FREE Online
Citizen Data Scientist Course

You Too Can be a Citizen Data Scientist – No Matter Your Role, Skill or Job Function

Section 10 - Predictive Analytics Use Cases

Instructor Notes: This supporting documentation includes a complete set of the slides used in the course material. Some sections also include expanded material, articles and documentation to further student understanding of more complex topics.

For your conenience, contact information is displayed at the end of the online course and at the conclusion of the supporting documentation in Section 12. We invite you to contact us with questions, requests or comments.

Section 10 – Predictive Analytics Use Cases

Sample Business Use Cases for Predictive Analytics

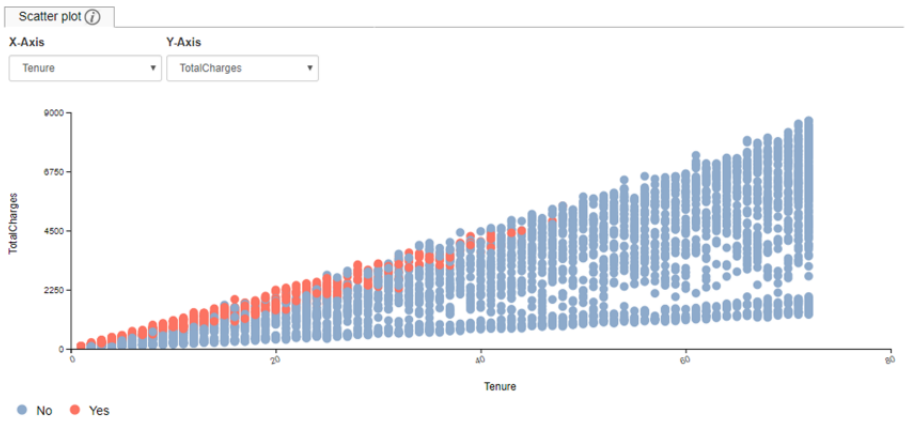
Customer Churn	Fraud Mitigation	Maintenance Management	Quality Control
Demand Planning	Product/Service Cross-Selling & Up-Selling	Customer Targeting	Loan Approval
Human Resource Attrition	Online Target Marketing	Marketing Optimization	Predictive Analytics Using External Data e.g. Correlation of GDP with your Sales

Use Case – Customer Churn

Customer churn is something every business wants to avoid. The cost of acquiring and interacting with customers is one a business must fund and, every time the business loses a customer (customer churn), it must spend more money to replace that customer.

Influencing Factors:
Services that each customer uses, customer account information, demographic information about customers.

Benefits:
Reduce customer churn, improve customer retention, identify and rank customer dissatisfaction issues, identify and improve marketing messaging and campaign effectiveness, identify and create new services or products to attract and retain clients.



Use Case – Fraud Mitigation

Mitigate fraud to improve business results and develop and sustain fraud detection processes to enable operations monitoring.

Use existing integrated data to identify the most common and unique signs of fraud and to create processes, set thresholds and alerts to track and monitor events.

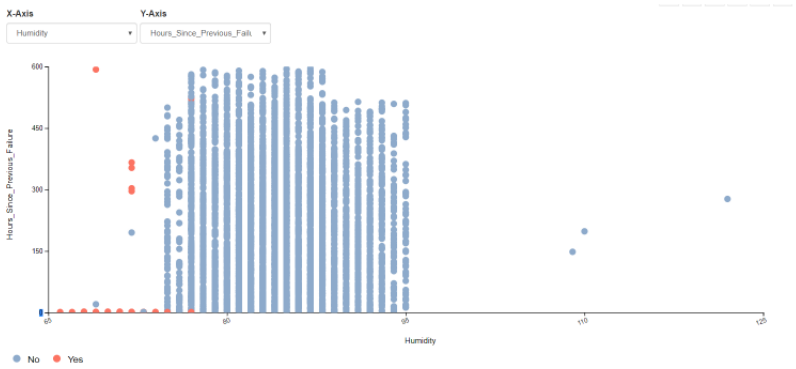
Benefits:

Develop fraud detection and mitigation models, reduce costs and negative impact on the bottom line, optimize resources and processes, Improve services, respond to changes and new developments in fraudulent activities, identify patterns and trends, create and leverage fraud behavioral models to monitor activity

Use Case – Maintenance Management

Focus on maintenance to keep equipment up and running and reduce downtime. For businesses that perform maintenance services, anticipating required resources, hours on the job and the types of training required is also required.

