Batching Techniques :

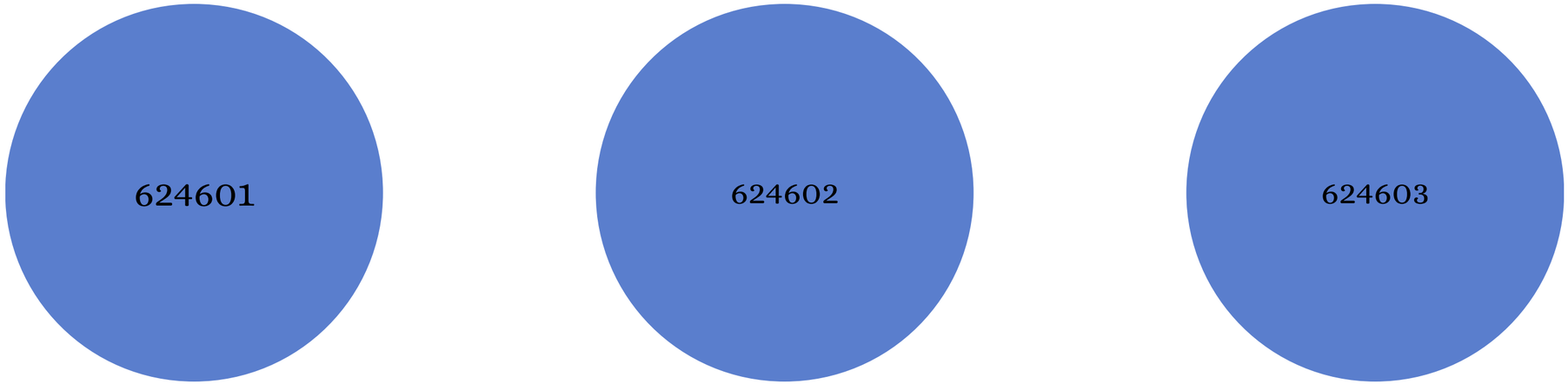
Random Assignment (RD): In this approach, orders are randomly assigned to available riders without considering factors such as proximity to the order location or workload of the rider.

Nearest Rider Dispatch (SP-D): With this approach, the platform dispatches orders in real-time to the rider who is closest to the order location. This method aims to minimize delivery time by selecting the rider with the shortest travel distance to the pickup point.

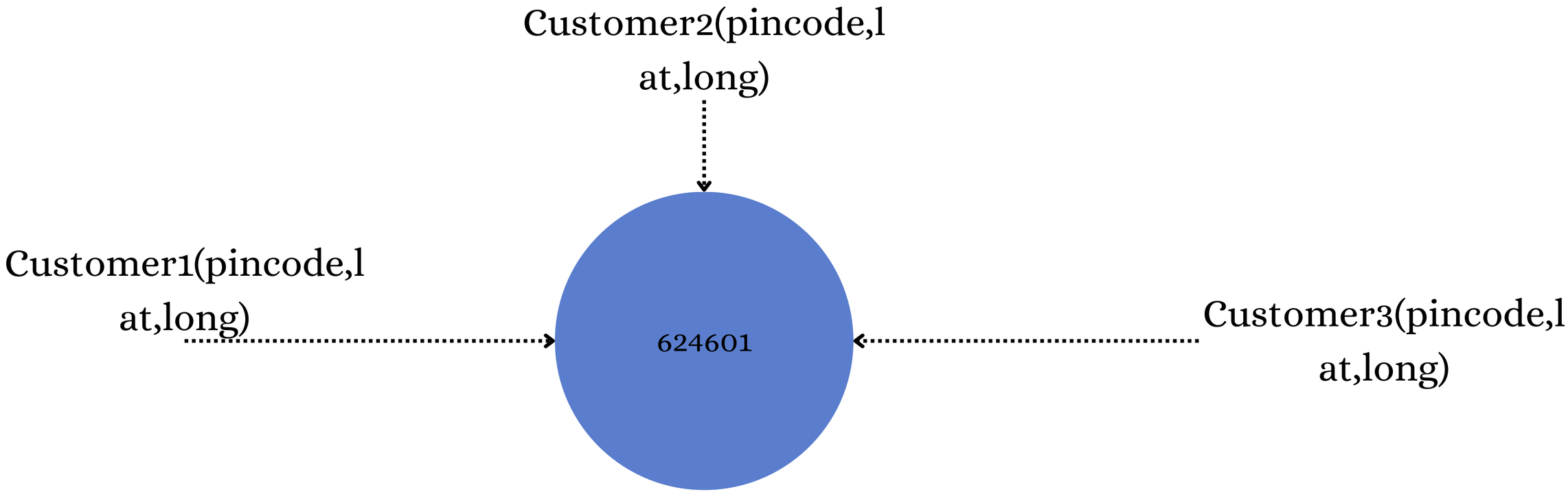
Batched Order Dispatch (BPD): In the Batched Order Dispatch approach, all orders generated within a fixed period of time are grouped together. Then, multiple orders are dispatched to several riders simultaneously. This method is more efficient for handling large-scale orders as it optimizes the use of available resources by assigning multiple orders to riders at once.

