MTA Targeted Marketing Applications

Problem Statement

- Leveraging Public Transportation Ridership Patterns to attract private investments and/or revenue from corporate sources.

- The main goal is for corporations to patron certain stations of the existing in exchange for running blanket ads.

Huh? What do you guys do again?

- We are a business facing project which provides a platform for businesses to run spatially targeted ads
- Provide rebates on ticket fare to the MTA user by leveraging in-coach ad rev
- Provide a spatially targeted billboard marketing solution

Who is it for?

- The primary persona of a user are for the Sales and Marketing division of medium to large corporations.

- The secondary consumer is the average Joe using the subway lines.

But, how?

Techie Jargon

- Mine rider data
- Develop robust live streaming solution
- Explore the idea of Local hub
- Make use of spatial nature of data

What we really mean

- Which are the most used stations?
- Make some Vibranium grade platform!
- Where do people get/switch rides?
- Which neighbours are really good at spreading the word?

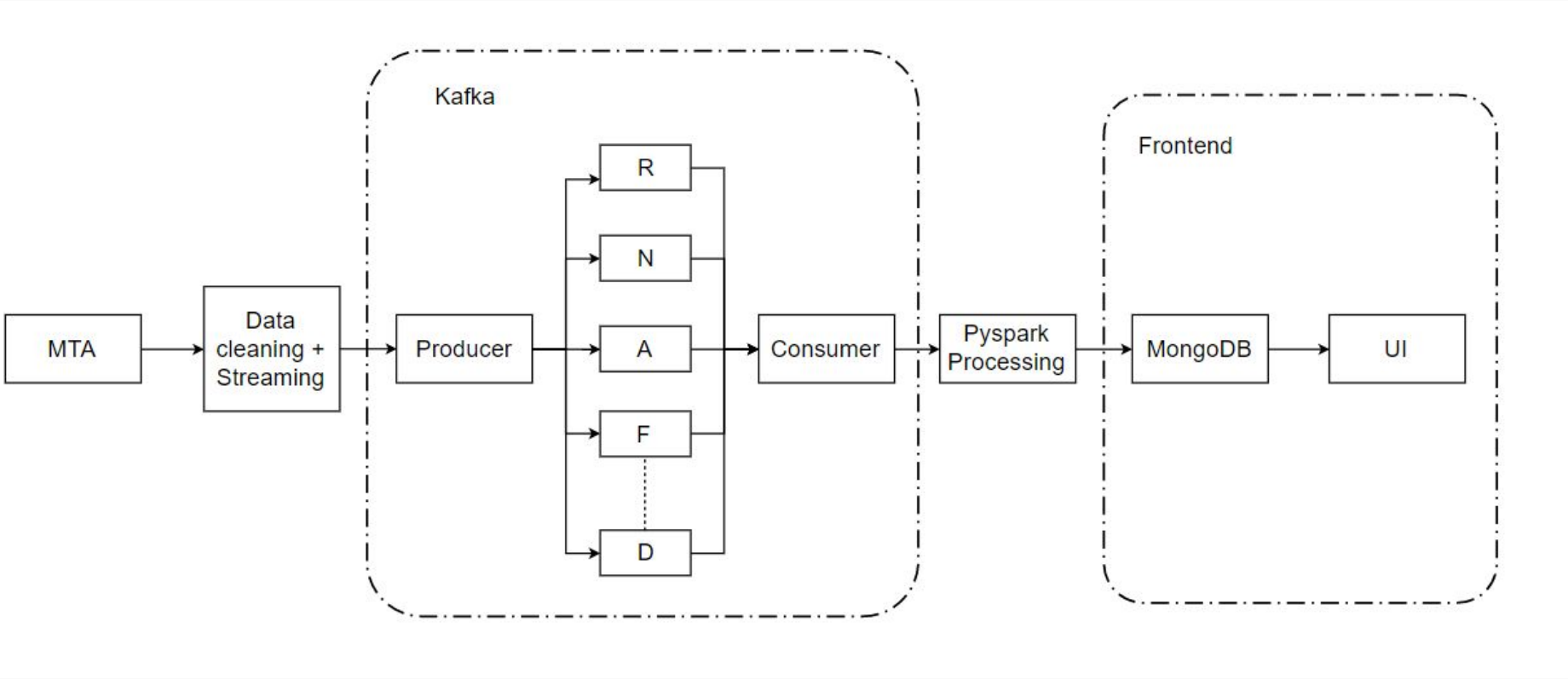
Can you be more specific?

