Similarity Based Explainable AI (XAI) is an Analytic Workbench for Marketing

As a CMO, who has been supporting CMO's for 25 years with hundreds of analytic and data driven marketing campaigns across multiple industries, I am all too familiar with the latency inherent in the CRM campaign process of large enterprises. Marketers experience a multiple months-long workflow to acquire and integrate data, perform segmentation and modeling, select and activate audiences for campaigns, execute and measure results, and then integrate findings into their next campaign. Latency, lack of precision or relevancy, and an inability to apply learnings in a timely manner is an age-old struggle. This process is ripe for significant efficiency gains through AI technology and applications. Enter machine learning for marketing.

Marketing Campaigns are the Revenue Lifeblood for B2C Brands

Marketing campaigns, including addressable digital and TV, are the lifeblood of revenue for many brands. Every time you pull the campaign lever, revenue is generated in a predictable manner. Once established, campaigns become increasingly cemented into their well-defined and lengthy process. Most involved are reticent, or at the very least, unable to easily change the process simply due to the number of tasks and people involved, as well as the data sources, channels, vendors and calendar windows required. Tasks are many, time consuming and cumbersome.

Marketing Campaign KPI's

Response

Conversion

4-7 Months

Profit

Revenue

Machine Learning and Marketing Efficiency

What if you could plug technology into your existing process, that made it twice as fast, agile, efficient, precise, and relevant? If you could pull that campaign lever more frequently, with better results – without risking the predictable nature of existing campaigns you would, wouldn't you? This is the promise of machine learning, that is slowly finding its way into different parts of the campaign workflow. However, like all technology, marketers struggle to know what ML to use, where to use it, how to use it and whether to trust it. Since most ML is a black box, issues with trust relative to what its being predicted and why, what data is being used by the algorithms and why, and the need to explain what it's doing for business, privacy and compliance reasons are big issues.

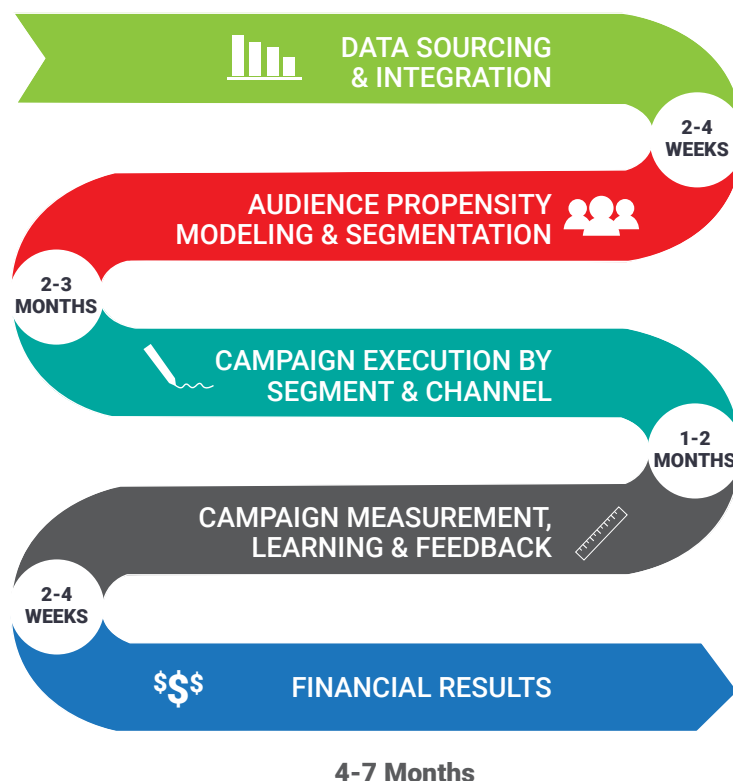# Similarity-Based XAI Has the Broadest and Deepest Impact on the Campaign Process

Not all machine learning is created equal when it comes to tightening up the CRM campaign process. Enter similarity based explainable artificial intelligence (XAI). Similarity based XAI, unlike any other ML, is built on a method called similarity (knn or nearest neighbor), that in its own right, addresses challenges across the campaign process. The method also enables high precision and transparency to inform marketers with the reason, "Why", a customer or prospect is predicted to buy, at great speed, at an individual prediction level when combined with proprietary techniques in search and metric learning.

