PROJECT REPORT

Team ID : PNT2022TMID39201

Project Tittle : A new hint to transportation Analysis of . the NYC bike share system.

Team Size : 4

Team Leader : AJITHA.A

Team Member 1 : NARMADHA.R

Team Member 2 : SHNEHA.P

Team Member 3 : JEBA.V.V

PROJECT OVERVIEW:

Like all other sharing systems, Airbnb the housing sharing system, Uber the car sharing system, Citi Bike is the network of bicycle rental stations intended for point-to-point transportation. Data shows Citi Bike is New York City's largest bike sharing system. It's a convenient solution for trips that are too far to walk but too short for a taxi or the subway. The bike sharing system is combined with all other transportation methods available in the area for commuters.

Currently, there are about a million trips on average per month by Citi Bike riders. The system has 10,000 bicycles and 610 stations. By end of 2017, the total size of Citi Bike system will be 12,000 bikes and 750 stations. The grey area is the current service area. The yellow and blue areas represent the sections to be covered by end of 2017.
The Process would be :

1. Collecting data regarding user's who have used the bike sharingsystem.

2. Visualising the data collected.

3. Understanding the data, in order to come up with conclusions regarding the bike system.

Now, there are a few resources that have been helpful in understanding the bike share market, and there are datasets available to help us get started to try and visualise the data. The abstract from each of the resources that were found to be helpful are given below, along with the links to resources and author names (If present):

1. https://www.nyc.gov/html/dot/downloads/pdf/bike-share-outreach-report.pdf
   - **NYC Bike Share**

   74% of New Yorkers support bike share (August 2012 Quinnipiac poll) Janette Sadik-Khan - Former commissioner of the New York City Department of Transportation (2007–2013)

   In just the last five years, New York City has made huge strides in creating modern, safer streets. Drawing from Mayor Michael Bloomberg's PlaNYC
   sustainability agenda, we've established more than 300 miles of bike lanes, 30 plazas and made expansive street safety redesigns toaccommodate all
   street users citywide—all while recording the five safest years in city history and logging remarkable economic gains in
   corridors whereprojects
   were implemented. Citi Bike presents a new way for New Yorkers to get around that takes advantage of these changes to our streets, and it also marks a new standard for public participation in planning. Behind every planned station on the street there are thousands ofsuggestions, handwritten notes on maps and direct comments tosystem planners and online from a vast spectrum of New Yorkers.

2. https://towardsdatascience.com/exploring-bike-share-data-3e3b2f28760c

   - **Exploring NYC Bike Share Data**

   Author : *Clif Kranish*

   Many bike share systems make available their trip data for those who want to understand how their systems are used. The bike share system in New York City, Citi Bike, is one of them, but they don't provide much more than the data. I've got some experience in obtaining and preparing their data for visualization, so in this article I will show you how to get started with this rich data source.

3. https://www1.nyc.gov/assets/planning/download/pdf/plans/transportation/bike_share_complete.pdf

Bike Share Opportunities in NYC

Executive Summary :

Bike-share programs represent a unique opportunity for the City of New York to re-envision transportation within the urban sphere. As a transportation system, bike-shares are ideally designed for densely populated cities like New York. Distances between many major destinations are small and almost 50% of New York's workforce lives within a reasonable bicycling distance (less than 5 miles) of their place of work. Importantly, bike-shares offer immediate transportation solutions as they can be built, installed and open for business in months rather than years. Bike-share programs offer options for economic growth and job creation, as well as providing considerable health benefits. Furthermore, a New York City bike- share program could help to further New York's image as an innovative "green" leader.

4. https://ride.citibikenyc.com/system-data
   - **Citi Bike System Data.**

   We publish downloadable files of Citi Bike trip data.

5. https://www.researchgate.net/publication/260227758_Bicycle_Sharing_Systems_Demand
   - **Bicycle Sharing Systems Demand**

   Authors : *Inês Frade and Anabela Ribeiro*

   One of the problems in bicycle sharing systems design is the estimation of the potential demand for the service, especially in countries where this type of system is not yet implemented. The main objective of this methodology is to relate the demand of

determination of demand based on the experience of other countries.The method is applied to a medium-sized Portuguese city, Coimbra.

