), which is performed on most UIT projects, sometimes called beta testing or end-user testing, is a phase of software development in which the software is tested in the "real world" by the intended audience or business representative.

◊ Before product goes live.

◊ Done by end users.

◊ Fix usability issue.

◊ Ensures viable product.

**UAT test cases will look like this:**

◊ Are testers filling out the correct information in bike?

◊ Do they understand what's happening when being redirected to the in bike system?

| Resolution | Severity 1 | Severity 2 | Severity 3 | Severity 4 | Subtotal |
|---|---|---|---|---|---|
| By Design | 9 | 3 | 2 | 3 | 17 |
| Duplicate | 1 | 0 | 3 | 0 | 4 |
| External | 2 | 3 | 0 | 1 | 6 |
| Fixed | 11 | 2 | 4 | 20 | 37 |
| Not Reproduced | 0 | 0 | 1 | 0 | 1 |
| Skipped | 0 | 0 | 1 | 1 | 2 |
| Won't Fix | 0 | 5 | 2 | 1 | 8 |
| Totals | 23 | 13 | 13 | 26 | 75 |

# 9.RESULTS

## 9.1 PERFORMANCE METRICS

The main metrics are used to judge the performance of bikeshare systems: average number of daily uses per bike and average daily trips per resident (of the coverage area). These two metrics tend to have an inverse relationship.

A system with a low number of bikes could have high per-bike usage because demand is high, but fail to meet that demand and therefore have a lower number of trips per resident. On the other hand, a system could have a high number of trips per resident but also a very high number of bikes, and therefore a low number of trips per bike.

Both of these extremes are inefficient; a sustainable system should find a balance of having just enough bikes to satisfy demand with around 4 daily trips per bike share system.

**Average daily trips per bike**

Target: 4-8 daily uses per bike

Turnover is critical to a successful bikeshare system, and this metric gets at how efficiently thebikes are being used. Fewer than four daily uses per bike can result in financial unsustainability for the operator (i.e., user fees not able to cover cost to operate each bike), while more than eight daily uses can indicate limited bike availability, especially during peak hours. New York City (6.4), Barcelona (6.4), Mexico City (5.4), and Guangzhou (5.0) showed solid daily usage numbers in 2017.

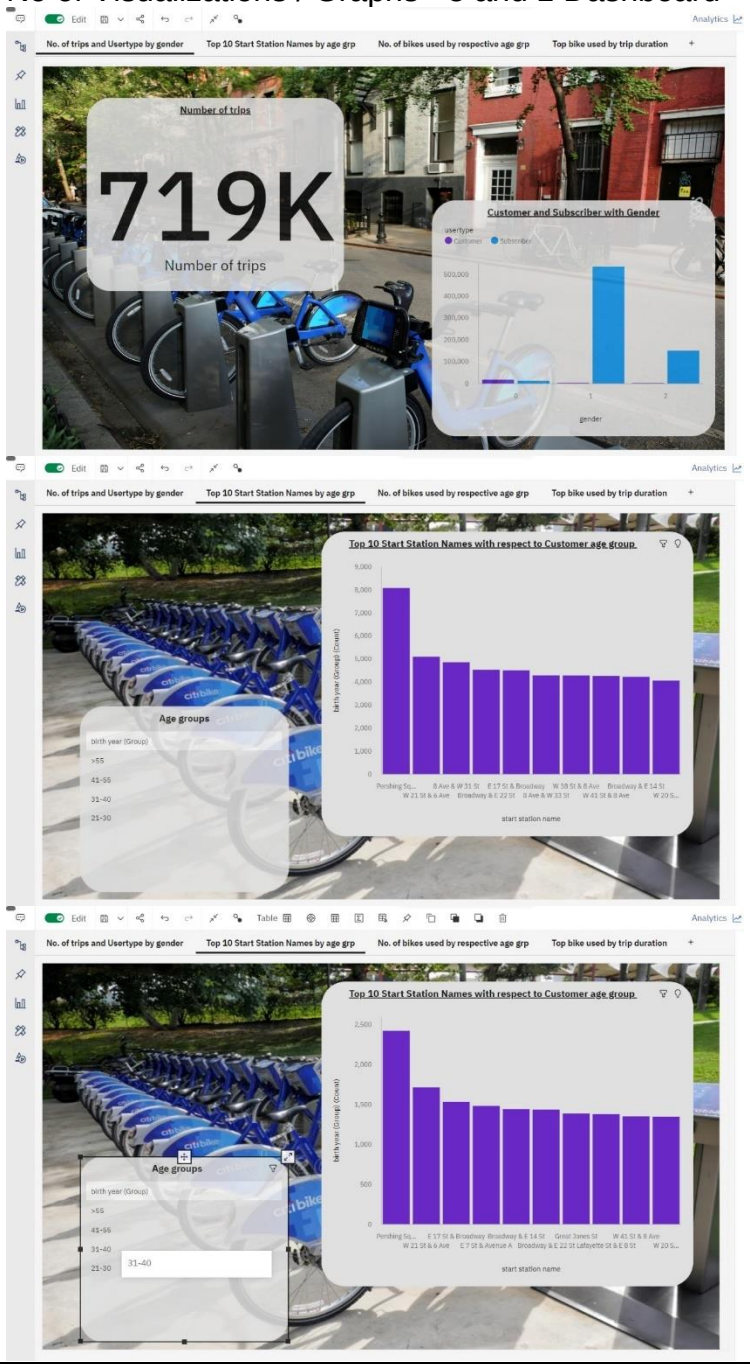
**Average daily trips per 1,000 residents (in service area)**

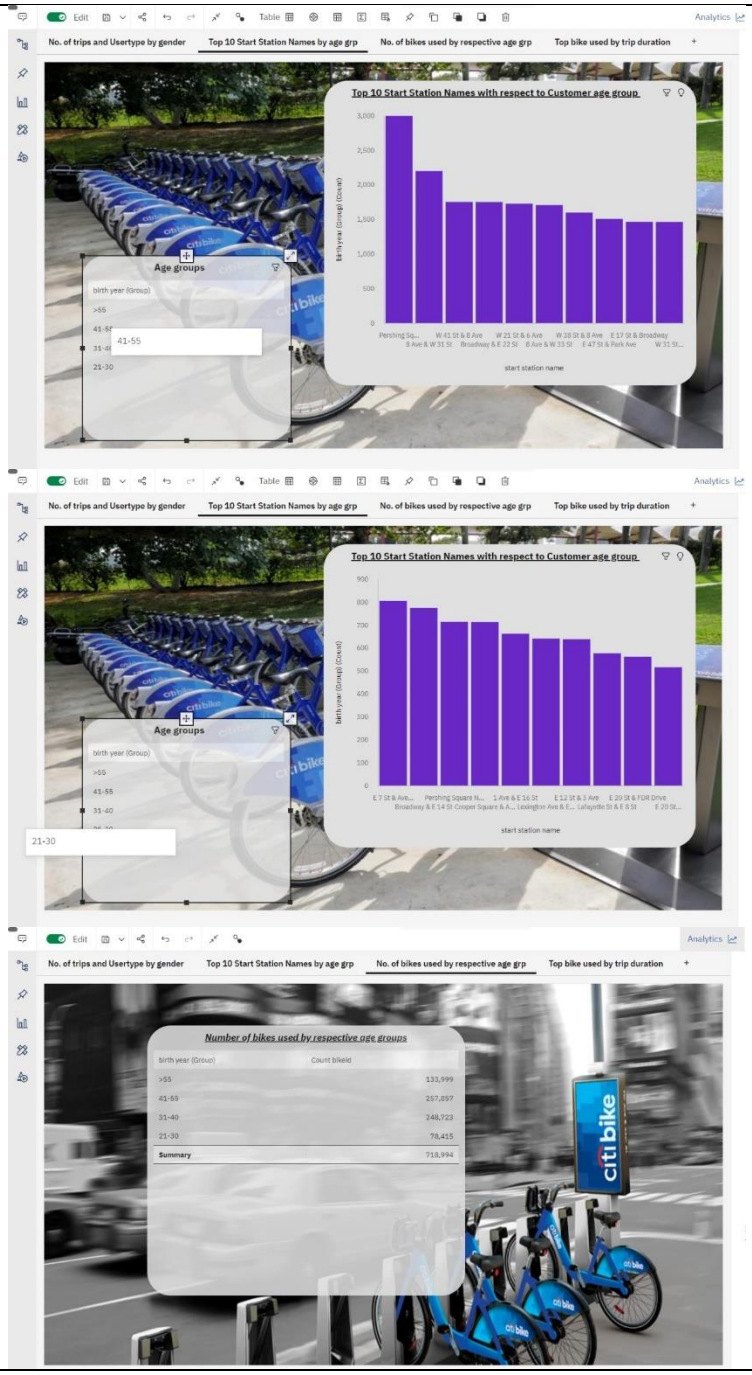
Target: city-generated, improvement over time