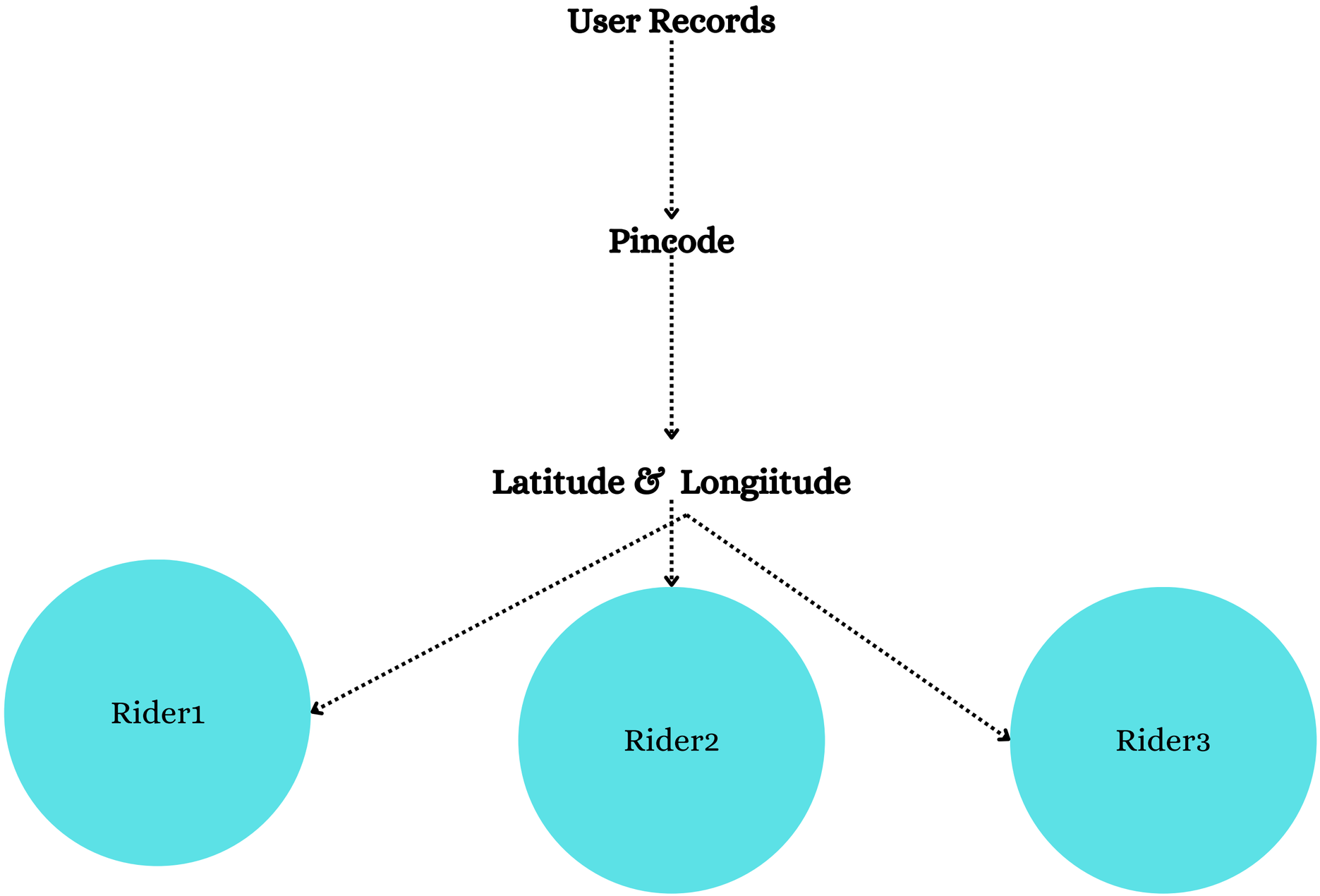
Algorithm :

- Clustering of kitchens based on the pincodes ,available in the db.
- The pincode is going to act as a index of the corresponding cluster.

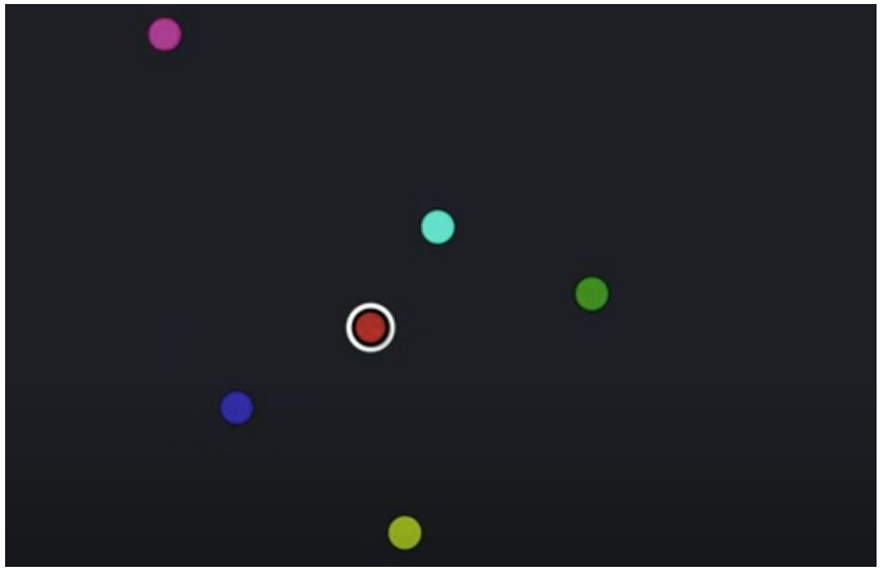


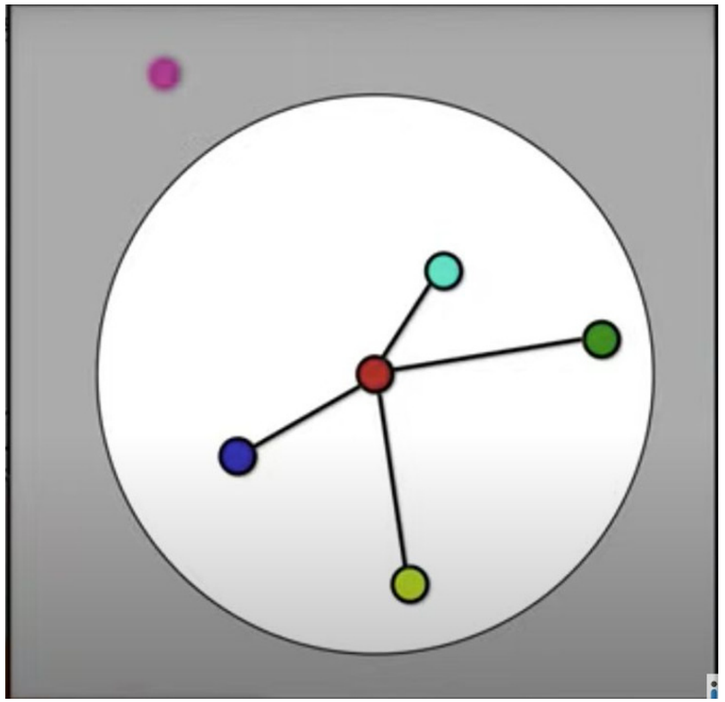
The orders that are placed in a same clustter ,having the same location or customers with nearby location are assigned to a particular rider.




User Records
Pincode
Latitude & Longiitude
Rider1
Rider2
Rider3

Proximity analysis:





Optimize delivery routes:

Develop an algorithm that dynamically analyzes order locations, rider locations, and traffic conditions to create the most efficient delivery routes, minimizing travel time and distance. This could involve clustering orders based on proximity and incorporating real-time traffic data.

Distance Calculation (Optimal Way):

- The Euclidian method can be used for calculating the distance . But ,for many records it takes more time for calculation .So , an optimal method should be used .

