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Projects

RESEARCH | ANALYTICS | TECHNOLOGY

CASE STUDY: Optimization of ICT Center's Location Allocation using Advanced Analytics

Regional Authorities in India were looking forward to the allocation of centers used to serve ICT demands of a rural region. For this an optimum model was to be prepared based on region's geographic location.

Context

- A total of 180 villages across 4 states
- People don't have access to basic ICT infrastructure so authorities plan to open of ICT centers
- The objective of the authorities to set up these ICT centers includes:
  - Maximum population coverage
  - Minimum cost & time of travel to desired location

Solution Summary

- Defined the problem using operation research modeling technique
- Used the Advanced Clustering technique using Fuzzy Computing to derive the location of centers
- Used Evolutionary algorithm to optimize the location derived from clustering.
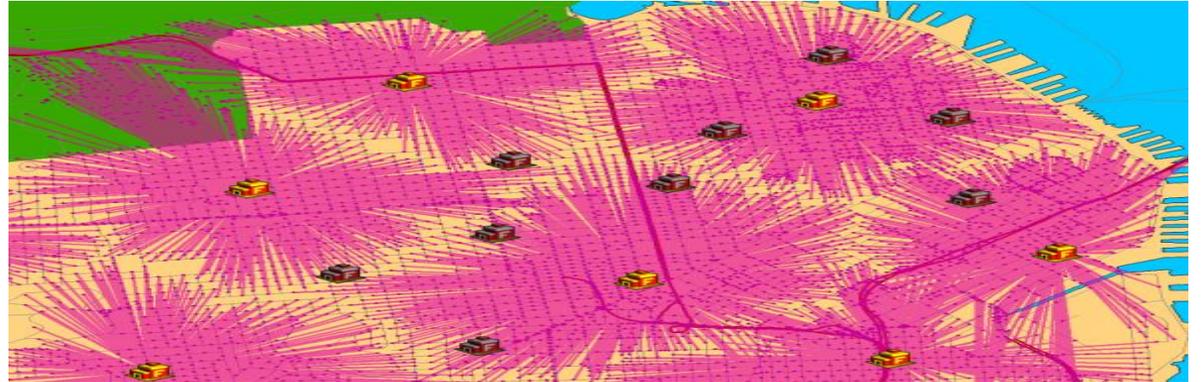
Benefits Achieved

- Reduced the cost of travel and time of travel by 17% as compared to the random allocation and other existing schemes of location allocation
- Used the latitudinal and longitudinal data points along with cost of travel and population size of the villages.
- Advanced level analytics ensured that efficiency is achieved within the existing system.

CASE STUDY: Generation of Rules for Click pattern occurring for an advertisement agency

An Advertisement Agency wanted to understand the click patterns on digital banners placed by them at relevant digital positions. By this the agency can guide their clients towards a better Click Through Rate

Context

- A total of 10 lacs click data to be mined for patterns
- Incorrect position of banner ads for digital marketing leads to substantial revenue loss
- The objective of the agency was to understand click patterns based on:
  - Maximum accuracy rate
  - Minimum error rate

Solution Summary

- Divided the data into training set and test set in the ratio of 80:20
- Used the CHAID decision tree in order to generate and understand various rules for clicks and non-clicks
- Used classification matrix to analysis the rules generated through the tree

Benefits Achieved

- The rules developed for clicks through training set produced an accuracy of more than 80% for the test data
- Various features for device and network connections were used for the rules generation
- Advanced analytics using Data Mining ensured that agency is able to correctly use these rules for placement of banner ads for maximizing clicks and minimizing non-clicks.

CASE STUDY: Recommending the products based on user profile for online retailer

An Online retail company wants to improve the basic recommendation system based on frequencies and top selling products. The company wanted to make the recommendation system more dynamic based on the transactions generated by users.