Take the guesswork out of production equipment maintenance and anticipate routine maintenance, which parts should be ordered and when and when equipment should be replaced. Predict when maintenance and repair will be required on a piece of equipment placed in a customer location and which parts to keep on hand, as well as what resources and training employees will need to satisfy the demand.



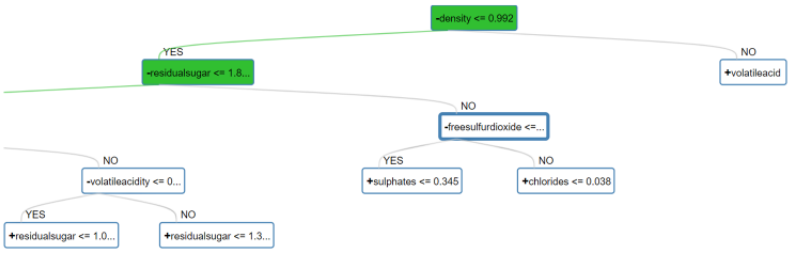
Benefits:

- Optimize resources, optimize parts and inventory, optimize schedules and training schedules, manage costs
- Improve customer satisfaction, anticipate and mitigate downtime

Use Case – Quality Control

Businesses that fail to control quality will lose customers and market share and, in some cases, expose the organization to legal risk and liability. Identifying quality issues will help to streamline the development process and speed product and service completion, and it will increase customer satisfaction and brand reputation.

Using advanced analytics to identify quality issues will improve production processes, protect the business against liability claims and allow the organization to focus on quality issues and change product design and/or processes.



Benefits:
Identify issues before they affect brand reputation, reduce business liability and legal risk, improve market reputation, increase and sustain customer satisfaction

Use Case – Demand Planning

Forecast the inventory necessary to meet seasonal demand, the number of suppliers needed to satisfy the need across the country, the need for equipment maintenance to ready plants for peak production, training requirements to meet the needs of a new product.

Using data integrated from disparate data sources, augmented analytics helps the business anticipate production demands, plan for new locations to meet demand and identify operational issues. Advanced analytics can help the business forecast and predict customer buying behavior and changes in product demand across multiple segments.

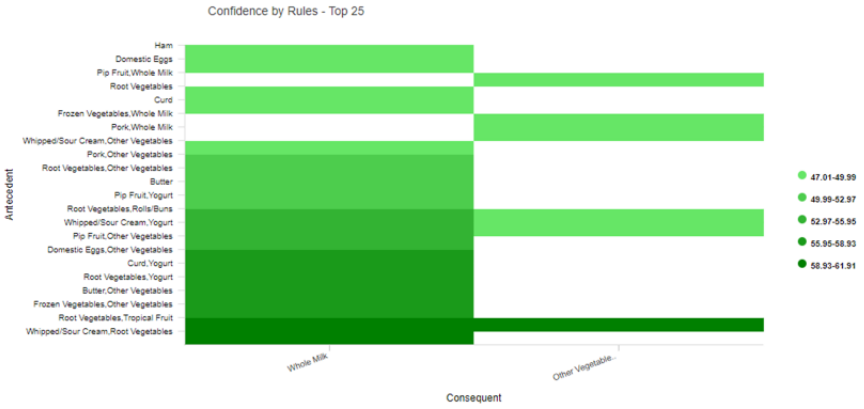
Benefits:
Plan for market and customer buying behavior changes, optimize products, features and design, optimize supply chain, production and distribution, plan for resources, locations and training, control inventory, improve revenue stream and customer satisfaction

Use Case – Product and Service Cross-Selling and Up-Selling

Businesses are happy when customers buy and, they are even happier when they can leverage customer satisfaction to cross-sell and upsell products and services, to increase revenue and brand loyalty. The organization needs to know what makes a customer buy, try another product or stick with the brand for future purchases of a particular product, related product or service.

