



Alkindi Corporate Overview

Introduction

All sorts of websites suffer from inadequate product discovery tools for consumers, resulting in lower customer involvement, higher customer acquisition costs, and limited willingness by consumers to pay for unknown products or services. Responding to this market need, Alkindi has developed improved technology for recommending content and products based on individualized preference profiles. Alkindi offers superior recommendation functionality by focusing on individual taste profiles. The Alkindi solution can increase the amount of online content consumed, reduce the cost of acquiring customers, increase related commerce transactions, and lock consumers into networks of recommendations from people they come to rely on.

Superior Technology

Alkindi's recommendation technique improves on standard collaborative filtering models. Collaborative filtering technology works by clustering people with other people who share their tastes. Alkindi has improved on the technology in each of its three fundamental components: input efficiency, clustering accuracy, and output quality. Alkindi optimizes the selection of products presented for rating in real time, in order to minimize the amount of information necessary before receiving satisfying recommendations. Alkindi creates its preference groups by clustering similar users together using a wider range of information than competitive models and by better managing sparse data. The output model maximizes user satisfaction by sampling from a large number of possible recommendation algorithms and giving preference to the ones that work best for each individual.

In user testing, Alkindi's movie recommendation algorithm outperformed four leading competitors: NetPerceptions, Macromedia's LikeMinds, Blockbuster (using Sourcelight Technology) and Netflix. With respect to Alkindi's own members, Alkindi's models have been able to cut the number of "bad recommendations" provided by the best possible non-personalized approach by more than 50%.

Customer benefits

Alkindi offers its customers a sticky application that can drive significant revenues. Users establish Alkindi profiles by rating, buying, or viewing products and content and then receiving recommendations on other content or products they will enjoy. Having an Alkindi profile will allow a user to receive personalized recommendations, keep a list of favorite products, and access these recommendations across multiple platforms.

The Alkindi recommendation system provides our clients three primary benefits. First, Alkindi's recommendation functionality can significantly increase the amount of content being consumed by reducing the cost of search (in terms of time spent searching and time consuming unsatisfying con-

tent). Second, recommendation tools lock the user into the client's service, because there are costs to changing to a new service without an existing understanding of customer preferences. And third, Alkindi helps our clients build a valuable database of demographic and taste profiles.

Future Applications

Alkindi's understanding of individual tastes also allows the service to credibly suggest specific, named individuals as advisors to Alkindi members. These sorts of human relationships are expected to be stickier than even the best recommendation algorithm alone. As users extend their advisor network to include friends and family (allowing the collaborative filtering tool to ensure consistent recommendations, even from friends), they become reliant on the service as a means to keep in touch with existing community networks. This effect can be accelerated through weekly personalized updates sent to users via email. By providing regular information about people whom the individual cares about, Alkindi can provide one of the few features on the web that cannot be cheaply replicated by other sites.

Consumer Acceptance

Unlike other personalization companies, Alkindi provides consumers several strong incentives to participate in creating an account:

- **Rewarding input process.** Alkindi's invention of a metric for evaluating the understanding of each user in real time provides strong positive feedback for data input activities. Alkindi's dynamic surveying techniques increase the incentive to rate more products. New ways to maximize the efficiency of each product presented for rating increase the speed with which quality recommendations can be achieved.
- **Ownership and control.** Each Alkindi account belongs to, and can be modified by, the Alkindi member who created it. Alkindi enables today's increasingly savvy, privacy-sensitive consumers to benefit from the most accurate personalization system available without giving up control over their information.
- **Universal access.** Alkindi allows members to get recommendations on the Internet and on wireless devices, making sure that our recommendations are available wherever they shop and increasing their reliance on those recommendations.

Alkindi's consumer-friendly philosophy coupled with universal access to consistent recommendations will increase the flow of communication between consumers and companies and the number of resulting transactions. For portals, local guides, interactive TV providers, music distributors, commerce sites, and other Internet businesses, Alkindi's recommendation engine is good business.