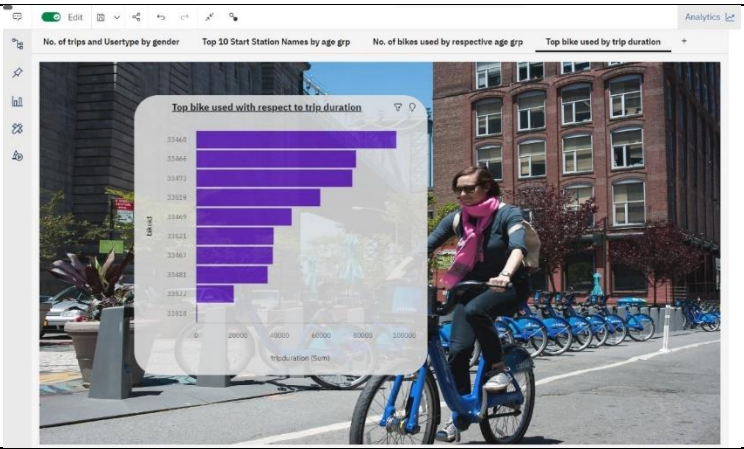
This is a metric of market penetration, that is, how many people in the service area are using the system. A high number of uses spread across residents in the service area is key the increasing bicycle mode share, decreasing vehicle and transit network congestion, and promoting safe, clean, healthy modes of transport.

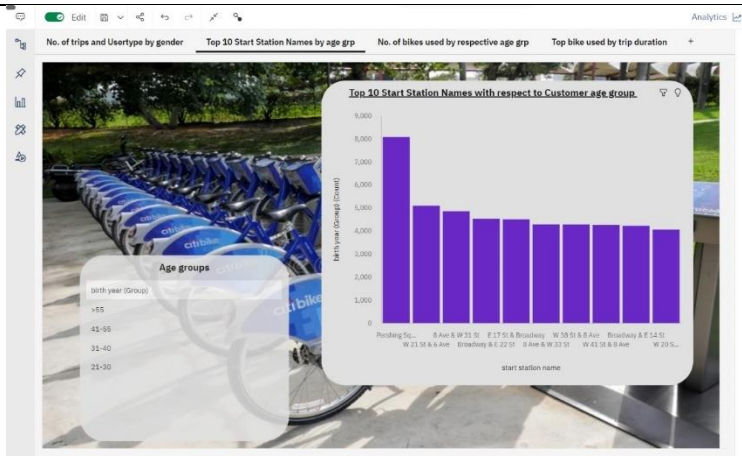
Trips per 1,000 residents should be monitored as the system matures, with the goal of increasing market penetration over time (a more prescriptive target for annual improvement in market penetration could be created from baseline trip numbers). An increase in trips per 1,000 residents indicates more trips being taken by bike, and can help to evaluate progress toward citywide mode shift goals.

**Model Performance Testing:**

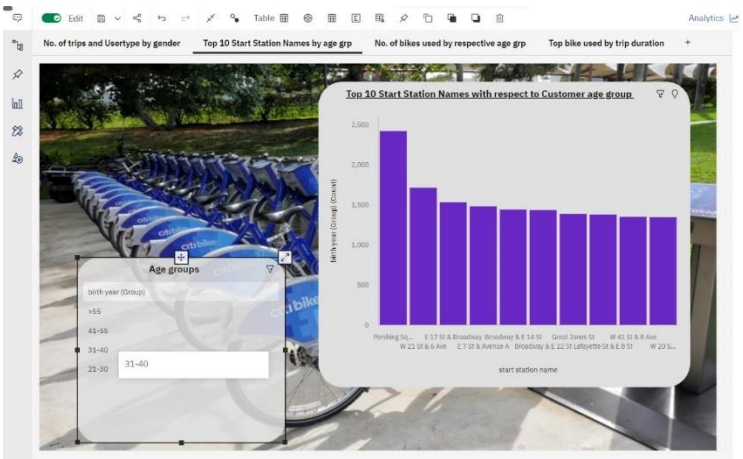
| S.No. | Parameter | Screenshot / Values |
|---|---|---|
| 1. | Dashboard design | No of Visualizations / Graphs - 5 and 1 Dashboard   |

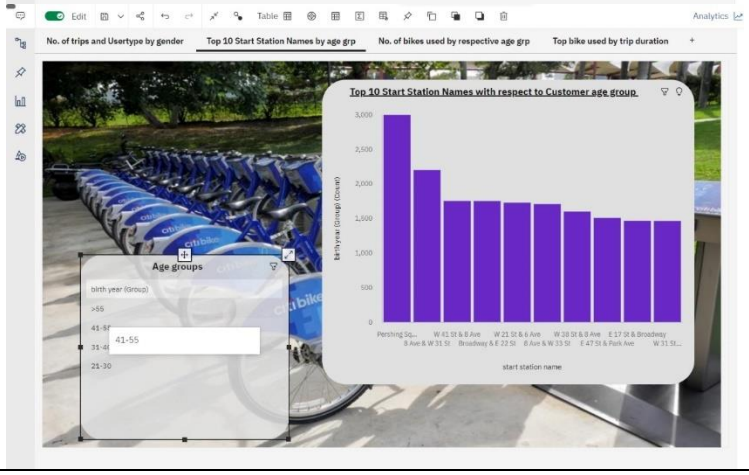

Edit
Table
Analytics
No. of trips and Usertype by gender
Top 10 Start Station Names by age grp
No. of bikes used by respective age grp
Top bike used by trip duration
Top 10 Start Station Names with respect to Customer age group
Age groups
birth year (Group)
>55
41-55
31-40
21-30
start station name
Edit
Table
Analytics
No. of trips and Usertype by gender
Top 10 Start Station Names by age grp
No. of bikes used by respective age grp
Top bike used by trip duration
Top 10 Start Station Names with respect to Customer age group
Age groups
birth year (Group)
>55
41-55
31-40
21-30
start station name
Edit
Analytics
No. of trips and Usertype by gender
Top 10 Start Station Names by age grp
No. of bikes used by respective age grp
Top bike used by trip duration
Number of bikes used by respective age groups
birth year (Group)
Count bikeid
>55 133,999
41-55 257,897
31-40 248,723
21-30 78,415
Summary 718,994
citi bike

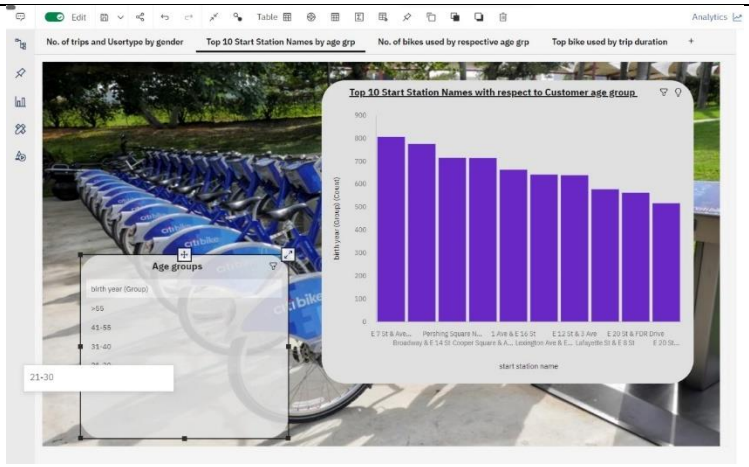
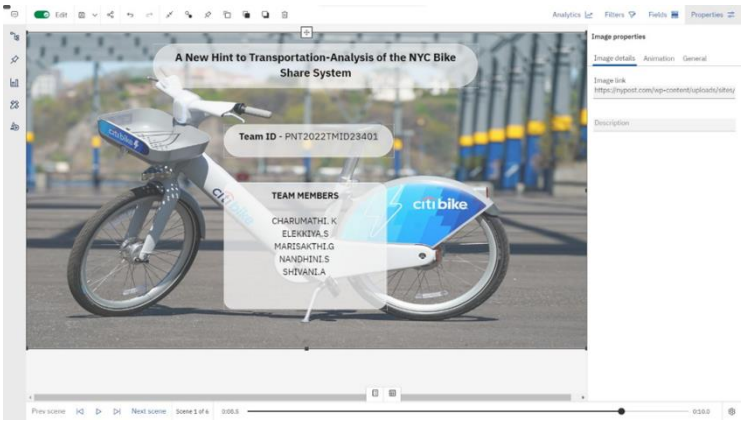
| | | |
|---|---|---|
| | |  |
| 2. | Data Responsiveness | Yes. It is responsive. It can tackle changing needs, preferences and behavior, reduces risk and can scale on-demand.<br>data we're working with and give a brief overview of what each feature represents or should represent<br>1. Trip Duration (seconds) — How long a trip lasted<br>2. Start Time and Date<br>3. Stop Time and Date<br>4. Start Station Name<br>5. End Station Name<br>6. Station ID - Unique identifier for each station<br>7. Station Lat/Long - Coordinates<br>8. Bike ID - unique identifier for each bike<br>9. User Type (Customer = 24-hour pass or 3-day pass user; Subscriber = Annual Member) - Customers are usually tourists, subscribers are usually NYC residents<br>10. Gender (Zero=unknown; 1=male; 2=female) - Usually unknown for customers since they often sign up at a kiosk<br>11. Year of Birth - Self-entered, not validated by an ID.<br>An interactive dashboard, story, and report is created in the end |
| 3. | Amount Data to Rendered (DB2 Metrics) | 718994 rows of data is used |
| 4. | Utilization of Data Filters | **Without age group filter:** |

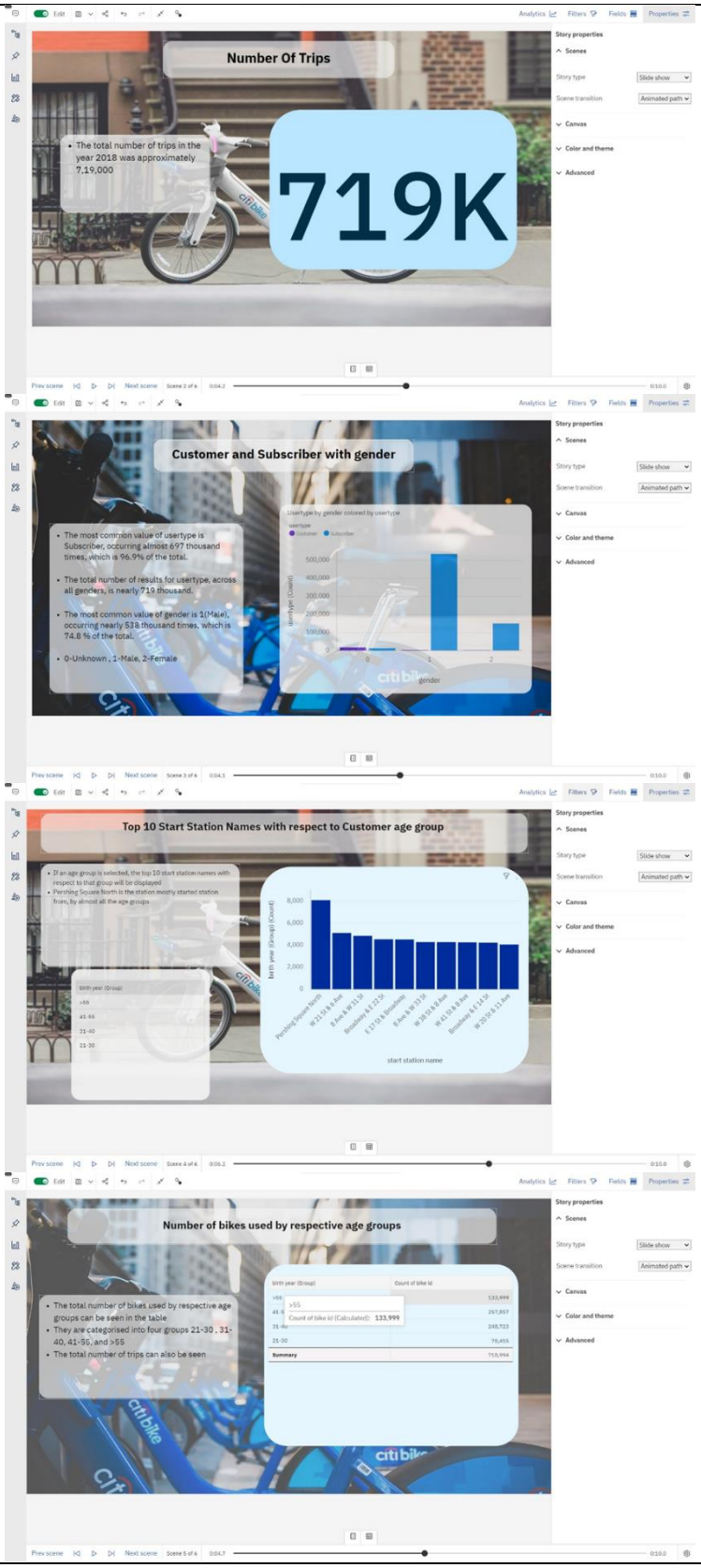


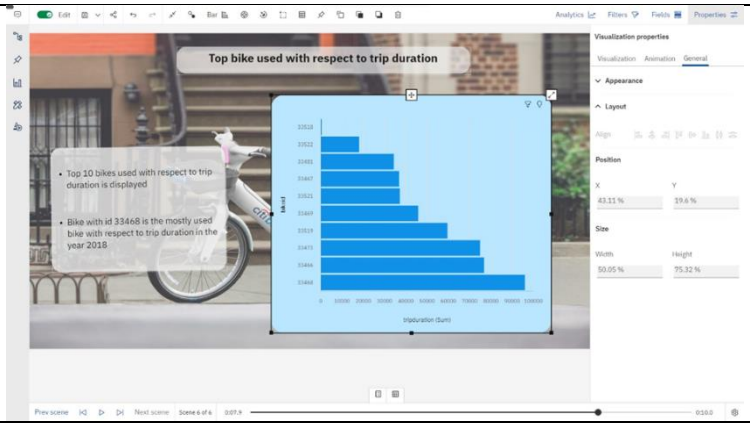
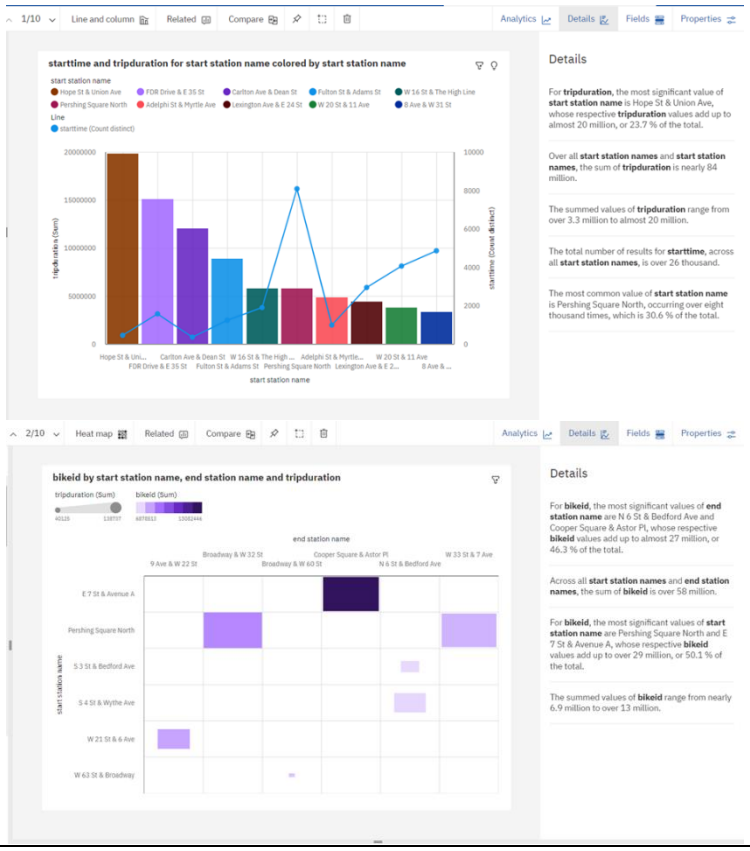

## With age group filter:

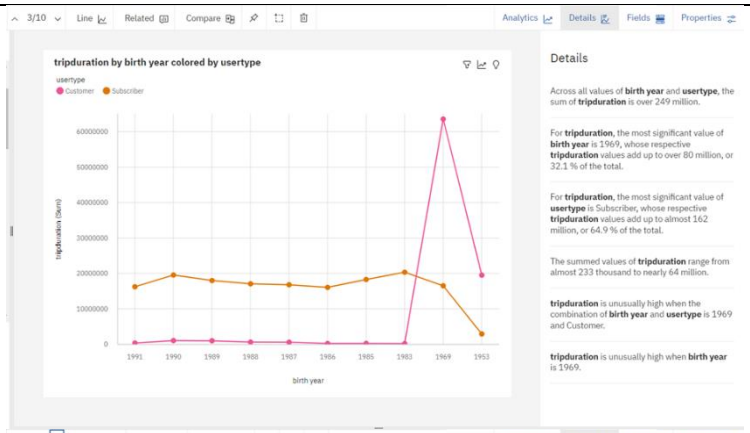


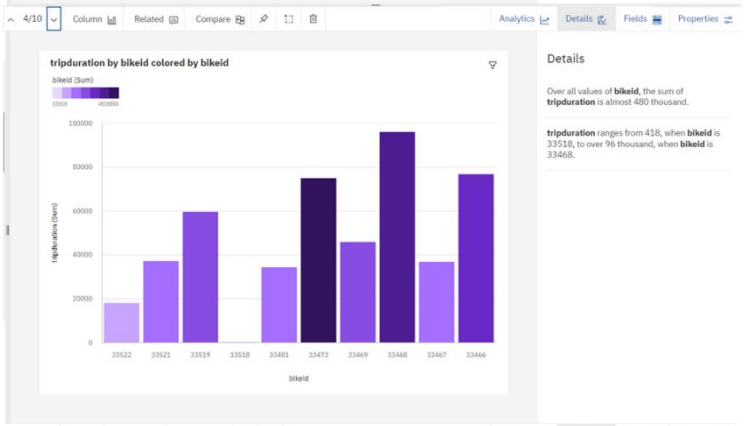



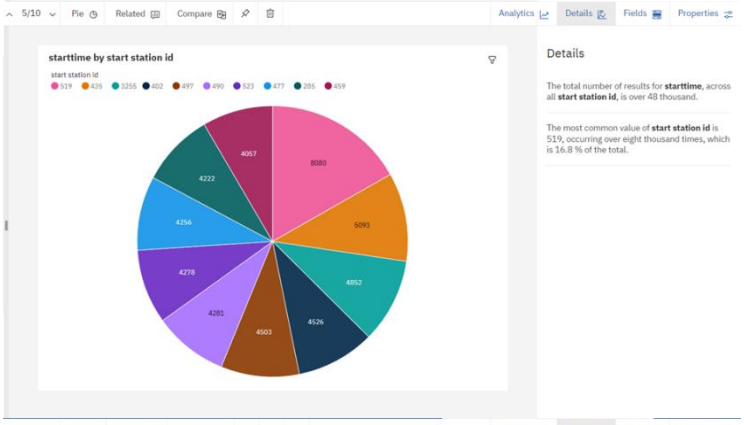
| | | |
|---|---|---|
| | |  <br>  <br>Sorting by ascending, descending, top or bottom etc and other data filters were also used |
| 5. | Effective User Story | No of Scenes Added - 6<br>  |

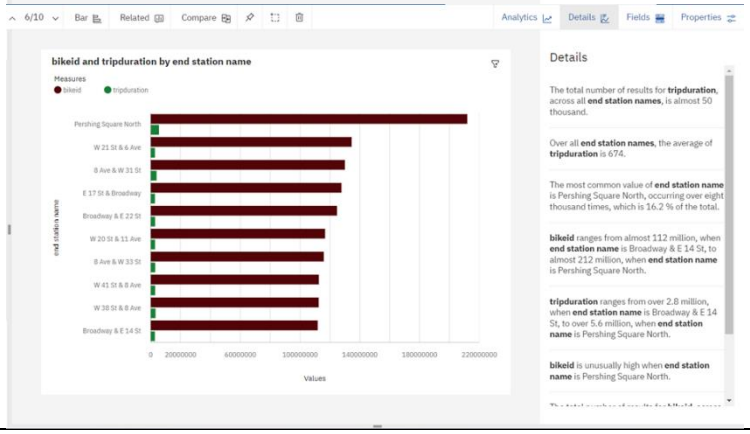

Number Of Trips
• The total number of trips in the year 2018 was approximately 7,19,000
719K
Customer and Subscriber with gender
• The most common value of usertype is Subscriber, occurring almost 697 thousand times, which is 96.9% of the total.
• The total number of results for usertype, across all genders, is nearly 719 thousand.
• The most common value of gender is 1(Male), occurring nearly 538 thousand times, which is 74.8 % of the total.
• 0-Unknown , 1-Male, 2-Female
Top 10 Start Station Names with respect to Customer age group
• If an age group is selected, the top 10 start station names with respect to that group will be displayed
• Pershing Square North is the station mostly started station from, by almost all the age groups
Number of bikes used by respective age groups
• The total number of bikes used by respective age groups can be seen in the table
• They are categorised into four groups 21-30 , 31-40, 41-55, and >55
• The total number of trips can also be seen

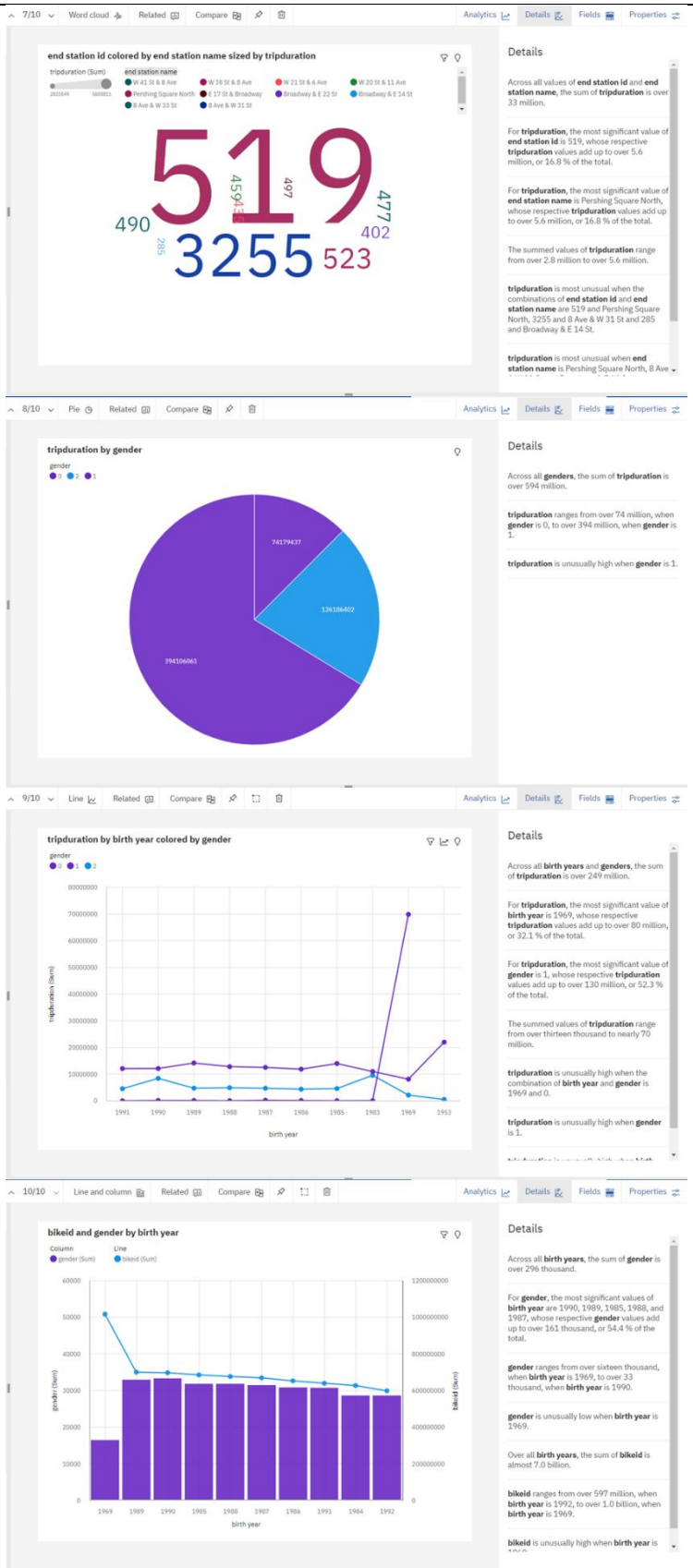
| | | |
|---|---|---|
| | |  |
| 6. | Descriptive Reports | No of Visualizations / Graphs - 10<br>  |


3/10
Line
Related
Compare
Analytics
Details
Fields
Properties
tripduration by birth year colored by usertype
usertype
Customer
Subscriber
tripduration (Sum)
birth year
Details
Across all values of birth year and usertype, the sum of tripduration is over 249 million.
For tripduration, the most significant value of birth year is 1969, whose respective tripduration values add up to over 80 million, or 32.1 % of the total.
For tripduration, the most significant value of usertype is Subscriber, whose respective tripduration values add up to almost 162 million, or 64.9 % of the total.
The summed values of tripduration range from almost 233 thousand to nearly 64 million.
tripduration is unusually high when the combination of birth year and usertype is 1969 and Customer.
tripduration is unusually high when birth year is 1969.


4/10
Column
Related
Compare
Analytics
Details
Fields
Properties
tripduration by bikeid colored by bikeid
bikeid (Sum)
tripduration (Sum)
bikeid
Details
Over all values of bikeid, the sum of tripduration is almost 480 thousand.
tripduration ranges from 418, when bikeid is 33518, to over 96 thousand, when bikeid is 33468.


5/10
Pie
Related
Compare
Analytics
Details
Fields
Properties
starttime by start station id
start station id
Details
The total number of results for starttime, across all start station id, is over 48 thousand.
The most common value of start station id is 519, occurring over eight thousand times, which is 16.8 % of the total.


6/10
Bar
Related
Compare
Analytics
Details
Fields
Properties
bikeid and tripduration by end station name
Measures
bikeid
tripduration
Pershing Square North
W 21 St & 6 Ave
8 Ave & W 31 St
E 17 St & Broadway
Broadway & E 22 St
W 20 St & 11 Ave
8 Ave & W 33 St
W 41 St & 8 Ave
W 38 St & 8 Ave
Broadway & E 14 St
Values
Details
The total number of results for tripduration, across all end station names, is almost 50 thousand.
Over all end station names, the average of tripduration is 674.
The most common value of end station name is Pershing Square North, occurring over eight thousand times, which is 16.2 % of the total.
bikeid ranges from almost 112 million, when end station name is Broadway & E 14 St, to almost 212 million, when end station name is Pershing Square North.
tripduration ranges from over 2.8 million, when end station name is Broadway & E 14 St, to over 5.6 million, when end station name is Pershing Square North.
bikeid is unusually high when end station name is Pershing Square North.


