

Afiniti® Artificial Intelligence

Artificial Intelligence at Afiniti

Afiniti's artificial intelligence systems mirror the evolution of the broader AI industry, and sit at the convergence of computer science, mathematics, psychology, linguistics, philosophy and neuroscience. Since its inception in 2006, Afiniti has pioneered several areas of statistics and mathematics relevant to the contact center industry, which has led to over 40 issued patents.

Every day Afiniti processes approximately two petabytes of data to ensure that its clients are achieving optimal agent and caller pairings in their environment. By comparison, the human brain's capacity to store memories is also estimated to be approximately two petabytes.

Within this "big-data" environment, Afiniti's technology continually discovers subtle models of interaction between callers and agents that serve as the basis for creating optimal caller/agent pairings. Continual training is important because of the dynamic nature of contact centers: agents change, incentives structures shift, competitive pressures evolve, and even weather and holidays can have an impact.

There are three central inputs into the Afiniti artificial intelligence process: information about agents, information about callers, and call outcome data that establishes what happened for each agent/caller pair. As a generalization, Afiniti's artificial intelligence process may be compared to a regression analysis with caller and agent information as independent variables, and call outcomes as the dependent variable. Afiniti is solving for the question: "how do we behaviorally pair callers and agents together in a contact center such that overall contact center performance is optimized?"

Afiniti's Artificial Intelligence Team

Afiniti's artificial intelligence team employs over forty team members across the globe who have collegiate degrees in mathematics, statistics, or computer science. Members of our artificial intelligence team hold doctoral, masters', and undergraduate degrees from leading universities in the fields of mathematics and statistics, including the Massachusetts Institute of Technology, Yale, Columbia, Georgetown, and the University of Illinois at Urbana-Champaign.

Ittai Kan leads the artificial intelligence research team. During his doctoral studies at the University of Illinois, Ittai's doctoral thesis classified the geometry of attractors for a wide variety of chaotic flows. His groundbreaking analytic work in the area would later prove central to the evolution of Afiniti's artificial intelligence engine. After receiving his doctorate, Ittai went on to teach Mathematics as a tenured professor at George Mason University before moving into industry. The artificial intelligence research team is focused on evolving Afiniti's core artificial intelligence systems over time, incorporating new psychological and behavior insights as they emerge across multiple Afiniti clients.

Afiniti also maintains an artificial intelligence production team, whose role is to ensure that Afiniti's deployment at individual clients are continually at optimal performance. Vikash Khatri, a Fullbright scholar from the University of Southern California where he received his Master's degree in Computer Science, leads this team. The artificial intelligence production team is responsible for the daily data import, artificial intelligence training, and model deployment functions for over one hundred global deployments.

The Artificial Intelligence Process

Afiniti's process traditionally starts with an import of 30 to 120 days of historical client call data that includes references to caller, agent, and call outcome.

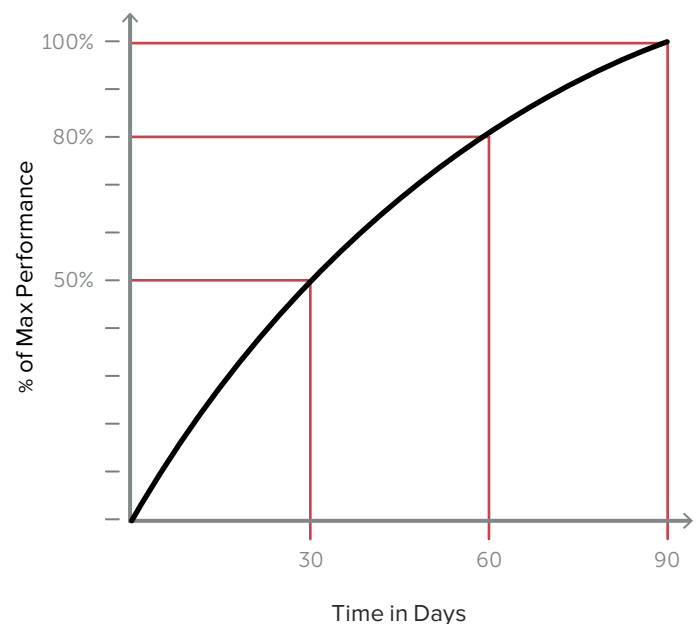
In cases where clients do not initially have data structured in this way, Afiniti will reconcile the existing data and ensure it is consolidated and presented in appropriate format. Afiniti's artificial intelligence team has successfully completed this often complex process over a hundred times.

