Data science / ariticifial intelligence / machine learning | Medical Devices | Marketing analytics | Sequential optimization

# Sequential Optimization for Prospective Customer Segmentation and Content Targeting

ResMed

## BUSINESS PROBLEM

A key challenge for ResMed's ongoing growth is increasing awareness and treatment of obstructive sleep apnea (OSA), a highly prevalent and underdiagnosed sleep disorder. To address this, ResMed is seeking to introduce an online OSA diagnostic pathway. This includes creating a streamlined digital journey for customers to get diagnosed, and driving traffic with data-driven marketing tactics. Data collected through these efforts enable ResMed to more efficiently use its marketing budget, glean new customer insights, and ultimately serve more patients with critical life-enhancing treatment.

## APPROACH

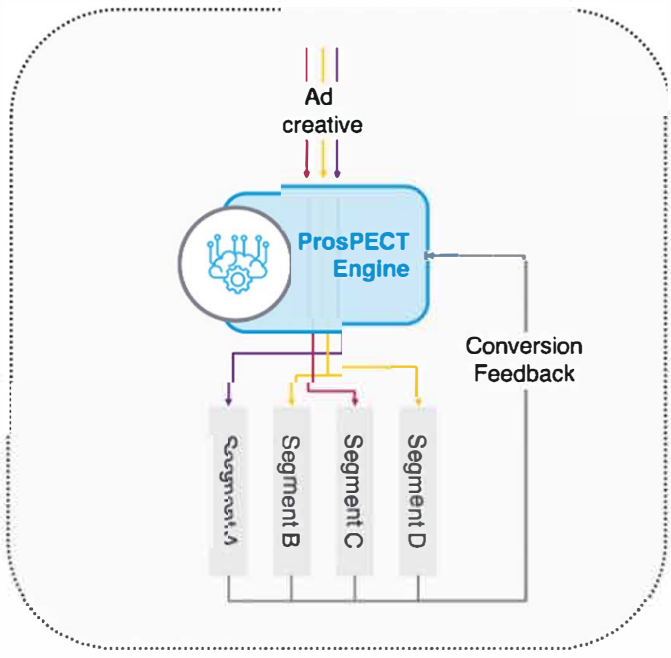
This project tackles the problem of intelligent targeting for online paid advertising. A sequential optimization procedure (batched sequential model-based algorithm configuration, or B-SMAC) was developed and tested to conduct ad experiments efficiently and automatically. Ultimately, the algorithm identifies the best-performing target audience while using minimal experimental resources.

## DATA SOURCES

Online advertising performance data (API); web analytics data (API)

**Data Types and Format**

Time series, tabular

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## IMPACT

The B-SMAC algorithm allows ResMed's online marketing teams to make data-driven ad targeting decisions that increase conversions. Further, customer segment-level ad effectiveness data revealed by this tool enable ResMed to optimize its marketing content strategy and also to glean insights that can be used throughout the business.

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|---|---|
| **DRIVERS** | OSA is highly prevalent but underdiagnosed sleep disorder. Because of this, it is critical to create and optimize a streamlined diagnostic funnel so more patients can receive life-altering treatment. |
| **BARRIERS** | Building relationships and working with stakeholders while working remotely during COVID; Tackling the first data science marketing use case; Surpassing internal legal and data privacy procedures for data access |
| **ENABLERS** | A strong collaborative culture within ResMed and my stakeholder teams; Guidance and help from the data science and data engineering teams; A continuous improvement mindset at ResMed that is open to change and improvement |
| **ACTIONS** | A robust handover with the technical team who can own the technology going forward; Comprehensive code and logic documentation; Finding business stakeholders to sponsor the project going forward. |
| **INNOVATION** | The use of a sequential optimization paradigm to make marketing decisions; Doing initial testing in a simulation environment; Implementing re-aggregation approaches to turn B-SMAC outputs into high-performing economically viable ad targeting strategies |
| **IMPROVEMENT** | Targeting by re-aggregated B-SMAC outperforms human-based targeting by 2.8x, and outperforms Facebook's internal black-box targeting paradigm by 1.6x. This is true while simultaneously providing customer segment-level ad effectiveness insights that can be leveraged by the business, which the two baselines do not provide. |
| **BEST PRACTICES** | Testing the solution in a simulation environment first; Leveraging / adapting existing algorithms instead of starting from scratch; Working with data engineering team to ensure the right data is available in the right form, at the right time |
| **OTHER APPLICATIONS** | Any situation where many parameters must be set simultaneously, and experimentation is allowed but costly |