Think of a CRM driven marketing campaign being supported by a set of tools, loosely bolted to a hard surface. What ML technology can tighten down the most bolts across various steps of the process to make existing functions smarter, faster, more efficient, more precise and intelligent? This is where similarity based XAI technology holds an advantage. With precision to match any other method, while using similarity-based functions to enable multiple aspects of the workflow, it stands out as a versatile and powerful method, that handles the most marketing functions and tasks of any ML. Similarity based XAI is an analytic workbench for marketers and their analytic teams because it has the greatest breadth of impact.

How XAI Reduces Latency, and Increases Precision & Relevancy in the Campaign Process

The typical CRM workflow of marketing looks like this:

Typical Marketing Campaign Workflow

DATA SOURCING & INTEGRATION

2-4 WEEKS

AUDIENCE PROPENSITY MODELING & SEGMENTATION

2-3 MONTHS

CAMPAIGN EXECUTION BY SEGMENT & CHANNEL

1-2 MONTHS

CAMPAIGN MEASUREMENT, LEARNING & FEEDBACK

2-4 WEEKS

FINANCIAL RESULTS

4-7 Months

The XAI workbench can plug in to existing workflows via API to perform key functions with high impact:

sM XAI Plug In Via Restful API

Typical Marketing Campaign Workflow

DATA SOURCING & INTEGRATION — 2-4 WEEKS

AUDIENCE PROPENSITY MODELING & SEGMENTATION — 2-3 MONTHS

CAMPAIGN EXECUTION BY SEGMENT & CHANNEL — 1-2 MONTHS

CAMPAIGN MEASUREMENT, LEARNING & FEEDBACK — 2-4 WEEKS

$$$ FINANCIAL RESULTS

4-7 Months

sM XAI Functions

- Fuzzy Matching for Identity Resolution
- Cross Database Reconciliation

- Predictions with weighted factors
- Dynamic Predictive Segmentation

- Segments with weighted factors
- Control segment granularity

- Twin pairing for test & control
- Instant matching of control to test pop.

sM XAI Impact

~20%+ file matching increase
~10%+ increase in identity linking
1 hour to run on hundreds of millions

~20%+ increase in predictive precision
~20x segment resolution
Days vs Months to model & segment

~100% increase in relevancy
~20%+ increase in conversion rates
Days vs Weeks to campaign execution

One to One ad effect measurement
~40%+ increase in spend efficiency
Minutes to report once data is recieved

1-3 Months (Reduces latency by 50%)

In a one to moment world, in which the relevancy of marketing messages and customer experiences are paramount for building trust and retaining existing customers, the current process is simply too slow, too imprecise and too irrelevant to the customer. Reducing latency by 50% (for those processes that bookend the campaign window itself) and increasing precision and relevance by 20%-100% or more is possible, through similarity based XAI, not in a narrow way but in a broader way – and can be activated across the workflow in a phased approach for maximum impact.

Besides Efficiency – Improving Relevancy is the End Game for CMO's

Where XAI has probably the greatest impact is in *improving the relevancy of a campaign to increase conversion rates.* This is the most exciting aspect of this technology. It is widely recognized by marketers that traditional segmentation doesn't provide nearly the level of precision or contextual relevancy needed today. According to a Forrester Report, commissioned by simMachines and published in January, 2018, *Capture the Customer Moment with Dynamic Predictive Segmentation*, "100% of marketers agreed it was risky not to adopt XAI enabled Dynamic Predictive Segmentation." The report also highlighted the following key risks:

"What are the risks of not adopting dynamic predictive segmentation? Select all that apply."