Influencing Factors:
Transaction ID, date of purchase, products purchased

Benefits:
Develop a comprehensive understanding of customer buying behavior and brand loyalty, Increase revenue, target new product and service design and roll-out, drive marketing messages to targeted customer segments, improve brand loyalty and product and service mix

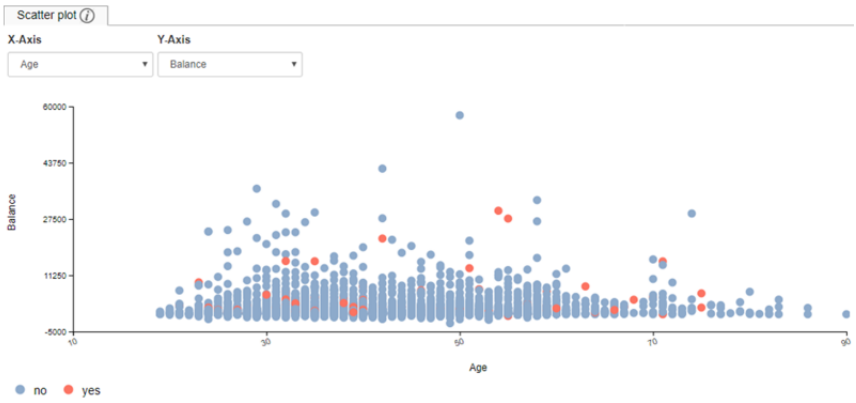


Use Case – Customer Targeting

In order to anticipate and satisfy customer needs, a business must understand buying behavior, and categorize products and services to target segments and preferences. If a business can identify the things that cause a particular customer to buy a product or service, it can create products, marketing, advertising and outreach that will target specific customer buying behaviors and needs.

Influencing Factors:
Demographics information, number of days since last email was sent, existing loan details, home ownership status, previous default status

Benefits:
Improve customer satisfaction, improve sales conversion, improve product design and features. optimize customer targeting and segmentation, anticipate market, customer, and the need for service, product and pricing changes, optimize sales resources and advertising budget

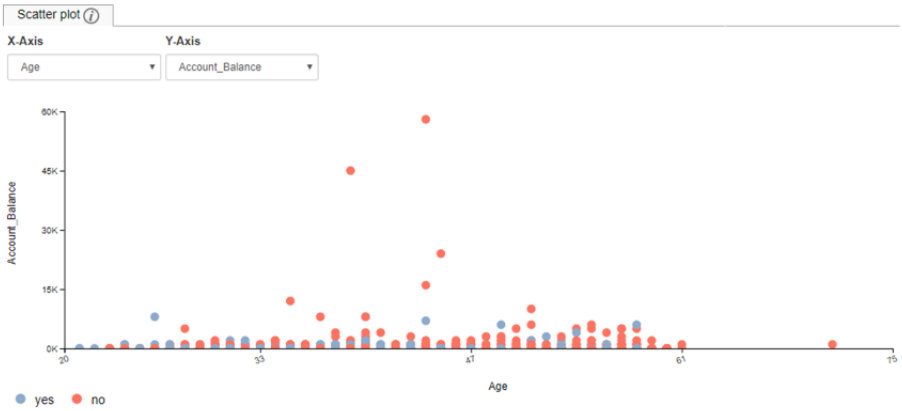


Use Case – Loan Approval

A bank or financial company can determine what type of loan applicants are most likely to default, and which ones are most likely to pay on time. This technique can be used to predict whether a particular customer will default, and when it will happen and to understand why particular customers default.

Influencing Factors:
Demographic info about customers – gender, age education, marital status, occupation, customer bank account details, past history and existing loan details

Benefits:
Improve productivity, improve loan approval process, decrease loan defaults, optimize available funds

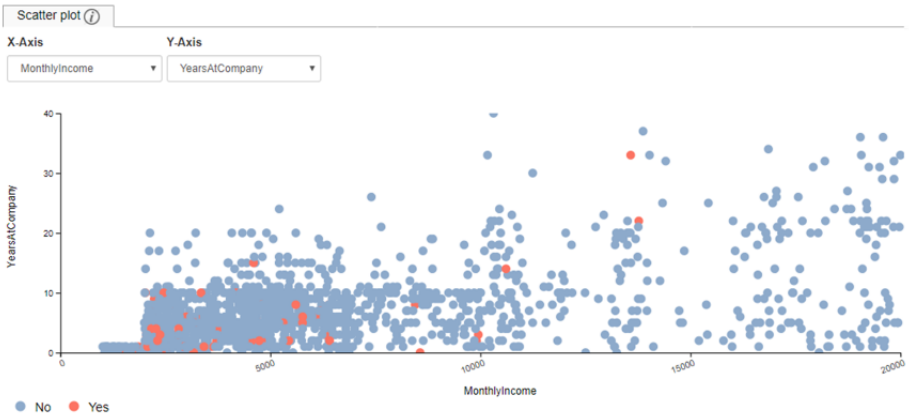


Use Case – Human Resource Attrition

A company can determine which employees are most likely to leave, and which ones are most likely to remain loyal. This technique can be used to predict whether a particular employee will leave and when it will happen and to understand why particular employees leave.