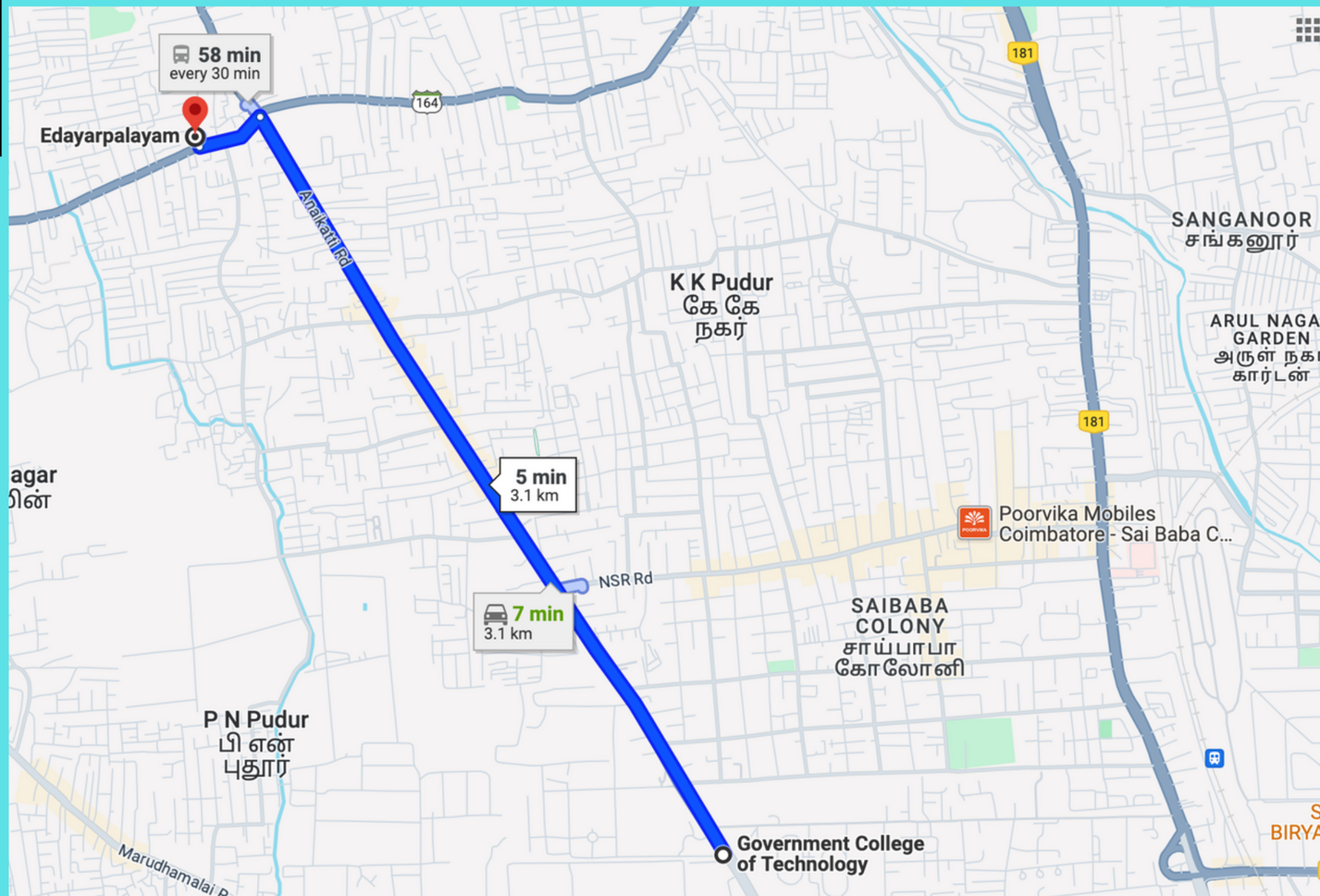
- We can convert the latitude and longitude into binary numbers and use the binary search to find the Most Significant Bit(MSB).By comparing the MSB's of two locations we can easily find the nearer loactions.

Distances ,

d1=00000100 **d2=00000101**

As the no of common bits in MSB's in two locations increases the accuracy also increases.

OrderId	CustomerLocation	KitchenId	KitchenLocation
101	Gandhipuram	503	RSpuram
102	Gandhipuram	505	Venkadapauram (between gandhipuram and RSpuram)



Clustering :

Customer Id	Customer Location (lat & lon)	Kitchen Id	Kitchen Location (lat & lon)	Time