50% Lack of precision in executing outbound campaigns.

43% Inadequate level of speed-to-insight across customer touchpoints

27% Losing customers to competitors

48% Inability to predict what a customer wants with enough accuracy during interactions.

34% Inability to predict with enough precision next best offer or recommendation

24% Inability to apply the latest customer interaction or updates quickly enough into predictions

44% Inability to uncover emerging trends and react to them quickly/with low latency

28% Inability to improve campaign performance

0% No impact

Base: 155 US decision makers responsible for program execution or campaign planning
Source: A commissioned study conducted by Forrester Consulting on behalf of simMachines, August 2017
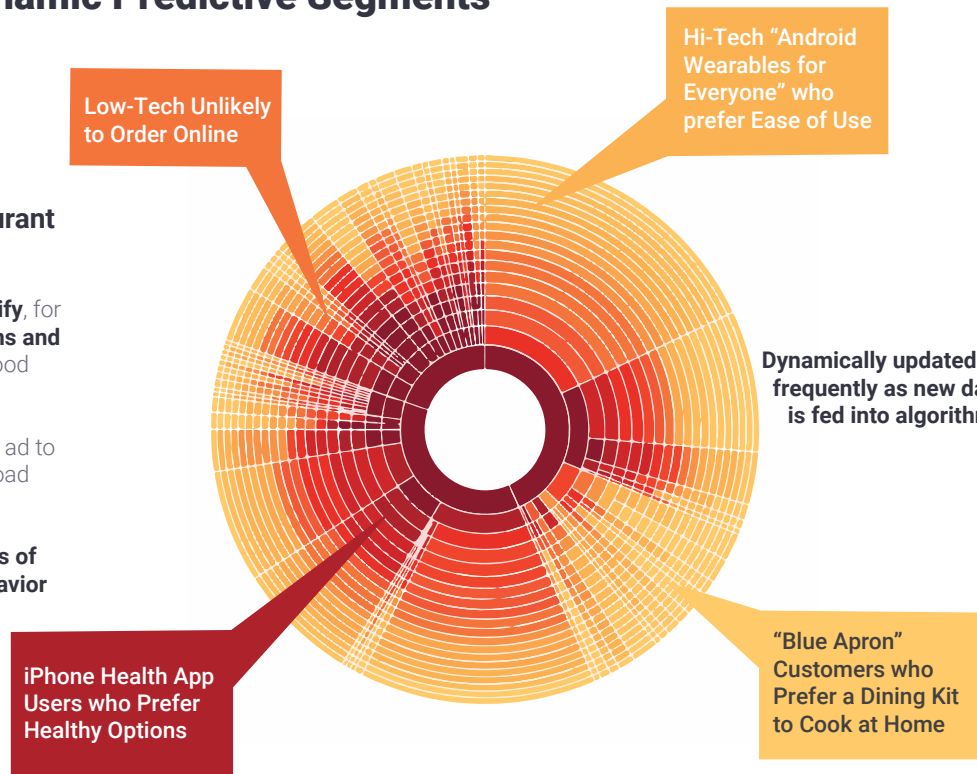
So how does similarity based XAI enable relevancy through Dynamic Predictive Segmentation? Here is a simple example using segmentation focused on online restaurant food delivery. First the segments are generated in days, if algorithms need to be trained, or in minutes / hours if already trained and ready.

XAI Enabled Dynamic Predictive Segments

Low-Tech Unlikely to Order Online

Hi-Tech "Android Wearables for Everyone" who prefer Ease of Use

Example: Order Restaurant Delivery Online

Use contextual data to **identify**, for example, **purchasing patterns and drivers** of predicted online food delivery customers.

Instead of sending the same ad to all predicted buyers, or to broad descriptive segments, drive **contextually relevant offers based on the primary drivers of the predicted purchase behavior for each segment.**

Dynamically updated as frequently as new data is fed into algorithms

iPhone Health App Users who Prefer Healthy Options

"Blue Apron" Customers who Prefer a Dining Kit to Cook at Home

Similarity based XAI automatically generates segments based on predictions that share common characteristics. These segments are inherently predictive, contextually relevant and actionable. However, super segments often reveal themselves for immediate focus, along with the most important factors that characterize a particular segment, *in order of importance.* These factors are the drivers of the predicted behavior.

Under current descriptive segmentation approaches, segments are blunt, lacking the contextual relevance associated with each buyer:

Traditional Descriptive Segmentation Example:
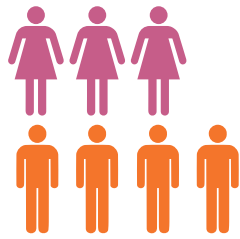
Descriptive & Static Segmentation

Segment 1: Women, Mid 20s
Ad Campaign: "Dinner & a Movie Night"

Segment 2: Men, Middle Age
Ad Campaign: "Eat Out at Home"

Black box ML weights all factors equally in making a prediction which means it's adding predictive power but not generating more granular customer segments based on the relative weights of the factors associated with a buyer's predicted behavior. *The prediction and the segments are disconnected.*

Predictive "Black Box" ML Segmentation Example:
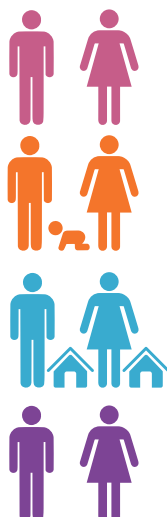
Predictive & Static Segmentation

Segment 1: Women, Mid 20s
Ad Campaign: "Dinner & a Movie Night"

Segment 2: Men, Middle Age
Ad Campaign: "Eat Out at Home"

Segment 3: Not Likely to Order

With similarity based XAI, factors are dynamically weighted by the algorithms and reveal what the key drivers of predicted behavior are to target messages and offers. *The prediction and the segments are one and the same.*

XAI Enabled Dynamic Predictive Segmentation Example:

Dynamic Predictive Segmentation

Segment 1: Having hi-tech wearable android devices
Ad Campaign: "Easy to use online ordering saves your last order and recommends new ones for you"

Segment 2: "Blue Apron" customers with children
Ad Campaign: "Have all that you need to make dinner, delivered right to your family.

Segment 3: iPhone Health App Users who live close to a restaurant
Ad Campaign: "Healthy options delivered right to your door from right around the corner"

Segment 4: Not likely to respond to an online delivery service offer, promote restaurant visit instead

For CMO's, the ability to run segmentation in days and increase precision and relevancy at the same time is very valuable and a "must have" in today's environment. When your company needs to make a strategic decision to pivot or stay on course, similarity based XAI gives your data a "voice" that provides speed to insight, a critical need for CMO's to maintain competitive positioning and a high degree of relevancy to customers constantly changing needs.

Similarity Based XAI's Impact is Big and Immediate Since It's Easy and Fast to Deploy

One of the key advantages of XAI is that it can plug in easily into existing processes via a restful API. Without disrupting current workflows, functionality can be added to enhance specific processes. Each area carries its own fast payback and ROI, but once deployed across the workflow – the cumulative impact is significant. ROI impacts of efficiency, increased response and conversion span any dimension of the customer lifecycle, from acquisition to reactivation and retention. It doesn't take many basis point increases to yield millions in pre-tax operating profit for most brands.

Next Stop – Customer Experience Management

The same technology can be used to achieve significant relevancy in inbound customer experience applications. With recommendations based on "Why" someone is contacting you, relevancy can be up-ticked on the inbound side in a deployment time-frame that modernizes the current state very quickly for many brands that lag behind. Similarity based XAI continuously learns on previously successful interactions to create new ones based on how similar one customer is to another. And this creates even more impact opportunities – and even more importantly, relevant moments of interaction with customers. Similarity based XAI is truly a next generation analytic workbench for marketing.