6. https://nycdatascience.com/blog/r/data-visulization-on-nyc-citi-bike/

   - **Data Visualization on NYC Citi Bike**

     Author : *Summer Sun*

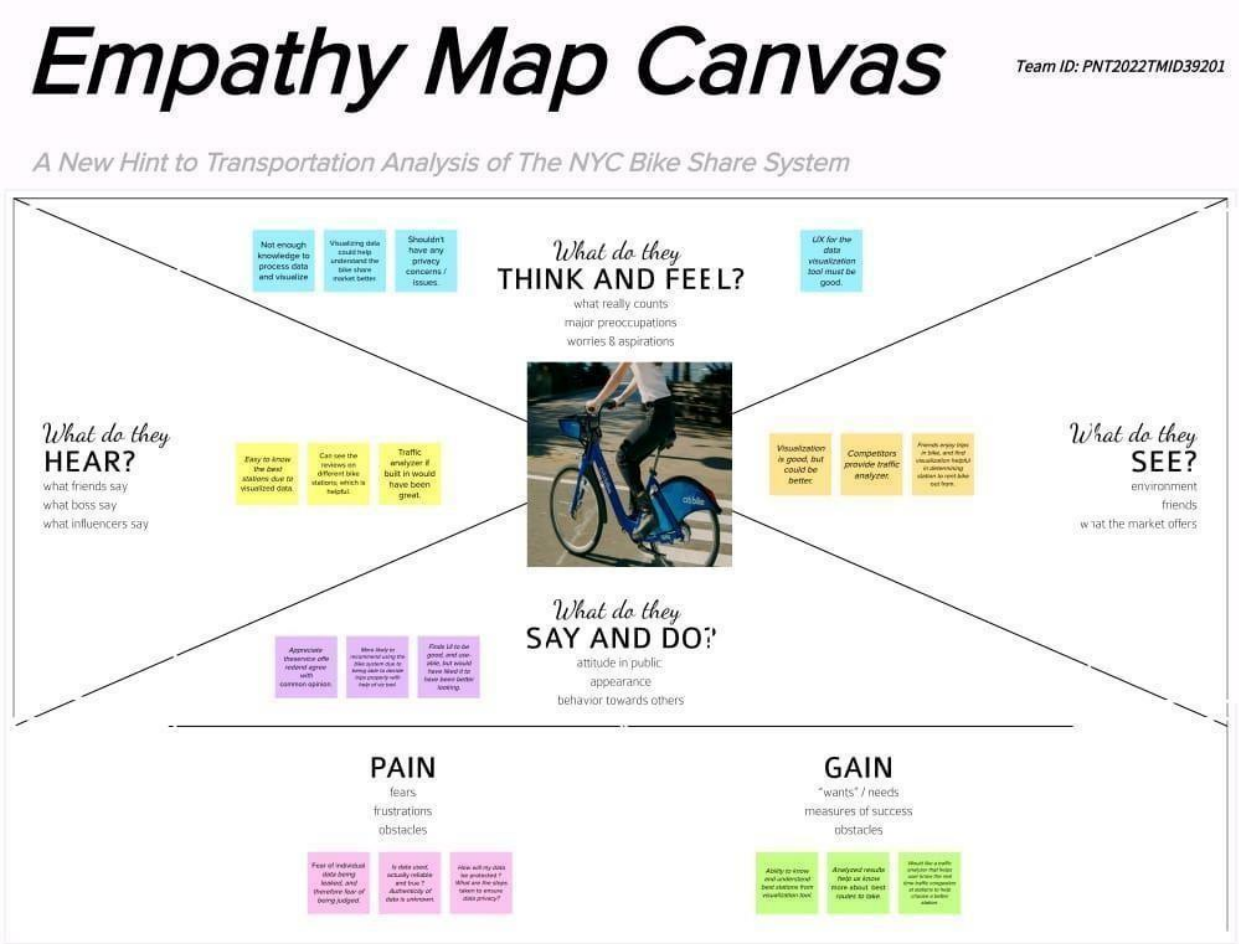
   Any Citi Bike client has come up against two frustrating scenarios: theempty dock at the start and full dock at the end of the trip. Researchers call this as "rebalancing" problem as part of "fleet optimization" questions. This problem has attracted the attention of data scientists to develop complex methodologies to optimize the available bikes andopen docks.

   Following I attempt to utilize the shiny visualization app to provide a hint for the 3 questions:

   1. ***Fleet Routing Pattern Detection**: what are the most popular routes during peak hours and off-peak? What is the direction ofthe flow?*
   2. ***Station Balance Prediction**: what is the average volume of imbalance in the distributed system? What is the station- level inflow and outflow? Is it sensitive to the time? How does it look like in a time series?*
   3. ***Reducing rebalancing demand**: What are the riders' activities like? Is it possible to rebalance through*

The motivation of the bikeshare usage has also been studied: 70% of Capital Bikeshare (Washington D.C.) riders choose bikeshare as the quickest and easiest way to get to their destination [7]. Bicycling to work decreases risk of mortality in approximately 40% after multivariate adjustment, including leisure time physical activity [8].

Hubway Bikeshare (Boston, MA) started to pilot programs of subsidized memberships while implementing stations in low- revenue areas in order to increase access and equity of ridership[9]. Cities stand to gain $2.6 billion annually in indirect savings based on lower road construction costs, reduced accidents, andlower carbon dioxide emissions [10].



Template

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- ***10 minutes*** *to prepare*
- ***1 hour*** *to collaborate*
- ***2-8 people*** *recommended*

Share template feedback

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

A **Team gathering**
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B **Set the goal**
Think about the problem you'll be focusing on solving in the brainstorming session.

C **Learn how to use the facilitation tools**
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

PROBLEM

To improve the User Experience, and effects of Data visualization for the data available on the Citi Bike Share Market.