7/10
Word cloud
Related
Compare
Analytics
Details
Fields
Properties
end station id colored by end station name sized by tripduration
tripduration (Sum)
end station name
W 41 St & 8 Ave
W 38 St & 8 Ave
W 21 St & 6 Ave
W 20 St & 11 Ave
Pershing Square North
E 17 St & Broadway
Broadway & E 22 St
Broadway & E 14 St
8 Ave & W 33 St
8 Ave & W 31 St
519
490
497
459
477
402
3255
285
523
Details
Across all values of end station id and end station name, the sum of tripduration is over 33 million.
For tripduration, the most significant value of end station id is 519, whose respective tripduration values add up to over 5.6 million, or 16.8 % of the total.
For tripduration, the most significant value of end station name is Pershing Square North, whose respective tripduration values add up to over 5.6 million, or 16.8 % of the total.
The summed values of tripduration range from over 2.8 million to over 5.6 million.
tripduration is most unusual when the combinations of end station id and end station name are 519 and Pershing Square North, 3255 and 8 Ave & W 31 St and 285 and Broadway & E 14 St.
tripduration is most unusual when end station name is Pershing Square North, 8 Ave
8/10
Pie
Related
Compare
Analytics
Details
Fields
Properties
tripduration by gender
gender
0
2
1
74179437
126186402
394106061
Details
Across all genders, the sum of tripduration is over 594 million.
tripduration ranges from over 74 million, when gender is 0, to over 394 million, when gender is 1.
tripduration is unusually high when gender is 1.
9/10
Line
Related
Compare
Analytics
Details
Fields
Properties
tripduration by birth year colored by gender
gender
0
1
2
80000000
70000000
60000000
50000000
40000000
30000000
20000000
10000000
0
tripduration (Sum)
1991
1990
1989
1988
1987
1986
1985
1983
1969
1953
birth year
Details
Across all birth years and genders, the sum of tripduration is over 249 million.
For tripduration, the most significant value of birth year is 1969, whose respective tripduration values add up to over 80 million, or 32.1 % of the total.
For tripduration, the most significant value of gender is 1, whose respective tripduration values add up to over 130 million, or 52.3 % of the total.
The summed values of tripduration range from over thirteen thousand to nearly 70 million.
tripduration is unusually high when the combination of birth year and gender is 1969 and 0.
tripduration is unusually high when gender is 1.
10/10
Line and column
Related
Compare
Analytics
Details
Fields
Properties
bikeid and gender by birth year
Column
gender (Sum)
Line
bikeid (Sum)
60000
50000
40000
30000
20000
10000
0
gender (Sum)
1200000000
1000000000
800000000
600000000
400000000
200000000
0
bikeid (Sum)
1969
1989
1990
1985
1988
1987
1986
1991
1984
1992
birth year
Details
Across all birth years, the sum of gender is over 296 thousand.
For gender, the most significant values of birth year are 1990, 1989, 1985, 1988, and 1987, whose respective gender values add up to over 161 thousand, or 54.4 % of the total.
gender ranges from over sixteen thousand, when birth year is 1969, to over 33 thousand, when birth year is 1990.
gender is unusually low when birth year is 1969.
Over all birth years, the sum of bikeid is almost 7.0 billion.
bikeid ranges from over 597 million, when birth year is 1992, to over 1.0 billion, when birth year is 1969.
bikeid is unusually high when birth year is

## 10.ADVANTAGES AND DISADVANTAGES

## ADVANTAGES

### 1. Convenient Mode of Transportation

The most common benefit of this program is its accessibility. If you are fond of cycling, you will find this method helpful as there are numerous systems just about everywhere for you to use.Bigger cities are supporting the use of bike-sharing. This is why it is common to find bike- sharing systems in downtown areas. Driving a car through congested avenues can be frustrating and irritating. This makes bike sharing very convenient.

### 2. Healthy Method for Traveling

Wellness, fitness, and health are an essential part of your life. You should care about what you consume and what your daily activity is. Bike-sharing systems can help and encourage you to live a better and healthier life. They help you stay in shape even when you are away from homevacationing.

### 3. Environmental Benefits

Maintaining a clean environment is as important as maintaining your health. Living in a heavily polluted environment can cause various health issues. Bikes do not release greenhouse gases, unlike buses and cars. So, if you are renting a bike from a bike-sharing system, you reduce the carbon footprint and take measures to keep your environment safe.

## DISADVANTAGES

### 1. Congestion in the Users of Bike Sharing

As bike-sharing systems can help you travel throughout the city, they do not exist in infinite numbers. Waiting can be annoying if the bike is not available. You may face this problem duringpeak hours.

### 2. A Helmet is a Requirement

When you are planning to ride a bike, you need to keep safety measures in your mind. Therefore, wearing a helmet is essential. Some bike sharing systems may require you to use a helmet butmight not provide them for you. Sometimes you will need to bring your own which can be a hassle.

### 3. Bikes Are Not Clean

Shared bikes can be unhygienic as many people have probably used it before you. The seat andhandlebars are a particularly high-traffic area for germs, so cleanliness is always a concern.

## 11.CONCLUSION

Bicycle sharing systems can be the new boom in India, with use of various prediction models the ease of operations will be increased. The four algorithms are applied on the bikeshare dataset for predicting the count of bicycles that will be rented per hour. We got some good results and accuracy with random forest and by using Tune RF function with the original random forest algorithm. The accuracy and performance has been compared between the models using Root Mean Squared Logarithmic Error (RMSLE).
If these systems include the use of analytics the probability of building a successful system will increase.

## 12.FUTURE SCOPE

One aspect of the data that I did not explore in great detail is the intra-day variation in usage of the system. This is also a key aspect that bike share system operators are interested in because knowing the variation in demand on an hourly basis is another very useful metric for identifying the times of the day when the need for artificial rebalancing is maximum.

Additionally, this work will feed into a larger study calculating the life cycle environmental impacts of a bikeshare system and its ability to substitute other modes of transit with the aim of reducing the overall Greenhouse gas (GHG) emissions due to transportation.

## 13.APPENDIX

### Research Methodology and Framework Methodology and Data Sources

Using spatial data primarily from the United States Census54 and New York City's Department of Information Technology & Telecommunications,55 ridership and station activity data from New York City Department of Transportation and NYC Bike Share, LLC,56 and station location data from NYC Bike Share, LLC, this study used ArcGIS software57 to analyze and show connections between Citi Bike and public transit. Data from Divvy Bikes,58 Chicago Open Data Portal,59 Capital Bike Share,60 the District Department of Transportation,61 Hubway,62 the Massachusetts Bay Transportation Authority,63 Nice Ride,64 and MetroGIS65 allowed for comparisons in station coverage area and station density in New York City, Chicago, Washington, DC, and Minneapolis/St. Paul. Researchers conducted interviews with New York City Department Transportation and NYC Bikeshare LLC staff.

### Framework

We examine connections between New York City's bike share program, Citi Bike, and the previously existing transportation options in New York City. After observing the system's success in its first year of operation, this study analyzes connections between bike share stations and from stations to transit options. New York City's bike share system offers a solution to the "last mile"66 problem, the problem of getting riders short distances, under a mile, to and from transit stations. A key component of this "last mile" analysis came through calculating the number of Citi Bike stations with 100, 200, 500, and 1320 feet67 of subway station entrances and comparing the proximity and density of bike share stations in New York City, Washington, DC, Chicago, Boston, and Minneapolis/St. Paul.