Call outcome data helps establish the results of varying pairings, but does not in isolation establish a view of behavior of agents and callers. To model agent behavior, for example, Afiniti works with clients to have agents complete a twenty-minute agent survey. This survey begins to build a view of how agents are likely to interact. Survey data is then enhanced with an actual view of agent call history: how has the agent performed in varying circumstances and with different callers?

Once Afiniti has built a view as to agent behavior, Afiniti proceeds to develop a view as to customer behavior. This view, in turn, is based on two data groups: external data from commercial and public databases, and internal data from client's own customer relationship management, billing and provisioning, and other databases. Providers of external data may include commercial sources such as Allant™, Acxiom™, Experian™, and open sources such as the US Census and national archives. Internal data includes such information as customer tenure, product purchase history, and frequency and outcome of interactions.

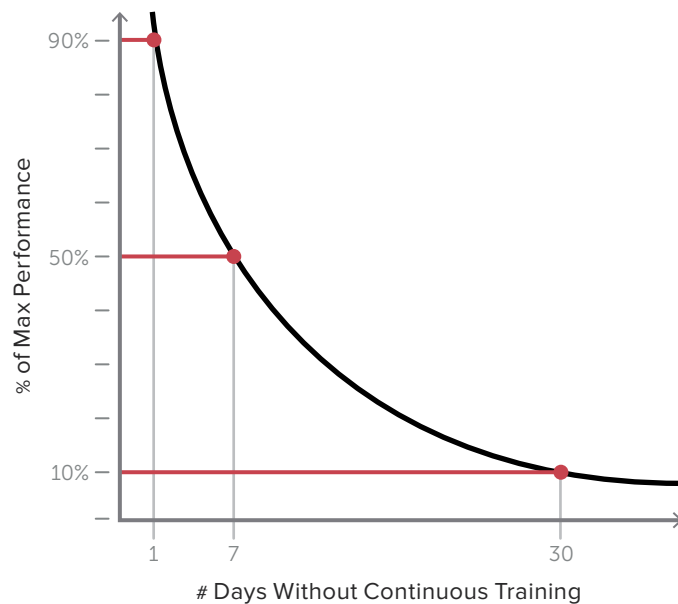
Afiniti's artificial intelligence systems nightly use this entire set of data—historical call data, agent information, and customer information—to train and evolve new behavioral pairing insights in a continuously changing environment. Training an artificial intelligence model is not immediate, and can take substantial time before it delivers optimal results. The time a model takes to evolve varies significantly based on scale of contact center, stability of agent and customer behavior, and availability and richness of data. However, a common rule of thumb is that approximately half the learning occurs in 30 days, approximately 80% in 60 days, and then essentially peak performance thereafter.

AI Learning Cycle



The benefits to continuous training are substantial, as artificial intelligence models will rapidly taper in effectiveness without maintenance. Within a day, models can lose up to 10% of their efficiency, and within a week models may only be half as efficient. At thirty days, the majority of model effectiveness is commonly lost. Accordingly, Afiniti updates its models nightly to ensure optimum performance.

AI Decay Curve



History and Future

When Afiniti first developed its artificial intelligence systems in 2006, computational power was approximately 3% of that available today, and Afiniti's systems ran on comparatively modest hardware.

Today, in an environment where highly parallelized computing power is economically accessible at scale, Afiniti's systems deliver insight and performance to a degree never before achieved. With over ten teraflops of compute capacity, Afiniti's systems are capable of managing over 2 million calls per day.

As computing power continues to increase exponentially, Afiniti is better positioned than ever to deliver contact center optimization services at enterprise scale. Amongst the subjects of research are the detection of circadian and other biological rhythms in agents, real time incorporation of localized weather conditions in prediction of customer behavior, and real-time anomaly detection in call flow patterns that would indicate a change in client environment.

We are looking forward to our next decade of innovation and market leadership in the artificial intelligence domain and the contact center industry.