

## ARTICLE TYPE

# Best Buyers For a Pizza

### Abstract

In this project, we address the challenge of harnessing historical data from global online shopping activities for effective target marketing. We formulate an algorithmic framework to classify international customers based on demographic data, purchasing history, and the likelihood of location-based marketing campaigns influencing specific product orders. The proposed solution involves data cleansing, automated integration, simulator-based parameter discernment, and a Deep Learning model for customer classification. Monthly sales predictions are refined using genetic algorithms and a simulator. The implemented technology demonstrates up to 7% increased sales after initial months, emphasizing tailored recommendations. Customer retention for repeat purchasers exposed to the system at least three times increases by 4%.

### The Problem

In this project, we handle a task that involves the formalization of an algorithmic framework to leverage historical data extracted from online shopping activities spanning various global markets (owned by the client). These activities encompass both the purchasing behavior of shoppers and their corresponding demographic attributes, as bought from social media and search engines in advance. The primary objective for the project is to develop a robust target marketing mechanism that can effectively classify international customers based on their aggregated demographic data and purchasing history focusing on the probability that a location-based marketing campaign in three leading social media websites would make them order a specific product.

### The Solution

To tackle this challenge we proposed a multi-step solution. Primarily, we embarked on a substantial endeavor encompassing the cleansing of a voluminous and unstructured dataset inherent to the organization. Subsequent to data refinement, we orchestrated its transformation into a structured format conducive to facile retrieval for future use. Concurrently, an automated module amenable to seamless integration into the client's operational systems was introduced. The crux of our challenge lay in discerning the pertinent parameters that signified meaningful data, delineating the significance of products to individual clients. To address this, we devised a simulator that generated results of discerning significance, and subsequently subjected to profound analysis. By subsequently formulating data-driven hypotheses and meticulously validating them, we conceptualized a Deep Learning model (FcNN) that proficiently classifies distinct client categories along with their purchasing patterns. Afterward, leveraging genetic algorithms and an intricately refined simulator, we achieved a monthly sales prediction update for various market segments, individual items, and diverse customer classes. Culminating our approach, we proactively engaged the client to dispatch personalized email recommendations to customers, advising them on prospective purchases for the forthcoming month.

### The Outcome

Following the implementation of the proposed technology, in the first three months, no statistically significant change has been measured. However, for the next months following it, an increase of up to 7% in overall sales is recorded, driven by the tailored product recommendations generated by the

algorithm. Additionally, customer retention for customers that buy from the company at least twice and are exposed to the system at least three times is increased by 4%.