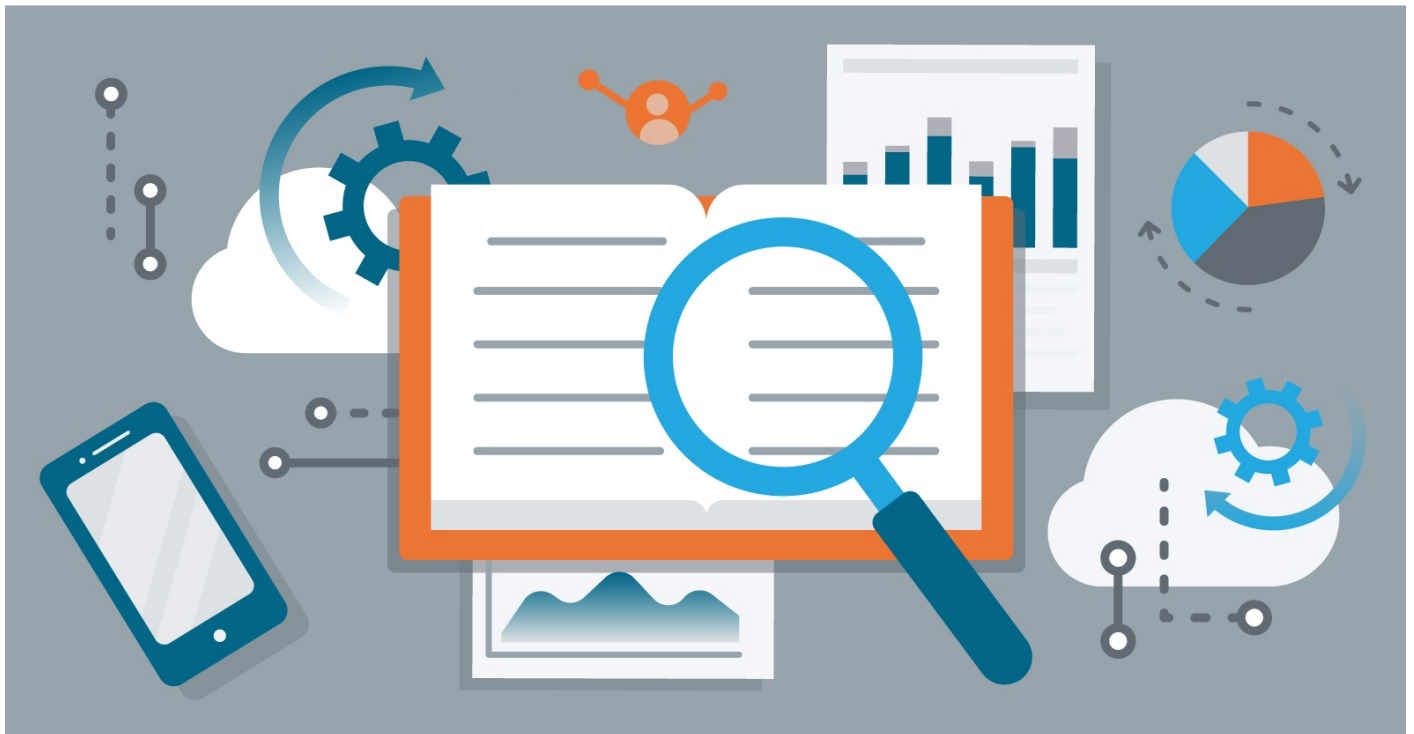# Marketing technology research papers worth checking out

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Customer Data & Analytics Blog

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We recently published a [blog post](#) highlighting how there is a wealth of innovative marketing technology tools available today. Advanced technologies such as artificial intelligence (AI), machine learning, and neural networks are being used to power many marketing technology platforms.

This blog post highlights a few interesting research papers that outline the use of various technologies for marketing use cases.

Contextual multi-armed bandits for causal marketing

Sawant, Namballa, Sadagopan, & Nassif, 2018

This paper explains that there are three primary challenges when it comes to addressing the causal effects of marketing. One of those challenges is counterfactual estimation where the outcome of a campaign targeted at a specific customer is known, but it is necessary to know what would have happened if a different marketing campaign had been presented instead. Another challenge is the unknown total effect size where marketing campaigns may drive customers to repeat actions such as purchasing multiple items related to an advertised product. Finally, another key challenge is that campaigns are often short-lived so the incremental effect of a campaign must be estimated quickly.

The researchers introduced an approach to address the above challenges. The approach involves uplift modeling, causal inference, and multi-armed bandits. Thompson sampling, a well-known multi-armed bandit method, was used in the approach. Contextual multi-armed bandit algorithms were used to optimize marketing campaign allocation with the focus on causal (incremental) effects.

Using general adversarial networks for marketing: A case study of Airbnb

Martinez & Kamalu, 2018

This paper explains how peer-to-peer (P2P) marketplaces like eBay and Airbnb rely on sellers to price and market the products that they list. These types of marketplaces also rely on sellers and buyers finding each other organically in a decentralized manner. Most sellers do not have a marketing team to help them list products in an optimal way that will attract and convert buyers. The researchers examine the use of [general adversarial networks (GANs)](#) to help with marketing on P2P marketplaces by providing recommendations automatically of how product descriptions could be reworded to help increase conversions.

The experiment focuses on using GANs to replicate text patterns from successful product listings on Airbnb. The researchers describe in the paper a key extension to the basic GAN model, a loss function that they applied to the generator. This loss function is named the Diehl-Martinez-Kamalu (DMK) Loss, and it is defined as a new class of functions that forces the generated output of the models to include a set of keywords defined by the user. This loss function allows the GAN to recommend ways of rewording the description of an Airbnb listing to help increase its chances of being booked.

Multimodal image captioning for marketing analysis

Harzig, Brehm, Lienhart, Kaiser, & Schallner, 2018

This paper explains how marketing teams could leverage the content of images to analyze consumer sentiment and interaction (positive or negative) with specific brands and a brand's products. And the content of

images posted on social networks could be used to track the popularity of a brand and its products over time. Finding brands in the content of images and then generating corresponding captions are key challenges.

The researchers address the above challenges through the introduction of their modified image captioning network. A popular image captioning model [(Show and Tell)](#) was enhanced with two extensions to allow three modalities (image, image captions, and image ratings) to be combined in a single [neural network architecture](#). The modified image captioning network finds brands in images and derives corresponding captions for those images. The network also produces real-valued image ratings simultaneously.

You can find many more computer science research papers related to marketing on https://arxiv.org.

Janet Wagner is a Zylotech contributing writer.

If you liked this post, check out our [other blog post on Why ecommerce is a goldmine for customer data tracking](#).

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