AFA: Auto tuning filters for Ads

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Background

Sponsored Search: Sponsored search is a **digital advertising** method where advertisers pay to have their ads appear alongside organic search results based on specific keywords. This model is commonly used by search engines and e-commerce platforms.

Importance of Ad Quality: High-quality ads are crucial as they ensure user satisfaction by providing relevant and valuable information, which in turn helps maintain the platform's credibility and user trust.

Role of Quality Filters: Quality filters are mechanisms that assess and ensure the relevance and value of ads shown to users. They help in maintaining a balance between ad visibility and user experience.

Problem Statement

Balancing Challenges: Platforms struggle to balance the need for ad visibility to drive revenue with the necessity of maintaining user satisfaction through relevant ad content.

Need for Automation: Manual tuning of ad quality filters is time-consuming and less adaptable to dynamic content and user behavior, highlighting the need for an automated solution.

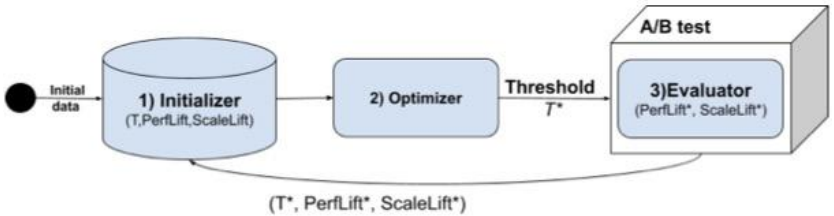
AFA overview

Introduction to AFA: AFA (Auto-tuning Filters for Ads) employs **Bayesian Optimization** to automate the tuning of ad quality filters, aiming to enhance ad relevance and performance without extensive manual intervention.

Goals of AFA:

a. Improve ad scale by increasing the visibility of ads without compromising quality.
b. Maintain high performance of ads ensuring they meet user expectations and drive engagement.

AFA Pipeline



Initializer: Gathers and stores initial data points from existing ad performance metrics.
Optimizer: Uses Bayesian methods to suggest optimal filter settings based on performance data.
Evaluator: Tests new filter settings in a controlled environment to measure impact before full deployment.

Implementation Details

Optimization Process: AFA uses a multi-objective function to balance between scale lift and performance lift, ensuring that adjustments to the ad quality filter lead to optimal outcomes.

Bayesian Optimization: This method models the uncertainty of the objective function behavior, allowing for efficient exploration and exploitation in tuning the filters.

$$f(t) = \bar{t} = \underset{t \in \text{Thresholds}}{argmax} \left(\delta_{s(t)} - \delta_{p^*(t)} \right)$$

where the modified performance will be defined as:

$$\delta_{p^*(t)} = \begin{cases} P(t) * \delta_{p(t)} & -C \leq \delta_{p(t)} < C \\ R(t) * \delta_{p(t)} & otherwise \end{cases}$$

Results and Efficiency

Empirical Results: AFA has demonstrated significant reductions in the need for manual adjustments and the frequency of A/B testing, leading to more agile and effective ad management.
Efficiency Comparison: Compared to traditional manual tuning methods, AFA reduces the time and effort required to achieve optimal ad quality settings by over 50%.

Phase	AFA Method Duration	Manual Approach Duration
Initial Data Collection	1 week	1 week
Iteration/Experimentation	3 weeks (1 week per iteration)	11 weeks (1 week per iteration)
Total Duration	4 weeks	12 weeks
Outcome	Optimal solution	Sub-optimal solution

Business Impact

Improvements in Metrics: Post-implementation of AFA, platforms have observed improvements in ad scale, performance, and overall user engagement.

Case Study: In a real-world application, AFA improved ad quality scores by 80% and increased ad revenue by 44% compared to previous manual methods.

Method	Scale	Performance	Quality	Revenue
Manual Tuning	**0.79%**	-0.66%	0.05%	-0.22%
AFA	**0.88%**	**-0.18%**	**0.09%**	**0.01%**
AFA vs Manual Tuning	**11%**	**72%**	**80%**	**44.0%**

Conclusion and Future Work

Summary: AFA represents a significant advancement in the automation of ad quality management, delivering faster, more reliable results.
Future Directions: Plans to extend AFA's application to other aspects of digital marketing and further enhance its algorithm to adapt to emerging market trends and user behaviors.

Thank you

Q&A time!

Contact me: