White Paper

Technology that Delivers Intelligent Information℠

Presented by:

Adaptive Technologies, Inc.
4530 E. Shea Blvd., Suite 130
Phoenix, AZ 85028
www.adaptiveinc.com

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Adaptive Technologies Inc. (ATI) - Technology Overview

Adaptive Technologies, Inc. has extensive expertise and successful industry experience uniquely applying artificial intelligence (AI) and predictive analytics (PA) methods to solve business challenges. Organizations today often use analytics focused on the past to assume future actions. ATi's proprietary technology is forward-looking, blending advanced science and analytics to predict the future. ATi provides Intelligent Information℠.

Christopher Stephens, PhD, leads the ATi Research and Development team. A highly regarded scientist with over 30 years of experience in the field, Chris also collaborated with the 1999 Nobel Laureate in Physics, who additionally serves on the ATi Advisory Board. Dr. Stephens and team are creating new methods to use science to define business problems, identify opportunities and predict future outcomes – a new standard in successful business performance management.

ATi has perfected what many business intelligence and predictive analytics companies are striving for:

- Predictions in dynamic environments
- Learning system that updates outputs in real-time
- Actionable outputs including automated decision-making
- Transparency of why an output was identified
- Interoperability in existing technology environments
- Confidence levels with each output
- Cross-enterprise functionality
- Software-as-a-service (SaaS) for easy application and use

Technology Summary

ATi has developed a proprietary platform that is ideally suited to predicting in an evolving environment. The ability to predict has universal application in business and can be applied to internal and external operations. Examples of how ATi has helped companies define problems and apply an adaptive approach include: volatility forecasting in finance, customer value management, target marketing and forecasting, healthcare cost prediction, risk management and fraud detection among others.

Technically, ATi's platform creates and maintains a population of "artificial agents." These agents are computer algorithms that identify specific features in the data to which they are exposed and draw actionable conclusions when they detect features that they are trained to interpret. The agents maintain a current "knowledge" base by learning from the data stream while they are in service. An individual agent's primary output is a probability distribution of future outcomes given the presence of specific conditioning variables or drivers.

The technology is comprised of a systematic search for the most relevant drivers based on intelligent evolutionary search, together with a proprietary analytics toolkit designed to build the probability of future outcomes in a manner that is

robust to imperfect data, such as missing values or isolated errors. In dynamic environments, the platform supports online hypothesis validation through agents that continually verify the validity of their assumptions and retire themselves when incoming data contradicts the hypotheses that had driven their selection of likely outcomes.

ATi's technology platform further provides a consensus layer that pools the opinions of individual agents and builds actionable outputs. Because one size does not fit all, the choice of consensus rule is dictated by the nature of a particular application. Consensus models are based on easy to understand principles such as democratic vote, winner-take-all, or universal agreement.

Distinguishing Features of ATi Solutions

Multiple Viewpoints

There are more ways than one to look at a given problem. Each view potentially leads to a different conclusion. ATi's agents bring forth a multitude of viewpoints, which are then collated at a consensus level. The choice of methodology for reaching consensus embodies the preferences associated with a particular business problem. For example, in fraud detection an aversion to false positives suggests seeking a broad consensus of opinions to achieve a high degree of certainty.

Measure of the Degree of Certainty

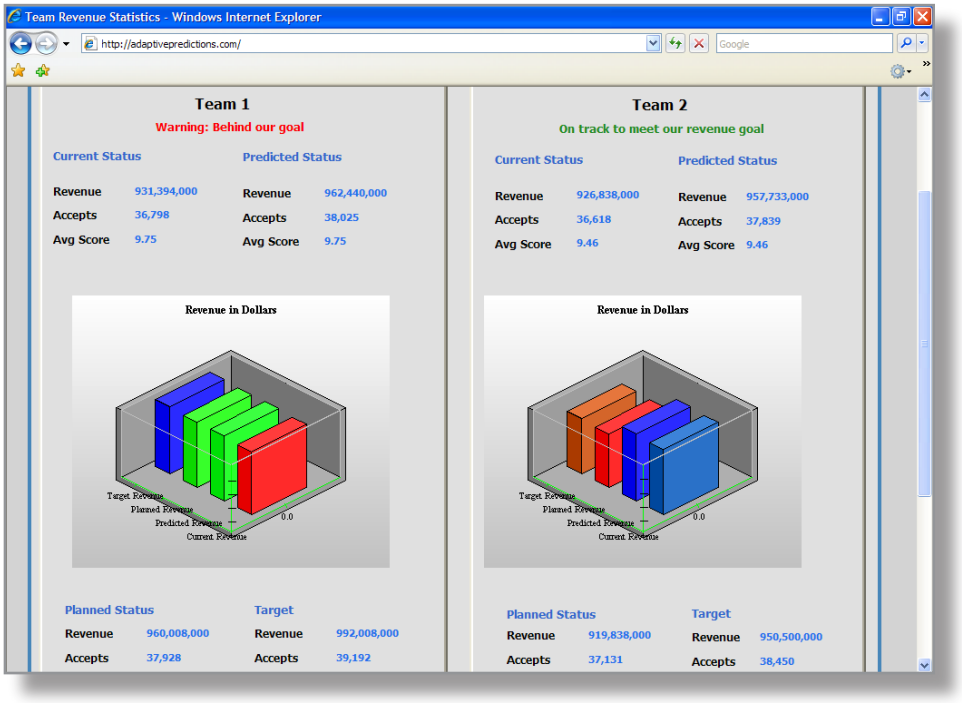
ATi's models are designed to give not only an actionable conclusion, but also provide the degree of certainty of each conclusion. Unlike typical business intelligence products, ATi provides a level of confidence with the outputs to enable business leaders to make better decisions. With Confidence.