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

Ajitha

Narmadha

Sneha

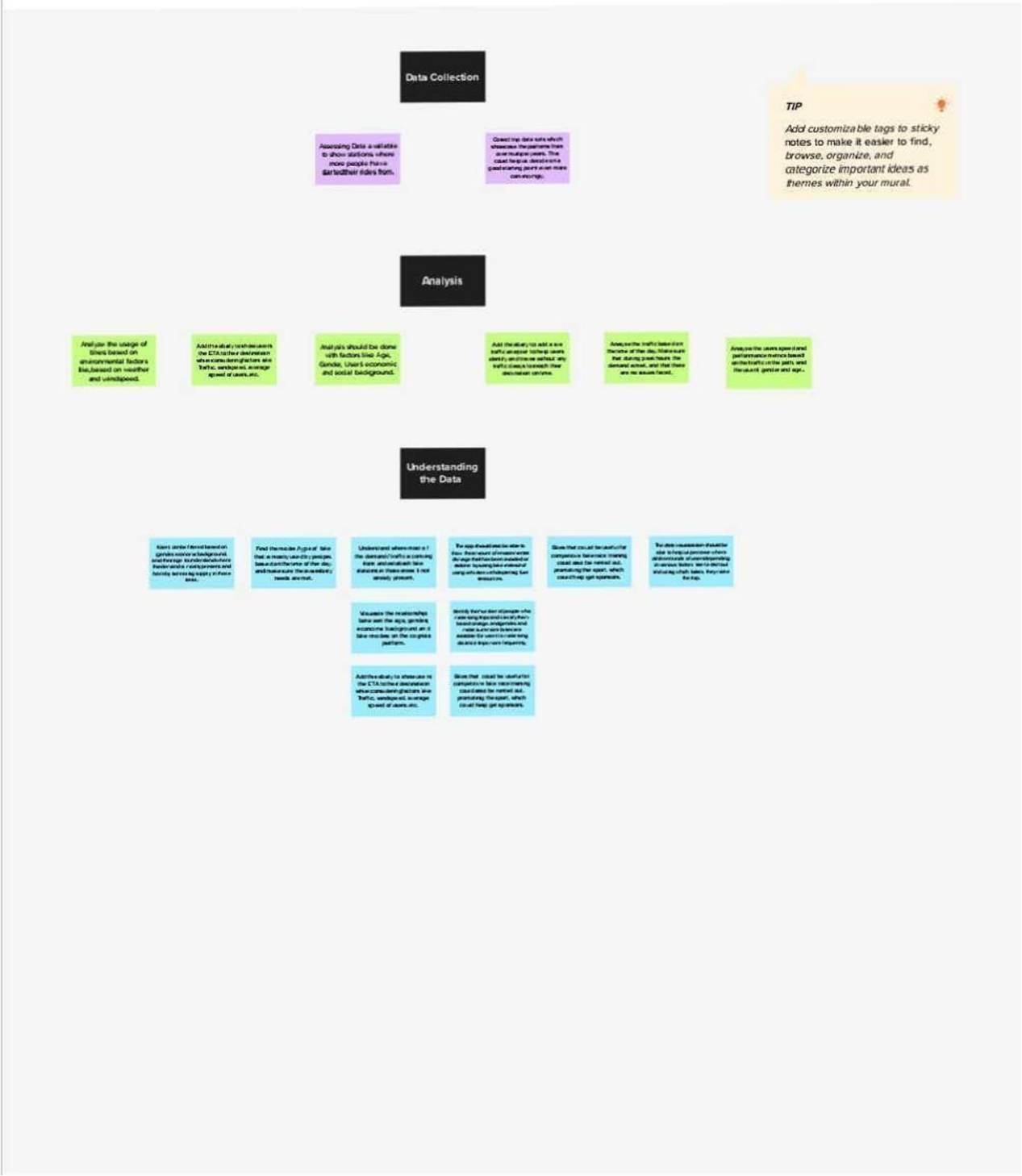
Jeba

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

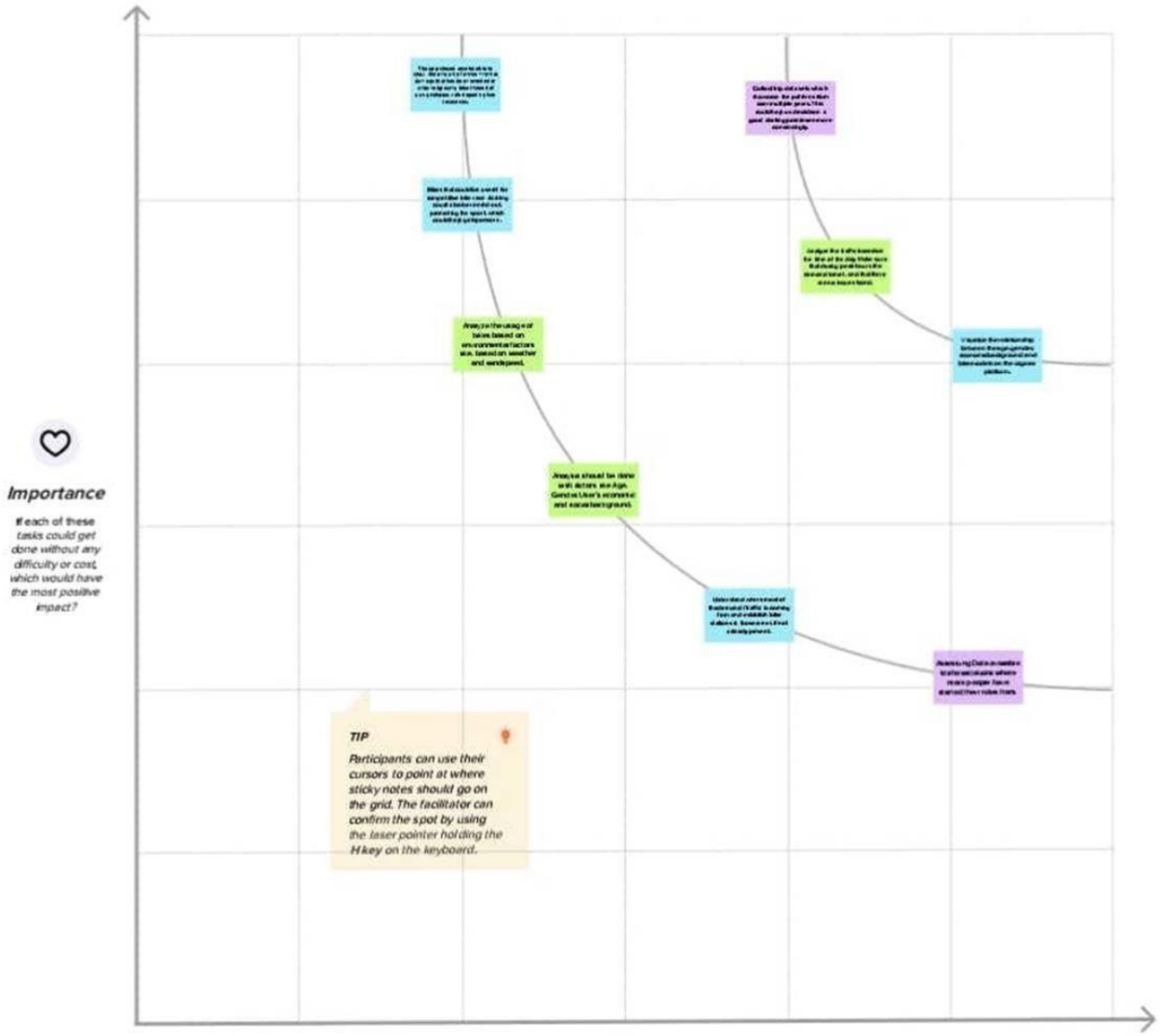


4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

A **Share the mural**
Share a view link *to the mural with stakeholders to keep them in the loop about the outcomes of the session.*

B **Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.
Open the template →

Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template →

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template →

Share template feedback

Project Planning Phase

Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

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	Shneha P Narmadha.R
Sprint-1		USN-2	As a user, I will receive confirmation email once Ihave registered for the application	2	High	Shneha. Narmadha Jeba.V.V
Sprint-1		USN-3	As a user, I can register for the applicationthrough Gmail	2	Medium	Narmadha Shneha
Sprint-2	Login	USN-4	As a user, I can log into the application byentering email & password	2	High	Ajitha Jeba Narmadha

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 systemdata from Lyft citi bike's official website that has the published files.	2	Medium	Ajitha Narmadha Shneha
Sprint-2		USN-6	I can use the citi bike share system data for analysis purposes	5	High	Ajitha Narmadha
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	Shneha Jeba Narmadha
Sprint-3	Dashboard	USN-8	I can register & access the dashboard createdbased on the analysis by logging in	3	Medium	Ajitha Narmadha Shneha
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	Jeba.V.V
Sprint-4		USN-10	As a user I can view the dashboard that displaysthe top 10 Start Station Names with respect to customer age group	5	High	Ajitha
Sprint-4		USN-11	As a user I can view the dashboard that displaysthe customer and subscriber with respect to gender	5	High	Narmadha
Sprint-4		USN-12	As a user I can view the dashboard that displays the total number of trips	5	High	Shneha

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

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)
Sprint-1	6	6 Days	24 Oct 2022	29 Oct 2022
Sprint-2	9	6 Days	31 Oct 2022	05 Nov 2022
Sprint-3	16	6 Days	07 Nov 2022	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022

Project Design Phase-I
Proposed Solution

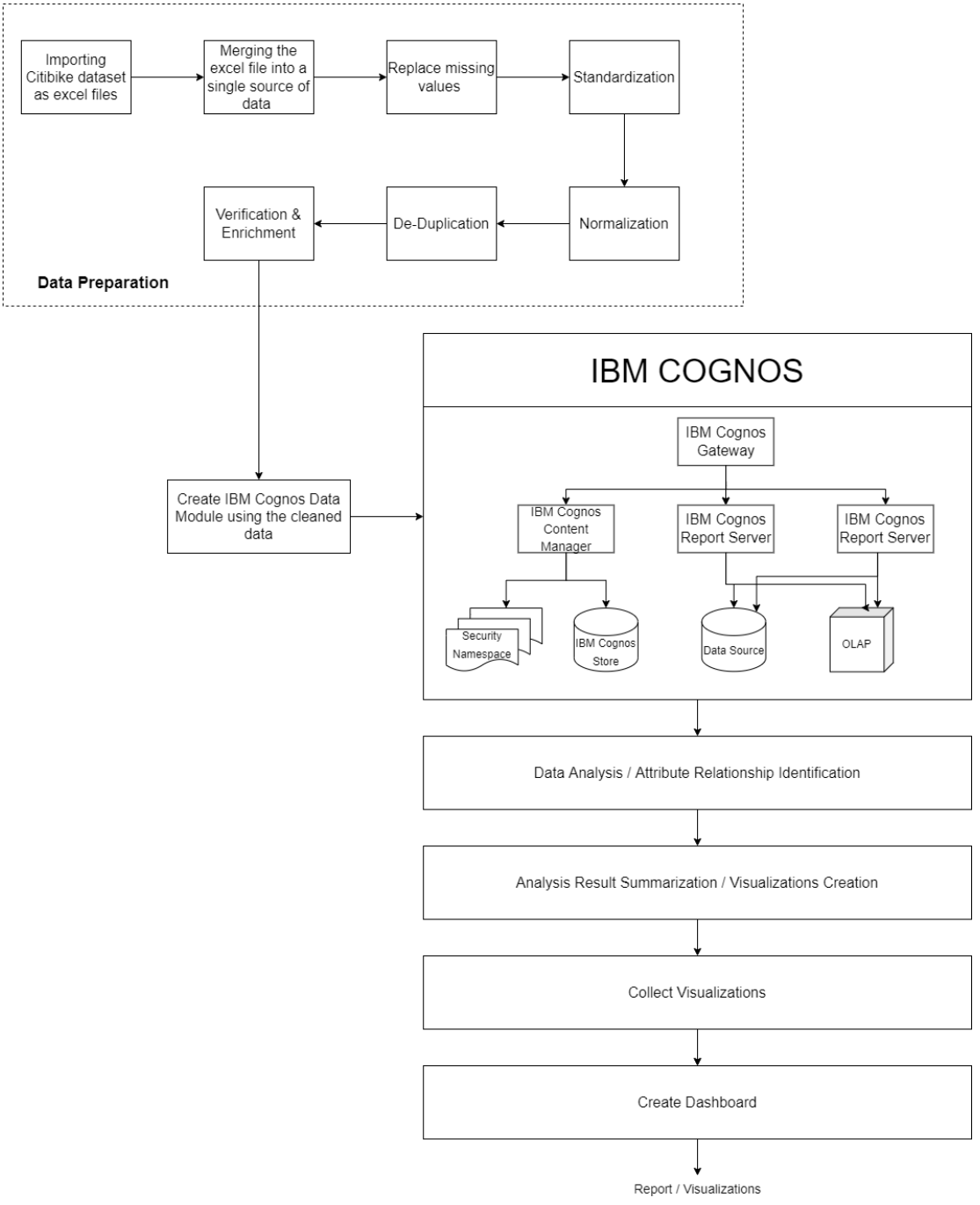
Proposed Solution:

S No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	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.	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 analysis. 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 bikeshare 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 moredata becomes available, particularly in otherareas 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.

Project Design
Phase-I
Solution Architecture

Solution Architecture Diagram:



Project Design Phase - II

Technical Architecture:

The Deliverable shall include the architectural diagram as below:

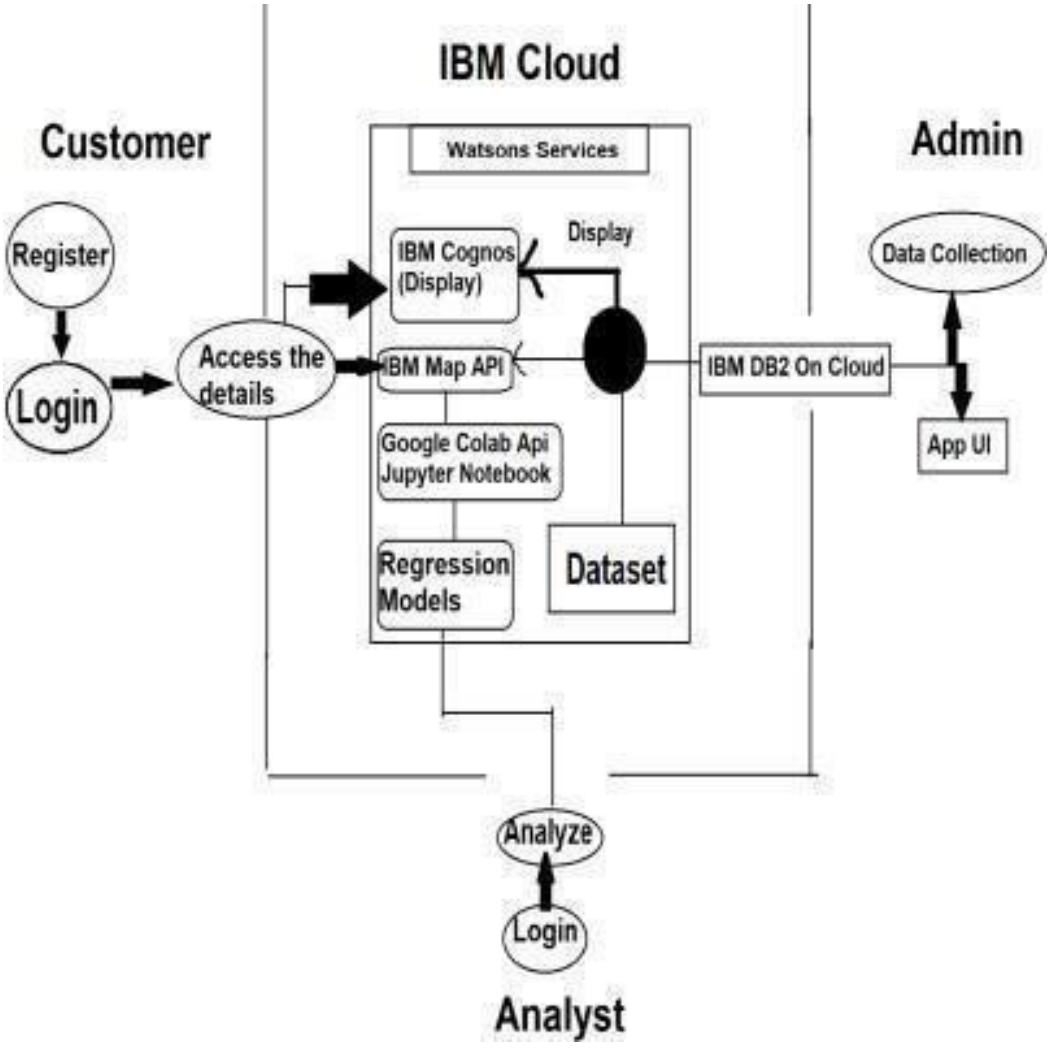


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	1. Display the visualization of the analyseddata 2. Display the inferences from the analysed data	HTML, CSS, JavaScript andIBM Cognos

2	Application Logic-1	Display details	HTML
3	Database	Data Type, Configurations etc.	MySQL
4	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
5	File Storage	File storage requirements	IBM Block Storage or OtherStorage Service or Local Filesystem
6	External API-1	To map the Citi Bike ride in NYC	IBM Map API, etc.
7	External API-2	Analysis of the data	Google Colab, Jupyter Notebook
8	Machine Learning Model	To plot graphs and predict values	Regression models
9	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Local SystCloud Server Configuration : IBM Cloud	Local, Cloud Foundry, Kubernetes, etc.

https://github.com/IBM-EPBL/IBM-Project-20887-1664532632

Project Development Phase

In this milestone you will start the project development and expected to perform the coding & solutioning, acceptance testing, performance testing based as per the sprint and submit them.

Project Development – Delivery of Sprint-1

In this activity you are expected to develop & submit the developed code by testing it.

Project Development – Delivery of Sprint-2

In this activity you are expected to develop & submit the developed code by testing it.

Project Development – Delivery of Sprint-3

In this activity you are expected to develop & submit the developed code by testing it.

Project Development – Delivery of Sprint-4

In this activity you are expected to develop & submit the developed code by testing it.