Influencing Factors:
Job satisfaction, satisfaction with pay, performance-reward contingencies, past working experience, employee personal and demographic information

Benefits:
Reduce attrition, improve hiring and screening processes, optimize compensation, improve training programs, improve employee loyalty and satisfaction

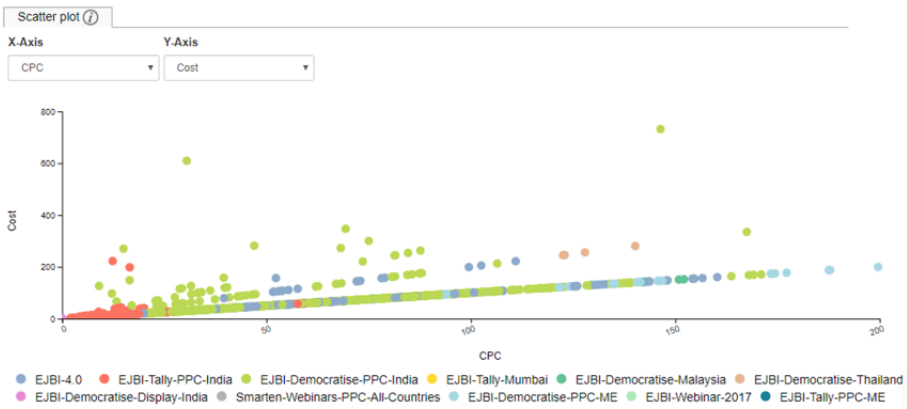


Use Case – Online Target Marketing

A company that uses Google analytics to track its website or app can determine what types of marketing campaigns perform well for the business and can create more targeted campaigns to increase sales and ROI.

Influencing Factors:
Campaign related information such as Cost Per Click (CPC) and cost.

Benefits:
Test hypotheses and theories for pricing changes, additional features etc. to create the right campaign, decrease the cost per click (CPC), predict conversions based on CPC and budget for a campaign, improve ROI, improve customer targeting and sales conversion, optimize marketing budget, Improve brand loyalty

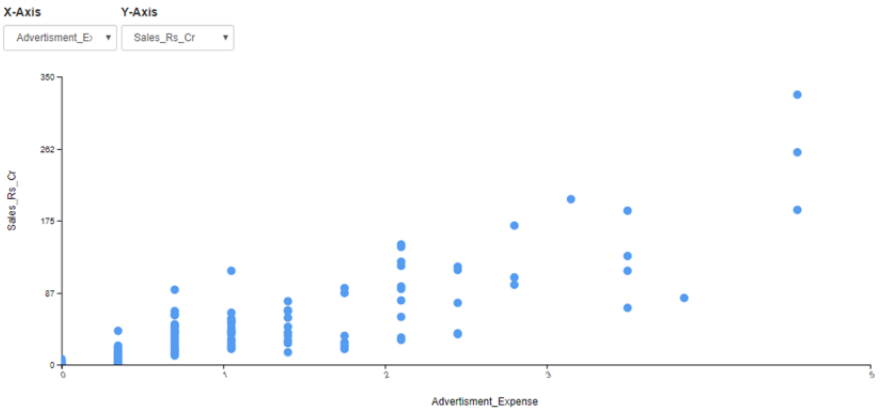


Use Case – Marketing Optimization

A company can determine the influence of the marketing and advertising campaigns on sales and identify whether marketing expenses are effective for the business and optimize the marketing budget to increase sales or ROI.

Influencing Factors:
Advertisement expense, vacancy, wholesale gap

Benefits:
Develop a comprehensive understanding of targets and customer segments, develop successful marketing and advertising campaigns across all segments, optimize marketing and advertising budget, increase competitive advantage

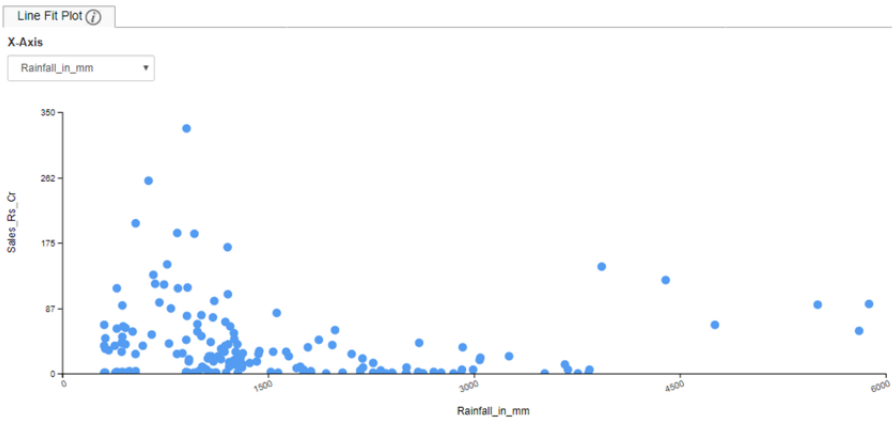


Use Case – Predictive Analytics Using External Data

A company can determine the influence of the internal and external data on sales and identify whether factors such as GDP, rainfall or population are effective for the business. Further appropriate action can be taken to increase sales or ROI.

Influencing Factors:
GDP, rainfall, vacancy, wholesale gap

Benefits:
Accurately plan for resources, locations, suppliers, adjust and manage marketing messages and advertising, optimize inventory, product supply, pricing and new products and services, mitigate risk and downtime, plan for maintenance and off-peak activities, improve planning process



Use Cases

The Rewards of Advanced Analytics

All over the world, businesses like yours are discovering the benefits of advanced analytics and, technology analysts predict that organizations leveraging augmented analytics solutions will grow at twice the rate of those that do not use these solutions. There is no denying that data and analytics are more important than ever and that the enterprise that engages in an active program to implement, adopt and use advanced analytics in the course of its day-to-day and strategic tasks and activities will have a competitive advantage and make better, more educated business decisions.

The rewards of business user focused advanced analytics are too numerous to mention and there are many use cases to support the effectiveness and benefits of augmented analytics within the average enterprise. Here are some examples of the successful leverage of advanced analytics within other organizations:

Customer Churn
(*https://www.smarten.com/augmented-analytics-use-cases/customer-churn.html*)
The cost of acquiring and interacting with customers is one a business must fund and, every time the business loses a customer (customer churn), it must spend more money to replace that customer.

Fraud Mitigation
(*https://www.smarten.com/augmented-analytics-use-cases/fraud-mitigations.html*)
Businesses must work to mitigate fraud to improve business results and develop and sustain fraud detection processes to enable operations monitoring.

Quality Control
(*https://www.smarten.com/augmented-analytics-use-cases/quality-control.html*)
Businesses that fail to control quality will lose customers and market share and, in some cases, expose the organization to legal risk and liability.

Demand Planning
(*https://www.smarten.com/augmented-analytics-use-cases/demand-planning.html*)
Businesses cannot afford to use guesswork in the planning process. There are many factors that influence business success and a business must anticipate and plan to accommodate.

Product and Service Cross-Selling and Up-Selling
(*https://www.smarten.com/augmented-analytics-use-cases/product-service-crosssell-upsell.html*)
Business managers strive to leverage customer satisfaction to cross-sell and upsell products and services, thereby increasing revenue and brand loyalty.

Maintenance Management
(*https://www.smarten.com/augmented-analytics-use-cases/maintenance-management.html*)
A business must focus on maintenance to keep equipment up and running and reduce downtime as well as perform anticipating required resources, hours on the job and the types of training required.

Customer Targeting
(*https://www.smarten.com/augmented-analytics-use-cases/customer-targeting.html*)
If a business can identify the things that cause a particular customer to buy a particular product or service, it can create products, marketing messages, advertising and outreach that will target specific customer buying behaviors and needs.

Human Resource Attrition
(*https://www.smarten.com/augmented-analytics-use-cases/human-resource-attrition.html*)
To retain employees, the organization must understand what makes a team member leave a position, what makes them want to stay and invest in the future of the business and what types of issues will create dissatisfaction.

Loan Approval
(*https://www.smarten.com/augmented-analytics-use-cases/loan-approval.html*)
The cost of dealing with 'bad' loans is high and it reduces profitability and productivity. To succeed, businesses must have a dependable process for attracting the right clientele and reviewing, approving and managing loans.

Marketing Optimization
(*https://www.smarten.com/augmented-analytics-use-cases/marketing-optimization.html*)
Businesses create targets and goals but, without a fundamental understanding of what affects sales and what kind of decision process customers use to choose a product or service, the marketing and advertising process is based only on guesswork.

Predictive Analytics Using External Data
(*https://www.smarten.com/augmented-analytics-use-cases/predictive-analytics-external-data.html*)
The ability to integrate data from sources outside the enterprise is crucial to many businesses. Analysis of external data is tedious and time consuming if it is not easily handled by an augmented analytics solution.

Online Target Marketing
(*https://www.smarten.com/augmented-analytics-use-cases/online-target-marketing.html*)
In order to optimize available marketing funds and resources, the enterprise must understand what works and what does not work, where to put its messaging and the ideal profile and demographic for its targeted customers.

These are just a few examples of advanced analytics use cases. We invite you to explore how the Smarten Augmented Analytics product can help your business to achieve goals and sustain a competitive advantage.

What Do You Want to Do?

Forecasting

Forecast values for the future based on past values, with one or more variables affecting future values.

- Example: Forecast product sales based on past sales, inflation, and GDP growth.
- Other use cases: product/service demand forecasting, inventory management, GDP forecasting, tourism forecasting

Classification

Split data into groups based on preassigned categories or classes.

- Example: An applicant for a new loan can be assigned likely/unlikely defaulter categories based on the preassigned defaulter/nondefaulter category for older applicants.
- Other use cases: likely credit card fraud, likely loan default analysis, crime/no crime analysis

Clustering

Split data into groups when preassigned categories or classes are not available (as compared with "classification," where preassigned categories or classes are available).

- Example: Segmenting online customers into heavy/moderate/low purchaser groups based on purchasing frequency, average purchase amount, income, age, etc.
- Other use cases: customer segmentation or grouping based on purchasing behavior, demography, and geography.

Correlation

Analyze how any two or more variables are associated.

- Example: Analyze whether or not there is a strong positive association between age and online purchasing frequency.
- Other use cases: identify association between product price and sales, between age and loan amount, etc.

Regression

Predicts change in one variable based on change in one or more other variables. Answers such questions as the following: Which factors matter most? Which factors can we ignore? How do those factors interact with each other?

- Example: eCommerce company can measure the sales impact of product price, product promotion, holidays, seasonality, etc.
- Other use cases: yield management, predicting property price, customer churn prediction, employee attrition prediction, etc.

Frequent pattern mining

Finds frequent patterns from the data.

- Example: A retail store can place bakery products, such as muffins, bread, and eggs, together if these products have a high frequency of being purchased together.
- Other use cases: market basket analysis, crime analysis.

Hypothesis testing

Answers such questions as the following: Are two samples significantly different? Is the treatment effective? Are two dimensions related or independent of each other?

- Example: An eCommerce company can measure the regional influence on product category and gender influence on purchased product type.
- Other use cases: finding out if a medical treatment/promotional activity has been effective, if two river samples differ significantly in terms of pH level, etc.

Descriptive statistics

Provides basic statistics, such as mean, median, mode, standard deviation, variance, skewness, and kurtosis.

Sampling

Simple Random Sampling

- Selection is purely based on chance and every item has equal chance of getting selected.
- For example : Lottery system

Stratified Sampling

- Population data is divided into subgroups that have similar attributes and characteristics and these subgroups are called Strata.
- For example, customers' subgroups can be formed based on any of their demographics such as income group, region, gender etc.
- A random sample from each of these subgroups is taken in proportion to the subgroup size relative to the population size, and these samples are then added to form a final stratified random sample. For example, if original dataset had 1:3 ratio of males and females then stratified random sample based on gender will also have 1:3 ratio of males and females.

Outliers

Outliers are the observations lying outside overall pattern of distribution.