

Business and Revenue Improvement

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My [professional career](#) since year 2000 has focused on data driven projects with the objective to optimize strategies and processes for business improvement, revenue improvement or the improvement of non-commercial systems, such as environmental systems. I have used [systemic approaches](#) by defining problem domains and boundaries and the inter-relationships of the components. Once the problem is clearly defined and delimited, I have applied technologies ranging from operations research, optimization, machine learning, probability theory, etc. Some examples are:

At [RTI International](#), I developed a quantitative framework to aid in decision making for integrated municipal solid waste (MSW) management. The [MSW Decision Support Tool](#) (MSW DST) incorporates revenue, cost and environmental objectives. The MSW DST has an optimization module that selects the best group of technology options based on cost or environmental criteria. I developed the [mathematical model](#) with an optimization engine represented by linear programming (LP) solved with CPLEX (now [IBM CPLEX](#)) to find an optimal solution. It includes multi-objective optimization with competing objective functions such as cost, environmental emissions, energy consumption and recycling levels. I used the [Modeling to Generate Alternatives](#) (MGA) methodology to alter the LP formulation to obtain multiple interesting near [optimal solutions](#). Impact: Increased revenue from the sale of recyclable materials and the generation of energy from waste-to-energy technologies.

As an independent consultant, I developed predictive models using R and machine learning to estimate parameters used in [price optimization methodologies](#). I used optimization algorithms to find optimal pricing strategies for multiple products considering elasticities, discounts, variable costs and other parameters. Impact: Optimized profit and revenue margins for retail business owners with methodological framework to make informed decisions on product price selection and product assortment.

As a data scientist at [Point Inside](#), I built models to help brick and mortar retail stores (e.g. Lowe's) to increase revenue using strategies ranging from marketing to upsell and cross-sell. Point Inside created an application that used signals from beacons to determine the location of customers in a store. Beacons are small, battery-operated wireless devices that transmit Bluetooth signals to nearby smartphones. In the context of retail, beacons reach out to customers that have Bluetooth enabled and the right retail apps downloaded onto their phones.

I used the data from these beacons to help our brick-and-mortar customers use [proximity marketing](#) to improve shopping experiences and increase sales. Another use case was to create a user to Point of Sale (POS) receipt association. The datasets consisted of two different sources: one was the POS receipts not identified by customer ID; and the other dataset consisted of click events, searches on the Point Inside app in the store (sometimes outside of the store) for

products. The idea was to try to establish a relationship between the click events and the actual purchases. Impact: Improved algorithms to guide searches on the Point Inside app in the store and increased sales conversions based on those searches.

I built item-to-item (I2I) based recommenders. I generated very large I2I sparse matrices by calculating the frequency of Point of Sale (POS) transactions containing any 2 items. I decomposed the matrix using Singular Value Decomposition ([SVD](#)). Impact: A new matrix was calculated using just a sub-set of the singular values and observing potential new i2i recommendations: “because you bought this item, we recommend this other item”.

At [Continental](#), I led the design and development of a solution for the [Truck Tires Competitor Pricing](#) project. The Continental pricing team is responsible for design, implementation, and reinforcement of pricing strategy in the US market, for all product areas. I used the [Pergola Platform](#) to manage stages, releases and configurations. This application has helped Continental increase our revenue by saving time and resources in the process of premium pricing. Continental produces top tier tires only, and currently the market is putting us pressure by offering lower cost products. Continental uses this tool to optimize premium pricing to meet our volume targets.