**Source Code**

***Home.html***

```
<!DOCTYPE html>
<html lang="en" dir="ltr">
  <head>
    <meta charset="utf-8" />
    <title>
      A New Hint to Transportation-Analysis of the NYC Bike Share System
    </title>
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <link
      href="https://unpkg.com/boxicons@2.1.2/css/boxicons.min.css"
      rel="stylesheet"
    />
    <style>
      @import
url("https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600&display=swap");

      * {
        padding: 0;
        margin: 0;
      }

      body {
        box-sizing: border-box;
        font-family: "Poppins", sans-serif;
        background: -webkit-linear-gradient(
          right,
          rgb(201, 211, 224),
          rgb(255, 255, 255)
        );
      }
```

```
#team-details {
  margin-top: 90px;
  text-align: center;
  text-transform: uppercase;
  margin-bottom: 80px;
}

#team-details h3 {
  text-decoration-line: underline;
}

#main-content {
  margin-left: 30px;
  margin-right: 30px;
}

ul {
  list-style-type: none;
  padding: 5px;
  background-color: rgb(34, 39, 63);
  position: fixed;
  top: 0;
  width: 100%;
  box-shadow: 2px 3px 20px 3px rgb(74, 74, 74);
}

li {
  float: left;
  display: flex;
  justify-content: center;
  align-items: center;
  text-decoration: none;
  transition: all 0.5s cubic-bezier(0.68, -0.55, 0.265, 1.55);
```

```
  margin-right: 12px;
}

li a {
  display: block;
  color: rgb(246, 239, 239);
  text-align: center;
  padding: 10px 10px;
  text-decoration: none;
}

li a:hover {
  border-radius: 12px;
}

li:last-child {
  float: right;
  margin-right: 30px;
}

#ibm-button button {
  border-radius: 20px;
  border: none;
  transition: 0.4s;
}

#ibm-button a {
  color: rgb(34, 39, 63);
  padding-left: 25px;
  padding-right: 25px;
}

#ibm-button button:hover {
  transform: scale(1.07);
```

```
    }
  </style>
</head>
<body>
  <ul>
    <li>
      <a class="active" href="Home.html"><strong>Home</strong></a>
    </li>
    <li>
      <a href="dashboard.html"><strong>Dashboard</strong></a>
    </li>
    <li>
      <a href="Report.html"><strong>Report</strong></a>
    </li>
    <li>
      <a href="Stories.html"><strong>Story</strong></a>
    </li>
    <li id="ibm-button">
      <button>
        <a
          href="https://eu1.ca.analytics.ibm.com/bi/?perspective=home"
          target="_blank"
          ><strong>IBM LOGIN</strong></a
        >
      </button>
    </li>
  </ul>

  <div id="team-details">
    <h1>
      A New Hint to Transportation-Analysis of the NYC Bike Share System
    </h1>
    <br />
    <h2>
```

```
    <strong style="text-align: center">Team ID:</strong>
    <strong>PNT2022TMID23401</strong>
  </h2>
  <br />
  <h3><strong>Team Members</strong></h3>
  <strong>Charumathi K<br /></strong>
  <strong>Elekkiya S<br /></strong>
  <strong>Marisakthi G<br /></strong>
  <strong>Nandhini S<br /></strong>
  <strong>Shivani A<br /></strong>
</div>
<br />
<div id="main-content">
  <h2>Introduction</h2>
  <br />
  <p>
    Bike share programs have risen in popularity in recent years and have
    been promoted as a lower carbon alternative to other forms of transit.
    Interest in bicycle sharing has been growing exponentially over the past
    decade, resulting in a proliferation of bike share systems in many
    cities across the world. This can be largely attributed to the
    successful incorporation of information technology in docking stations
    and mobile devices as well as improved logistics such as bicycle
    rebalancing to ensure responsive supply management. Cities often hope
    bike sharing will bring many benefits such as extending the reach of
    transit, substituting motorized trips, and encourage non-cyclists to try
    cycling.
  </p>
  <br />
  <p>
    The premise of bicycle sharing is that it is a short-term bike rental
    system, based on varying timed memberships. Members of the bike share
    network have access to stations, comprised of a pay-station and multiple
    bike docks, across the system where bikes can be checked out from one
```

station and returned to another nearest to their destination. The appeal of membership is 24/7 access to an automated bike rental network and utility of bikes without the worry of storage or maintenance. The price system is set to encourage shorter trips, with additional fees for any time used over that maximum. There is evidence that bike share users switch to bike share from motorized transport, such as bus and auto creating the potential for significant reductions in transportation related greenhouse gas or CO2 emissions.

<br /><br />

<h2>Project Description</h2>

<br />

Citi Bike must know how much increase or decrease they might see in supply and demand for their service in the future. Therefore, this analysis is made to provide an answer to this problem.By this analysis, they can gain a better understanding about the system.This analysis provides many benefits such as it measures data like distance, and helps with tasks such as route planning, expansion of the bicycle sharing system, manufacturing of desired bikes etc.<br /><br />It makes use of the available dataset precisely and gives accurate data visualizations that can be used to improve the citi bike sharing system.<br /><br />As more data becomes available, particularly in other areas with identically comprehensive bike sharing systems, a clearer picture of the role of this transport mode in these emergency situations can be better evaluated by this analysis and provide results with an increased accuracy.

<br /><br />

<h2>Project Objectives</h2>

<br />

By the end of this project, one will:

<br />

1.Know the fundamental concepts and can work on IBM Cognos Analytics

2.Gain a broad understanding of plotting different graphs
3.Be able to create meaningful dashboards

<br /><br />
<h2>Goal</h2>
<br />

The goal of this analysis is to create an operating report of Citi Bike for the year 2018. The following data visualizations are created to understand the report

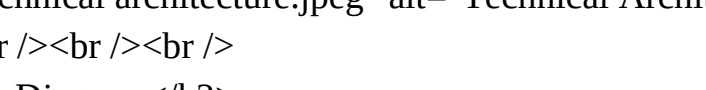
<br />
1.Total Number of Trips

2.What is Customer and subscriber with gender

3.Find the top bike used with respect to trip duration?

4.Calculating the number of bikes used by respective age groups

5.Top 10 Start Station Names with respect to Customer age group
<br /><br />
<h2>Solution architecture</h2>
<br />

<br /><br /><br /><br />
<h2>Technical architecture</h2>
<br />

<br /><br /><br /><br />
<h2>Data Flow Diagram</h2>

```
      <br />
      <img src="./Data flow diagram.jpeg" alt="Data flow diagram" />
    </div>
  </body>
</html>
```

***Dashboard.html***

```
<!DOCTYPE html>
<html lang="en" dir="ltr">
  <head>
    <meta charset="utf-8" />
    <title>
      A New Hint to Transportation-Analysis of the NYC Bike Share System
    </title>
    <link rel="stylesheet" href="#" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <link
      href="https://unpkg.com/boxicons@2.1.2/css/boxicons.min.css"
      rel="stylesheet"
    />
    <style>
      @import
url("https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600&disp
lay=swap");

      * {
        padding: 0;
        margin: 0;
      }

      body {
        box-sizing: border-box;
        font-family: "Poppins", sans-serif;
        background: -webkit-linear-gradient(
```

```
    right,
    rgb(201, 211, 224),
    rgb(255, 255, 255)
  );
}

iframe {
  display: flex;
}
p {
  text-align: center;
}

ul {
  list-style-type: none;

  padding: 5px;

  background-color: rgb(34, 39, 63);

  position: fixed;
  top: 0;
  width: 100%;
  box-shadow: 2px 3px 20px 3px rgb(74, 74, 74);
}

li {
  float: left;
  display: flex;
  justify-content: center;
  align-items: center;

  text-decoration: none;
  transition: all 0.5s cubic-bezier(0.68, -0.55, 0.265, 1.55);
```

```
  margin-right: 12px;
}

li a {
  display: block;
  color: rgb(246, 239, 239);
  text-align: center;
  padding: 10px 10px;
  text-decoration: none;
}

li a:hover {
  border-radius: 12px;
}

li:last-child {
  float: right;
  margin-right: 30px;
}

#ibm-button button {
  border-radius: 20px;
  border: none;
  transition: 0.4s;
}

#ibm-button a {
  color: rgb(34, 39, 63);
  padding-left: 25px;
  padding-right: 25px;
}

#ibm-button button:hover {
```

```
    transform: scale(1.07);
   }

   div {
    margin-top: 140px;
    margin-bottom: 40px;
    margin-left: 30px;
    margin-right: 30px;
   }
  </style>
</head>
<body>
  <ul>
   <li>
    <a class="active" href="Home.html"><strong>Home</strong></a>
   </li>
   <li>
    <a href="dashboard.html"><strong>Dashboard</strong></a>
   </li>
   <li>
    <a href="Report.html"><strong>Report</strong></a>
   </li>
   <li>
    <a href="Stories.html"><strong>Story</strong></a>
   </li>
   <li id="ibm-button">
    <button>
     <a
      href="https://eu1.ca.analytics.ibm.com/bi/?perspective=home"
      target="_blank"
      ><strong>IBM LOGIN</strong></a
     >
    </button>
   </li>
```

```
    </ul>

    <h1>A New Hint to Transportation-Analysis of the NYC Bike Share System</h1>
    <div>
      <iframe

src="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_
folders%2FNYC%2BDashboard-
5&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false
&amp;shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subVi
ew=model0000018494259cf2_00000000"
        width="1420"
        height="700"
        frameborder="0"
        gesture="media"
        allow="encrypted-media"
        allowfullscreen=""
      ></iframe>
      <br /><br /><br />
      <p>
        <a

href="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_fold
ers%2FNYC%2BDashboard-
5&action=view&mode=dashboard&subView=model0000018494259cf2_00000000"
          target="iframe_a"
          ><strong>IBM Cognos Analytics - Dashboard</strong></a
        >
      </p>
    </div>
  </body>
</html>
```