Milestones

Although Alkindi is only a year old, it has already achieved significant milestones. The Alkindi team has designed and tested a collaborative filtering algorithm that reduced by 50% the number of bad recommendations provided by a benchmark algorithm. In competitive testing, the Alkindi recommendation algorithm was rated highest out of a group of five movie recommendation systems. In a

survey of 130 video store customers, the suite of services to be provided by Alkindi was extremely well received. Alkindi has established advisory relationships with professors at MIT and UPenn, with a senior representative of the video retail industry, and with a media veteran. Alkindi has raised approximately \$1.3M from a top-tier group of investors, in addition to \$300,000 invested by Alkindi management. Alkindi recommendation services are currently offered to prospective clients only.

Testimonials

"Media companies need to get closer to their customers as the industry transitions to more direct business models. Alkindi's personal information infrastructure gives media marketers, for the first time, the ability to efficiently create direct relationships based on individual tastes. Alkindi will thrive by making its customers into category leaders."

Mariana Danilovic, CEO of Digital Media X

"I've been involved with Alkindi since it was incorporated and know the quality of the people on the research and development teams. The science in Alkindi's models is the real thing. Modeling n-dimensional preference space is difficult to do well, and Alkindi not only nailed it, they improved on published methods within months of starting work."

Gerbrand Ceder, Union Minière Professor of Materials Science at the Massachusetts Institute of Technology

"Based upon my decade of experience in machine learning research, I can comfortably say that Alkindi has built a state-of-the-art recommendation engine. Alkindi's novel work in modeling preference space offers the possibility of significantly improving on published collaborative filtering methods. Most important, I don't know of any other firm that can provide a more satisfying set of recommendations to consumers."

Lyle H. Ungar, Associate Professor of Computer and Information Science at the University of Pennsylvania

"Alkindi's approach to personalization is positioned to solve the industry's privacy hangover through empowerment of the consumer. Alkindi's solution is out in front, and truly treading on uncharted shores."

Eric Norlin, Former Managing Editor of www.personalization.com

"Alkindi has the strongest development team that I've ever worked with, and I don't say that lightly. The combination of Joe Schwartz and Eugene Stern is a truly extraordinary resource."

Bob Kramer, Appian Corporation

Management Team

CEO - Benjamin S. Appen

Prior to founding Alkindi and from 1992-2000, Mr. Appen worked at D. E. Shaw & Co., L.P., a New-York based investment firm focusing on quantitative trading and technology venture capital activities. A Senior Vice President, Mr. Appen most recently co-managed a team of seven building the firm's Internet incubator. In addition, he was responsible for allocating roughly \$23 million in venture capital investments, personally raised funds in excess of \$100 million and directed an asset management division investing in excess of \$500 million. Mr. Appen currently serves on the board of directors of Schrödinger, Inc., a computational chemistry software pioneer, and has spoken at multiple international conferences. In 1992, Mr. Appen graduated *magna cum laude* with a B.A. in Political Science from Columbia University.

Director of Research - Eugene Stern

Prior to joining Alkindi and from 1996-1999, Dr. Stern was a Rademacher Instructor in the Department of Mathematics at the University of Pennsylvania, where he studied how abstract symmetries can be represented concretely. He also initiated, developed, and taught an applications-based abstract algebra course. Prior to Penn, Dr. Stern was a Postdoctoral Fellow at the Mathematical Sciences Research Institute (MSRI), Berkeley, California. He has also held visiting positions at the Erwin Schrödinger Institute, Vienna, Austria and the Research Institute for Mathematical Sciences (RIMS), Kyoto, Japan. Dr. Stern earned a Ph.D. in Mathematics from the University of California at Berkeley in 1996 and graduated *magna cum laude* and Phi Beta Kappa from Harvard University in 1992 with a B.A. in Mathematics.