Context

- A total of 5 lac of transactions to be mined for recommender system
- Pilot study for one category of product from entertainment zone i.e. movies
- The objective of the company was to analyze the transactions to
  - Find most closest users based on transactions
  - Recommend appropriate product to similar users

Solution Summary

- Divided the data into training set and test set in the ratio of 80:20
- Used association rule mining using collaborative filtering in order to understand various similarity in users
- Suggest products to similar users based on their purchase behavior in past
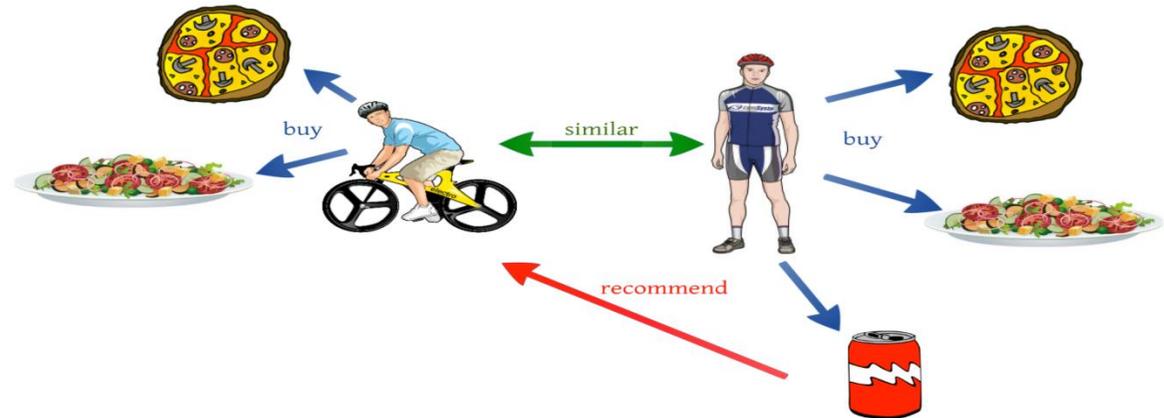
Benefits Achieved

- The recommender system based on collaborative filtering was found to be more accurate than normal recommender system based on descriptive analytics.
- Accurate recommendations enhanced the customer experience and hence led to increase in sales.
- User characteristics also helped the company to prepare offer plans to be given to the customers

CASE STUDY: Preparing a dynamic pricing plan for the online retail store

An Online Retail Store wanted to implement the dynamic pricing module for various FMCG products so that right customer gets the right discount on the purchase through their online store.

Context

- A total of 35 lac transactional data to be analyzed for appropriate pricing to the customers.
- Every customer does not need same discount.
- The objective of the company was to understand customer profiling so as to
  - Classify the customers
  - Predict the price range for a product for different classes

Solution Summary

- Based on various attributes related to purchase, the customers were clustered into different groups
- Using Statistical analysis, price range for every group was predicted.
- Given an offer or discount based on customer profile and his group, it was predicted whether he would purchase the product or not.

Benefits Achieved

- The scheme was found to be better for company as compared to other dynamic pricing techniques like agent based, auction based, simulation based, etc.
- Efficiency was achieved for the company in profiling the customers and offering discount to them.
- The technique being based on the principles of Machine Learning helped in making the system more dynamic.

CASE STUDY: Finding out the cut off values for clinical parameters

A medical diagnosis lab (under supervision of medical practitioners) wanted to derive cut off value for a specific type of medical test amongst the patients so that cross verification of the results can be done through other parameters too.

Context

- A total of 5000 patient data to be analyzed for appropriate cut-off value derivation.
- Current medical test (under this study) was too costly for patients to get it done in routine.
- So the lab worked on other cheaper medical tests to find a cut off value which can help in predicting a disease at lower cost.

Solution Summary

- ROC curve and Youden Index were used to analyze the data.
- Sensitivity and Specificity were the parameters used for Efficiency checking of the solution. They were based on true positive, true negative, false positive and false negative.
- Descriptive Analytics was primarily used for the solution

Benefits Achieved

- The cut off values were determined with an accuracy of 75% for other medical test.
- Patients were first advised to go for cheaper test and if alarming situation was found, the costlier tests were recommended.
- The technique helped the lab in getting more patient visits for diagnosis purpose of the specific disease.