

# Using Machine Learning to Increase Pub Revenue

*Insights Dashboard Powered By Machine Learning Increases Attendance and Sales at Board Games Pub*

**Insights gained through machine learning lead to an improved understanding of customer preferences, allowing for smarter offering and increased customer satisfaction.**

Hospitality is a high volume, low margin industry that focuses on meeting customer expectations and providing excellent customer experiences.

Due to the large amounts of data available to the industry, machine learning-based analytics can deliver insights that have the potential to increase attendance, sales volume, and revenue. It allows retailers in the hospitality industry to deliver experiences tailored to customer preferences, and track the success of those strategies.

## PROJECT HIGHLIGHTS

- **Deliverable:**
  - Dashboard for insights generation, customer segmentation and product recommendation.
- **Timeline:**
  - 3 weeks: Proof of Concept
  - 6 weeks: Working model
  - 3 months: Production deployment
- **Tech used:**
  - Python, SQL Server, AWS, Tableau
- **Machine learning techniques:**
  - K-means clustering
  - Association rule mining

# The Challenge

## Improve pub's revenue and attendance by using large amount of data

In 2017, Italian board games pub Bazinga Ludoclub wanted to increase customers attendance and sales, but lacked the capacity to take advantage of the data it had collected about customer purchasing habits.

The manager turned to Rediscovery.io, as a company specializing in developing bespoke **Machine Learning** solutions for business and academia.

Bazinga asked Rediscovery.io to use the pub's data to improve business performance by increasing sales and attendance.

Due to Bazinga's members-only business model, the manager had access to large amounts of data, including date and time of each customer entry and records of item sales.

### WHAT IS MACHINE LEARNING?

Machine learning is a branch of artificial intelligence that allows computers to learn without being explicitly programmed, and make data-based decisions without the need for human intervention.

Machine learning algorithms are trained to recognize patterns in data, then predict similar patterns in new data.



### ABOUT OUR CLIENT

**Bazinga Ludoclub** is a **pub** in Catania, Italy, that specializes in **board and video games**.

Established in November 2015, the members-only pub features food, a full bar, and more than 100 board games. In 2017, Bazinga had approximately 5,000 members. Entrants are required to purchase a yearly membership and for each entrance pay a fee that covers the cost of all board and video games. Members also enjoy themed evenings, tournaments, and food and drink specials.

The algorithms created by Rediscovery.io are helping Bazinga improve sales and attendance.



# The Decision-Making and Development Process

## DEFINING MEANINGFUL KPIS

Following a preliminary exploratory analysis of the data, the following KPIs were defined in order to consistently monitor the performance of the business:

- **Total profit margin across products**
- **Average customer spending**
- **Percentage of returning customers**
- **Customers' attendance by day of the week**

## DEFINING AREAS OF IMPROVEMENT

To improve on the agreed KPIs, Rediscovery.io identified three main areas of intervention to focus on:

- **Insights about products:** Use product performance data to drive strategic decisions about menu offerings. **Linked KPI:** Total profit margin across products.
- **Insights about customers:** Identify different groups of customers and their preferences by segmenting customers according to their purchasing patterns. **Linked KPIs:** Average customers spending, percentage of returning customers.
- **Promotions and special offers:** Recommendation of promotions and special offers tailored to specific customer segments and seasonalities, such as time of day and day of week. **Linked KPIs:** Avg. customer spending, customers' attendance by day of the week.

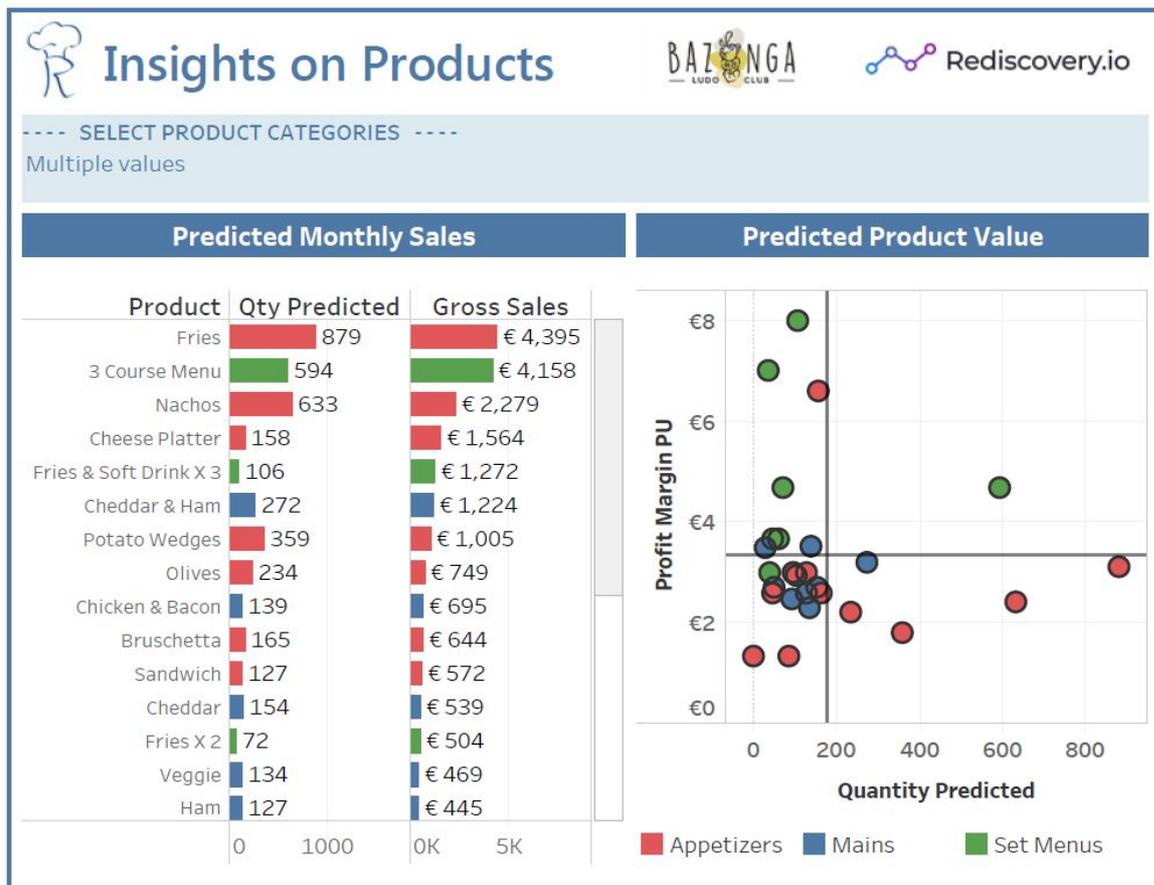
# The Solution

## Interactive Dashboard leveraging Machine Learning to Deliver Product and Customer Insights and Recommend Promotions and Special Offers

To provide actionable insights in real-time, Rediscovery.io developed a dashboard that leverages machine learning models and interactive tables and charts. The dashboard supports the manager in all his strategic decisions.

### INSIGHTS ABOUT PRODUCTS

Using predictive analytics on product performance and data on profit margins, the dashboard delivers actionable insights on product performance. Managers can use this information to increase revenue by promoting high-margin items and replacing low-performing items.



Extract from the dashboard

## INSIGHTS ABOUT CUSTOMERS

The dashboard uses a clustering algorithm to segment customers based on their purchasing patterns. Managers can use this information to increase revenue by formulating specific product offerings for specific customers segments, and to better manage inventory by making more informed decisions about stocking.

More in detail, this is how the algorithm works :

● **1. The algorithm uses data to extract factors describing customers' behaviour, such as average spending per meal and propensity to buy each product.**

The propensity to buy a certain product or visit the pub in a certain day is measured by normalized scores:

Anonymised customer ID	Average spending per meal	Propensity to buy product X	Propensity to buy product Y	Likelihood of attendance on Friday
adba423	€ 6.5	0.45	0.73	0.38
adba271	€ 5.3	0.24	0.81	0.74

● **2. Customers' behaviour across different factors (and specifically the distribution of those factors) is used to identify an optimal number of clusters.**

● **3. Customers with similar behaviour are assigned to the same cluster.**

■ **4. The average behaviour of customers for each clusters is finally extracted:**

Cluster #2 - "Weekday Player"
Number of customers: 3054 (30% of total)
Favourite products: 1) beer 2) soft drink 3) chips
Average money spent: €3.8
Total gross sales: €11,636
Average group size: 7 customers
Typical day: Thursday

Example of cluster created by the customer segmentation algorithm

Ultimately, the customer segmentation groups together customers with very similar habits and preferences and allows to build a *persona* around each customer group.

## RECOMMENDATIONS FOR PROMOTIONS AND SPECIAL OFFERS

Using a Machine Learning-based recommendation algorithm, the dashboard suggests special offers and promotions likely to increase customers spending and net revenues for the pub.

For example, the algorithm suggested that customers might be likely to buy into high-margin premium craft beers if those were offered on a set menu together with a popular item such as chips.

# Results

## Dashboard Powered by Machine Learning Leads to 18% Increase in Profit Margin

Rediscovery.io created a user-friendly, interactive dashboard that delivers machine-learning based insights. The dashboard allowed the manager to tailor products, promotions, and special events around customer preferences, increasing revenue and customer satisfaction. As a result, different KPIs showed a substantial improvement in the business performance:

- **Total profit margin across products increased by 18%**
- **Average spending per customer increased by €1.15 (16%)**
- **Returning customers increased by 12%**
- **Attendance during the week (Sunday to Thursday) increased by 8%**

*Are you considering building a machine learning solution?*  
**We're here to help**

**FOR MORE INFORMATION**

Please email [hello@rediscovery.io](mailto:hello@rediscovery.io) or call **+44 20 7117 2582**