***Report.html***

```
<!DOCTYPE html>
<html lang="en" dir="ltr">
  <head>
    <meta charset="utf-8" />
    <title>
      A New Hint to Transportation-Analysis of the NYC Bike Share System
    </title>
    <link rel="stylesheet" href="#" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <link
      href="https://unpkg.com/boxicons@2.1.2/css/boxicons.min.css"
      rel="stylesheet"
    />

    <style>
      @import
url("https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600&disp
lay=swap");
      * {
        padding: 0;
        margin: 0;
      }

      body {
        box-sizing: border-box;
        font-family: "Poppins", sans-serif;
        background: -webkit-linear-gradient(
          right,
          rgb(201, 211, 224),
          rgb(255, 255, 255)
        );
      }
```

```
iframe {
  display: flex;
}
p {
  text-align: center;
}

ul {
  list-style-type: none;
  padding: 5px;

  background-color: rgb(34, 39, 63);

  position: fixed;
  top: 0;
  width: 100%;
  box-shadow: 2px 3px 20px 3px rgb(74, 74, 74);
}

li {
  float: left;
  display: flex;
  justify-content: center;
  align-items: center;

  text-decoration: none;
  transition: all 0.5s cubic-bezier(0.68, -0.55, 0.265, 1.55);

  margin-right: 12px;
}

li a {
  /* border: 4px solid red; */
  display: block;
```

```
  color: rgb(246, 239, 239);
  text-align: center;
  padding: 10px 10px;
  text-decoration: none;
}

li a:hover {

  border-radius: 12px;
}

li:last-child {
  float: right;
  margin-right: 30px;
}

#ibm-button button {
  border-radius: 20px;
  border: none;
  transition: 0.4s;

}

#ibm-button a {
  color: rgb(34, 39, 63);
  padding-left: 25px;
  padding-right: 25px;
}

#ibm-button button:hover {


  transform: scale(1.07);
}
```

```
    div{
      margin-top: 140px;
      margin-bottom: 40px;
       margin-left: 30px;
      margin-right: 30px;
    }
  </style>
</head>
<body>
  <ul>
    <li>
      <a class="active" href="Home.html"><strong>Home</strong></a>
    </li>
    <li>
      <a href="dashboard.html"><strong>Dashboard</strong></a>
    </li>
    <li>
      <a href="Report.html"><strong>Report</strong></a>
    </li>
    <li>
      <a href="Stories.html"><strong>Story</strong></a>
    </li>
    <li id="ibm-button">
      <button>
        <a
          href="https://eu1.ca.analytics.ibm.com/bi/?perspective=home"
          target="_blank"
          ><strong>IBM LOGIN</strong></a
        >
      </button>
    </li>
  </ul>
```

```
    <div>
      <iframe

src="https://us3.ca.analytics.ibm.com/bi/?perspective=explore&amp;pathRef=.my_folders%2FNyc%2BExploration%2BShiv&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;subView=model00000184ab07fccf_00000004"
        width="1420"
        height="700"
        frameborder="0"
        gesture="media"
        allow="encrypted-media"
        allowfullscreen=""
      ></iframe>
      <br /><br /><br />
      <p>
        <a

href="https://us3.ca.analytics.ibm.com/bi/?perspective=explore&pathRef=.my_folders%2FNyc%2BExploration%2BShiv&subView=model00000184ab07fccf_00000004"
          target="iframe_a"
          ><strong>IBM Cognos Analytics - Report</strong></a
        >
      </p>
    </div>
  </body>
</html>
```

***Story.html***

```
<!DOCTYPE html>
<html lang="en" dir="ltr">
  <head>
    <meta charset="utf-8" />
    <title>
```

```
    A New Hint to Transportation-Analysis of the NYC Bike Share System
  </title>
  <link rel="stylesheet" href="#" />
  <meta name="viewport" content="width=device-width, initial-scale=1.0" />
  <link
    href="https://unpkg.com/boxicons@2.1.2/css/boxicons.min.css"
    rel="stylesheet"
  />
  <style>
    @import
url("https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600&disp
lay=swap");
    * {
      padding: 0;
      margin: 0;
    }

    body {
      box-sizing: border-box;
      font-family: "Poppins", sans-serif;
      background: -webkit-linear-gradient(
        right,
        rgb(201, 211, 224),
        rgb(255, 255, 255)
      );
    }

    iframe {
      display: flex;
    }
    p {
      text-align: center;
    }
```

```
ul {
  list-style-type: none;

  padding: 5px;
  background-color: rgb(34, 39, 63);
  position: fixed;
  top: 0;
  width: 100%;
  box-shadow: 2px 3px 20px 3px rgb(74, 74, 74);
}

li {
  float: left;
  display: flex;
  justify-content: center;
  align-items: center;

  text-decoration: none;
  transition: all 0.5s cubic-bezier(0.68, -0.55, 0.265, 1.55);
  margin-right: 12px;
}

li a {
  display: block;
  color: rgb(246, 239, 239);
  text-align: center;
  padding: 10px 10px;
  text-decoration: none;
}

li a:hover {
  border-radius: 12px;
}
```

```
    li:last-child {
      float: right;
      margin-right: 30px;
    }

    #ibm-button button {
      border-radius: 20px;
      border: none;
      transition: 0.4s;
    }

    #ibm-button a {
      color: rgb(34, 39, 63);
      padding-left: 25px;
      padding-right: 25px;
    }

    #ibm-button button:hover {
      transform: scale(1.07);
    }

    div {
      margin-top: 140px;
      margin-bottom: 40px;
      margin-left: 30px;
      margin-right: 30px;
    }
  </style>
</head>
<body>
  <ul>
    <li>
      <a class="active" href="Home.html"><strong>Home</strong></a>
    </li>
```

```
      <li>
        <a href="dashboard.html"><strong>Dashboard</strong></a>
      </li>
      <li>
        <a href="Report.html"><strong>Report</strong></a>
      </li>
      <li>
        <a href="Stories.html"><strong>Story</strong></a>
      </li>
      <li id="ibm-button">
        <button>
          <a
            href="https://eu1.ca.analytics.ibm.com/bi/?perspective=home"
            target="_blank"
            ><strong>IBM LOGIN</strong></a
          >
        </button>
      </li>
    </ul>
    <div>
      <iframe

src="https://us3.ca.analytics.ibm.com/bi/?perspective=story&amp;pathRef=.my_folders%2FNYC%2BStory&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;action=view&amp;sceneId=model00000184a9d046bb_00000001&amp;sceneTime=0"
        width="1420"
        height="700"
        frameborder="0"
        gesture="media"
        allow="encrypted-media"
        allowfullscreen=""
      ></iframe>
      <br /><br /><br />
```

```
    <p>
      <a

href="https://us3.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%
2FNYC%2BStory&action=view&sceneId=model00000184a9d046bb_00000001&sce
neTime=0"
        target="iframe_a"
        ><strong>IBM Cognos Analytics - Story</strong></a
      >
    </p>
  </div>
 </body>
</html>
```
---

**GitHub Link**

https://github.com/IBM-EPBL/IBM-Project-23089-1659866386

**Project Demo Link**

https://youtu.be/pTZ5hSeKtSA