Director of Software Development - Joseph A. Schwartz

Prior to joining Alkindi and from 1996-2000, Mr. Schwartz was a software development consultant at Daedalus Technology Group, Inc. At Daedalus, he designed and built systems-level software for Internet-based applications, including data compression and encryption technologies, networked video and audio applications, and database infrastructure. Previously, Mr. Schwartz designed, implemented, and trained local technicians to maintain Zimbabwe Online, a comprehensive online service offering chat, email, Internet access, and other applications. He graduated from Columbia University in 1992 with a B.A. in Physics, specializing in Astrophysics.

Director of Operations - Edward A. Cubbin

Prior to joining Alkindi and from 1998-2000, Mr. Cubbin worked at Bear Stearns in the equity research department, focusing on the multi-channel video industry, commercial broadband services and enhanced television applications. Mr. Cubbin drew on his unusually strong background in technology and quantitative modeling to improve the firm's financial models and valuation analysis. Before that, he worked at Space Systems/Loral where he developed financial and engineering op-

timization methods for the design of Loral's next generation satellites. Mr. Cubbin also worked at NASA where he designed and built the world's first sub-500 micro-Newton thrust measurement facility. Prior to working at NASA, Mr. Cubbin was a Princeton University Fellow in the Plasma Science Program. Mr. Cubbin earned an M.S. in Engineering from the Princeton University Aerospace Engineering Department in 1997 and a B.S. in Engineering from the University of Wisconsin, Madison in 1994.

Database Administrator – Roger Cunha

Prior to joining Alkindi, and from October 1999 through October 2000, Mr. Cunha was the Database Administrator at ExchangePath, LLC, a CMGI company. At ExchangePath, he designed enterprise-level databases and created websites with database access using JSP, ASP, Oracle and MS-SQL. Previously, Mr. Cunha spent over 6 years as a Database Administrator for Tribunal Regional do Trabalho da 4a Regiao, where he administered Oracle databases, creating new web-based research tools for the judges and lawyers of the 30 court units in the state of RS, Brazil. His experience with different operating systems includes HP-UX, Solaris, Linux and Windows NT. Mr. Cunha earned a B.S. in Computer Science from the Universidade Federal do RS-Brazil in 1998.

Investors and Advisors

Investors

Charles Ardai, CEO of Juno Online Service, Inc.

Derek Chang, Former CFO of GlobalCenter, Inc.

Daniel Fishbane, CFO of National Discount Brokers

Stuart Steckler, CFO of D. E. Shaw & Co., L.P.

Advisors

Gerbrand Ceder

Dr. Ceder is the Union Minière Professor of Materials Science at the Massachusetts Institute of Technology. Among other honors, Dr. Ceder has won a Career Award from the National Science Foundation and the Robert Lansing Hardy Award from The Metals, Minerals and Materials Society for showing "exceptional promise for a successful career." Dr. Ceder is the founder of Computational Modeling Consultants and has published 100-plus scientific papers in his various fields of study.

Mariana Danilovic

Ms. Danilovic is the CEO of Digital Media X, which provides seed financing and incubation to digital media and convergence companies. She also founded and directed the Digital Media Business Incubator at KPMG, which was instrumental in launching Internet Wire, Tonos.com, and Beyond Music. Before that, Ms. Danilovic headed business development for Mandalay Entertainment and worked at Sony Pictures Entertainment and Twentieth Century Fox International Television Group. Ms. Danilovic serves on the Board of Directors of numerous organizations including Venice Interactive Community (VIC), the Zone Club, the California Culture Net, and the Industry-University Council of University of California's Digital Media Innovation Program. She is a member of the Los Angeles Mayor Riordan's Digital Coast Roundtable.

Lyle H. Ungar

Dr. Ungar is an Associate Professor of Computer and Information Science at the University of Pennsylvania. He holds secondary appointments in the Systems Engineering and Chemical Engineering Departments, and at The Wharton School, in the Operations and Information Management Department. Dr. Ungar has received the Presidential Young Investigator (PYI) award from the National Science Foundation and has published numerous professional articles.