



Cluster expansion using look-alike engine built on Big Data platforms

How to serve most relevant ads based on analysis of user behaviors

Low conversions in online display ads is a perennial challenge for digital advertisers

Conversions in online display advertisement market are often arduous to achieve and require strenuous efforts from marketers to reach the coveted goals. Conversions, in a majority of the cases, are measured by clicks and quantified as clicks-to-impression ratio known as Click Through Rate (CTR). Advertisers are charged by publishers on per click basis and repercussions of low CTRs are low returns on investments for publishers and scanty market reach for advertisers. Hence, optimization of ad-spend and targeting to increase the CTRs of display advertisements is a compelling desideratum of the Digital Media industry.

One solution to the discussed problem is praxis of Look-Alike engine in ad-targeting. It has been proven, heuristically, that Look-Alike engine results in increased CTRs compared to traditional methods of targeting. In this paper we discuss the Look-Alike engine and its applications in the online advertisement industry.

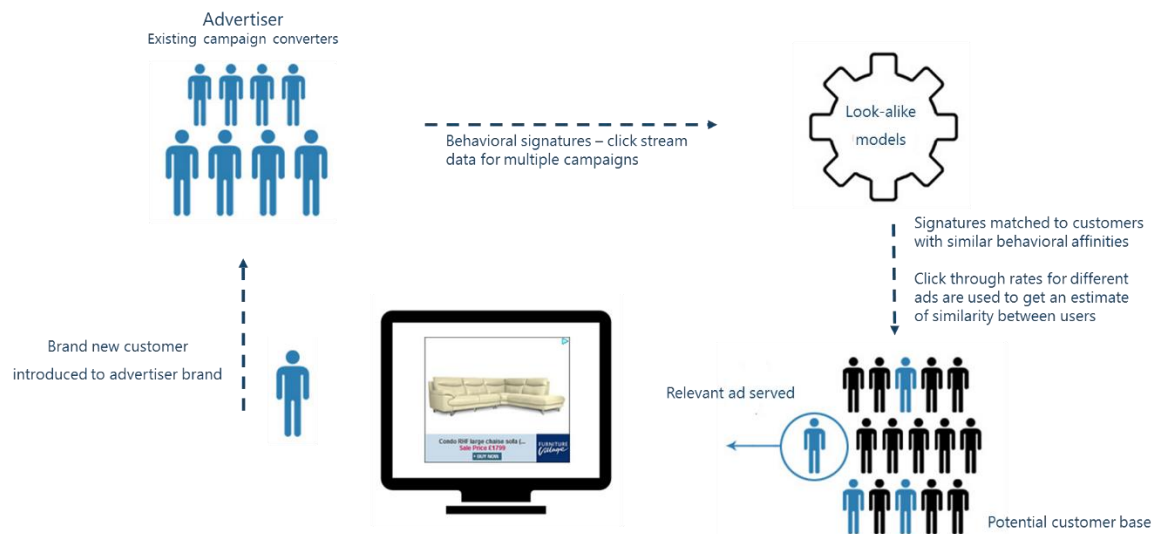


Figure 1 – Look-Alike engine for display advertisements

We know that people prefer to rely more on opinions from like-minded persons

The motivation for practice of Look-Alike engine in display advertisements materializes from the idea that people often obtain superlative recommendations from someone with similar tastes as themselves e.g., user B who is similar in tastes as user A can be shown those ads which have a high click-to-impression ratio of user A and have not been previously shown to user B.

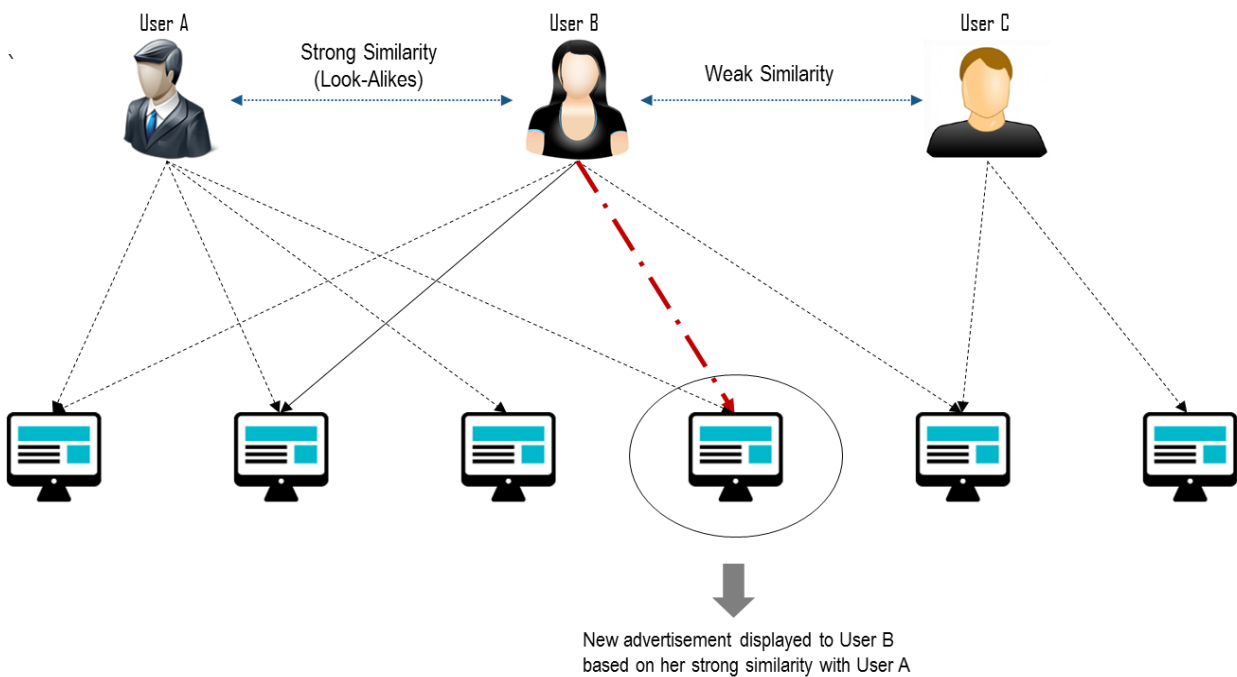


Figure 2 – Ad placements based on similarity

Let's understand the application of the same using an illustrative example.

A publisher has a customer base of 100 million unique subscribers. In 2014, an advertiser for its big sale day launched multiple campaigns on publisher's website on a subset of randomly selected 10 million customers. Conversions, measured as clicks, turned out to be 10 thousand. Next year, in 2015, instead of running the campaigns again on a random subset of customers, advertiser used Look-Alike engine to find look-alikes of 10 thousand customers which converted the previous year. These look-alikes have similar behavioral characteristics as the ones converted and thus result in higher conversion rates.

*Conversions in 2015 turned out to be 50 thousand; **5x** compared to random targeting*

One such application of Look-Alike engine is developed by TransOrg for digital media industry.

TransOrg created look-alike models to serve relevant ads as per user attributes

The architecture of TransOrg's Look-Alike engine is as described in the illustration below

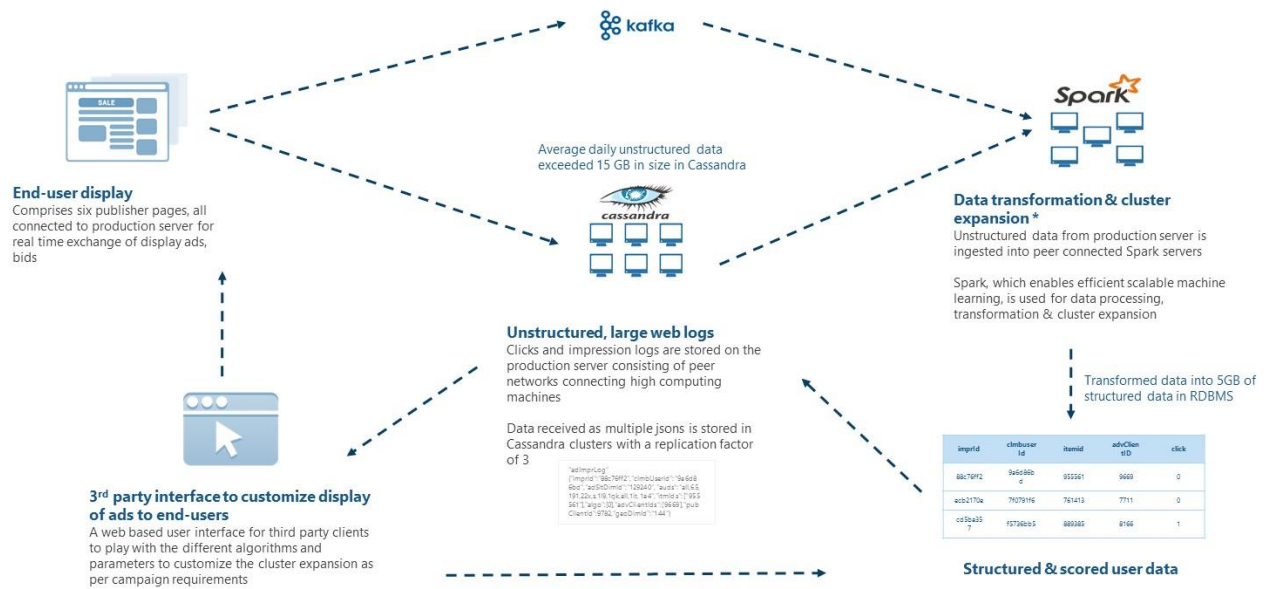


Figure 3 – Solution architecture: Look-Alike engine for display advertisements

User behaviors on publisher web pages consist primarily of clicks and impressions logs and are stored in **Cassandra** as multiple JSON objects. Relevant data from live platforms is also streamed through **Apache Kafka** to **Apache Spark Clusters**. Coupled with Kafka is the stream of historical data, which is pipelined in batch mode from Cassandra to Spark clusters. Apache Spark is cutting edge in cluster computing and scalable machine learning and is employed by TransOrg for all the computations required by Look-Alike engine.

Third party interface is used by the clients of publishers to optimize the audiences for their multiple campaigns. Employing a simple to operate user interface the clients input a list of converted customers and obtain look-alikes for multiple campaigns which are then displayed relevant ads on various properties of publishers. Information from third party interface eventuates computation of look-alikes on Apache Spark clusters. TransOrg has deployed state of the art combination of **Kernel and Factorization based algorithm** to accomplish distinguished exactitude in computation of look-alikes and unbeaten enhancement in click through rates. Subsequent to look-alikes computation, the extended list of optimized audience is made available to the clients via third party interface.



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The solution described above was developed in approximately six months and is an impeccable paradigm of application of big data and scalable machine learning for solving real business problems.

In conclusion, Look-Alike engine can help accelerate display ad conversions

Look-Alike engine is the future of optimized campaigning and assures significant increment in return on investment in display advertisement market. Adoption of Look-Alike engine for ad-targeting and optimization by publishers can result in **an increment of up-to 5x in click through rates**. For advertisers this means **5x higher market reach** and increased revenue from newly acquired customers. This is just the prelude of a long journey ahead of modeling and targeting right customers to enhance both customer engagement and retention. Coupled with recommender systems, Look-Alike engine guarantees both advertisers and publishers a superlative progress in display advertisement business.



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Author

Abhinav Litkar – Data Scientist from TransOrg Analytics

References

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- Apache Cassandra – <http://cassandra.apache.org/>
- Apache Kafka – <http://kafka.apache.org/>

Contact us

Shuchita Jain

Head – Client Development & Marketing at TransOrg Analytics

Tel: +91 124 4231894 | Mob: +91 98112 60911

www.transorg.com | shuchita.jain@transorg.com

Debjit Sen

Lead – Client Development at TransOrg Analytics

Tel: +91 124 4231894 | Mob: +91 99532 46251

www.transorg.com | debjit.sen@transorg.com