We have Identified two main use cases:

- Active Marketing (in-coach): Make the tickets cheaper while sharing who helped with the fare.
- Passive Marketing (Bill board): The good old poster/billboard marketing space

Let’s have a look under the hood

Architecture Diagram



*Currently Processing only R F and D lines

Data Streaming/ Kafka

- MTA provides number of entry/exits for each turnstile of each station.
- File for each day contains the above data for every four hours and is dumped every night on the MTA website.
- We use this data to create a Kafka stream of station data creating a topic for each line.

STATION	DATE	TIME	ENTRIES	EXITS
JAY ST-METROTEC	04/13/2019	4	514.0	473.0
DEKALB AV	04/13/2019	4	4082.0	1850.0
ATL AV-BARCLAY	04/13/2019	4	7139.0	8115.0

Analysis: Pyspark Streaming

Weight of each station for subsidy -

$$stationWeight_i = \left(\sum_{i=1}^{n} \#entries \right) / n$$

Weight of each station for ads -

$$stationWeight_i = \left(\sum_{i=1}^{n} (\#entries) + (\#exits) \right) / n$$

Price of each station for subsidy -

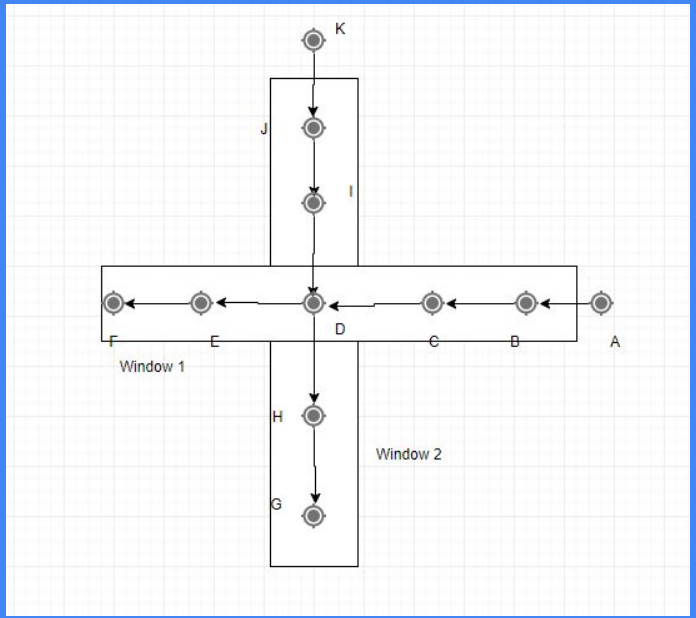
$$stationPrice_i = stationWeight_i * (\#entries)$$

Price of each station for ads -

$$stationPrice_i = stationWeight_i * (\#entries + \#exits)$$

Why a sliding window?

- To understand the local hubs
- Example: Traffic st Atlantic street is more or less independent of traffic at Lexington Ave



MongoDB and NodeJS

- After processing the MTA data, this data is dumped into a MongoDB collection.
- Each row of the collection contains the Station name, incoach price, advertisement price, number of entries and exits
- This data is then used by the front end to provide UI for a bidding system

Place Your Bid

#	Station Name	In Coach Price ($)	Bill Board ($)	Entries	Exits	Place Bid On In-Coach Price	Place Bid on Bill Board Price
1	FOREST HILLS 71	2632.41	3736.97	4922	3551	Place Bid	Place Bid
2	67 AV	172.56	207.12	1509	787	Place Bid	Place Bid
3	63 DR-REGO PARK	495.87	582.32	2772	1370	Place Bid	Place Bid
4	WOODHAVEN BLVD	1344.13	2034.05	3993	3253	Place Bid	Place Bid
5	GRAND-NEWTOWN	270.51	391.79	2300	1894	Place Bid	Place Bid
6	ELMHURST AV	95.17	99.91	1288	365	Place Bid	Place Bid

Feasibility and Scalability

- The producer-consumer system can scale as much as required owing to data being funneled into topics for each MTA Line
- Feasibility is guaranteed as the system is independent of MTA operations and no extra data is required

Demo - Show me the money!

Future work ?

- Stress testing the subsidy metric
- Building modular and appealing frontend for various user personas
- Providing cheaper options for local ads

The Team: Open for questions!

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