

# Beat Optimization



**KALEESUWARI**  
REFINERY PRIVATE LIMITED

# About Me



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Vijay is a BE - ECE Graduate from Bharathiar University, Coimbatore. He completed his post-graduation in Big Data and Data Analytics (BDAP) from SP Jain Global School. He also holds Certification as a Solution Consultant in SAP SCM-MM Module. A diploma holder in Advanced certification in Cloud Computing, IOT and Blockchain from IIT Madras.

Vijay has 20 years of accomplished IT experience in Retail/Manufacturing/Logistics IT systems, leading IT teams in accomplishing new technology initiatives, achieving process excellence, program design, program management with excellent track record of conceptualizing strategic solutions and developing profitable businesses through identification and formulation of tactical and long term strategies.

Vijay started his career with Hindustan Unilever in 2003 at the Goa plant, and another stint with their joint venture company - Hindustan Field Services in 2014. He worked with SAP Labs as Global Program Coordinator for 4 years from 2008. Prior to joining KRPL he was with TVS Supply Chain Solutions from 2017 as IT Head and as Technical Center Head with White Data Systems - a subsidiary unit of TVS SCS.

Vijay is a recipient of next 100 CIO award constituted and presented by 9.9 media group in the year 2022.



# Problem Statement

Kaleesuwari services close to 1 lakh retail outlets directly. A route plan to cover a cluster of outlets based on parameters such as distance between outlets, store throughput, store classification and number of people on ground would be the influencing the route plan creation.

The route plan is generally created by the sales person with his knowledge of the geography that he services and is totally dependent on the person leaving very less possibility to optimize the route.

In addition to this new outlets get added and removed all through the entire period and every month new beat creation becomes an additional task to the field executive which is not basically required.



# Constraints

- The objective is to map outlets to a beat or a cluster
  - A week will have 6 individual clusters mapped to six different sales man
  - Each and every sales man has to be assigned with 40 outlets. Minimum could be 35 outlets and maximum could be 45 outlets not more
  - Beat assignment should consider number of times a outlet has to be visited per week
  - The model has to be built as 2 scenarios
    - With salesman already provided in the sheet
    - Assume there is no salesman – the system has to derive number of sales man needed
  - Handling Blank Geocodes
    - If geo codes are not available use the pincode
    - If both geocode and pincode is not available based on other outlets assigned to the sales man assign a hypothetical geocode



# What is needed?

1. Based on the outlet universe and the servicing geography the system has to create beats/clusters. Each beat has to be given a meaningful name based on the geography of coverage if for eg. Mylapore has 165 outlets the beat can have names such as mylapore 1, mylapore2, etc
2. While doing so the system needs to take into account:
  1. Number of sales person on ground
  2. Number of outlets under a Distributor
  3. Number of times an outlet can be visited in a week
  4. Number of outlets that can be grouped in a beat
3. Input data needed for this conversion that will be provided:
  1. BA Code
  2. Retailer code
  3. Retailer geocode
  4. Sales man code
  5. Retailer latitude and longitude
  6. Class of outlet if any
4. The model needs to be dynamic in a way where the user can provide needed inputs on number of beats for a geography, number of beats to be created, number of sales officers needed to cover the beat and actual number available, average time taken to cover the outlet if the sales man uses a bike to cover all outlets of the beat
5. This is a classification or a grouping problem and a standard output is expected whenever the algorithm is executed. The output should not change if the same program is run more than once.



## Expected Output

- An optimal solution to cover maximum number of outlets with minimum number of resources
- If the time spent in outlet increases the cluster formation should change in line – a typical work day for a sales man will be 8:30 mins
- The output should have a summary and detail
- Summary:
  - Total number of outlets : if my master has 52k stores it needs to be extrapolated with number of visits, this number + one time visit outlet will be universe
  - Number of sales man
  - Min outlets assigned / cluster, max outlets assigned/cluster and average outlets/cluster
  - Number of outlets with valid geocodes and outlets with blank
  - Average distance between outlets within a cluster
  - Outliers if any



# Model Output

- Interactive output with capability to perform what if analysis
- The output should be shown with atleast 2 algorithms and the choice of best algorithm as per students
- A metric to demonstrate that accuracy % of solution provided for various algorithms being used
- Detailed explanation of why a specific algorithm was chosen
- Map plot of the clusters with different colour circle markers
- Model output with following derivatives
  - Cluster name
  - Avg. distance between two outlets in the cluster
  - Sales man name / code
  - Beat plan for a month say November to see the real time scenario

Region, BA.Code ,store.code ,Pincode, Sales\_officer ,Route.Name ,Contact.Number, lat, long, Avg distance between clusters





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**THANK YOU**