Robustness and Interpretability

ATi's agents accompany their outputs with key drivers on which the agent's decision was derived. This helps interpretability of the results by associating them with features that can be reviewed for reasonableness by a human decision-maker. The low number of drivers of individual agents also ensures a high degree of robustness. This stands in contrast with other approaches, such as neural networks that analyze a large number of variables at once and therefore tend to misfire on spurious patterns with no hope of human recovery.

Easy-to-Use Interface

ATi's customized interface and visualization capabilities provide actionable output presentations in an accessible fashion for management and decision makers. Users can also drill down to view the reasons for these outputs with simple "click-to-know" guided technology. The flexibility of ATi's technology provides customized viewpoints that are distinct to any function, any process, any problem or any question within a business – strategic, operational or analytical.



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Layered, Robust Approach to Data Analysis

ATi's models employ three analysis layers.

I. Feature Identification

The first step in the process is to reduce the space to be searched and to characterize a smaller number of distinctive, predictive variables. This process includes:

i. Reducing the search space by identifying irrelevant variables that can be discarded;
ii. Applying expert knowledge to identify variables that capture easily

interpretable features that are generally considered to be important;

iii. Using automated methods to identify potential relevant variables with a strong signal-to-noise ratio, through (a) intelligent evolutionary search, (b) Bayesian classifier methods and/or (c) clustering algorithms such as the Kohonen map.

ATi understands that automated searches are only as good as the user's ability to specify a good landscape function for guiding the search. To meet this challenge ATi builds on extensive experience gained through a growing list of successful applications and an extensive library of proprietary tools based on statistical concepts such as mutual information theory.

The feature identification problem can best be illustrated with the proverbial needle in a haystack problem. The first step discards sections of the barn where it is known that the needle would not have fallen. The second finds that a metal detector is useful in this case and marks small squares as "hot" or "cold." The third step classifies objects as straw, stone, or 'others', and identifies distinctive features of particular objects in each class, for example the presence of a pointed shape.

ATi views the identification of relevant input variables as a vitally important step in the prediction process. Once a set of relevant variables has been identified, the next step will consist of building the agent per se, as an algorithm capable of interpreting the identified features.

II. Prediction Agents

The role of prediction agents is to look at a limited set of identified relevant features and provide an educated opinion, also known as a prediction, on the desired outputs. The prediction agent's role is not only to provide the output but also the probability of this output or confidence level.

In the needle and haystack example above, this might be the probability that the pointed object was in fact a needle, given that it was identified as being from a hot square, being of class "other" and with the distinctive features of being pointed and thin. In a risk management application, a particular agent might look at financial data such as debt to equity ratios, free cash flow, insider trading bias and debt maturities to calculate the probability of default given these inputs.

Technically, ATi uses Bayesian learning and statistical estimator methods both to select small sets of previously identified features and to build the probability distribution of the output when these features are present. ATi firmly believes that prediction technology produces results in the bottom line only when outputs are easily understandable so that they can assist human analysis and managers can put them in context in order to make better informed decisions.

To enhance interpretability, individual agent models are designed to be simple and look at only a small number of relevant variables. ATi models normally

produce multiple agents with each bringing an opinion to the forefront based on a small number of specific inputs. The agents' opinions are then reconciled before any actionable conclusion is drawn and provided to the user.

III. Consensus

There is a high degree of flexibility in how consensus is sought among ATi agents and this can be exploited for a customized solution to a particular problem. Some examples include:

Additive Cost Function.

One seeks the total costs from several contributions. For each contribution, multiple agents are considered and the average cost for this contribution is derived. The total cost is the sum over contributions.

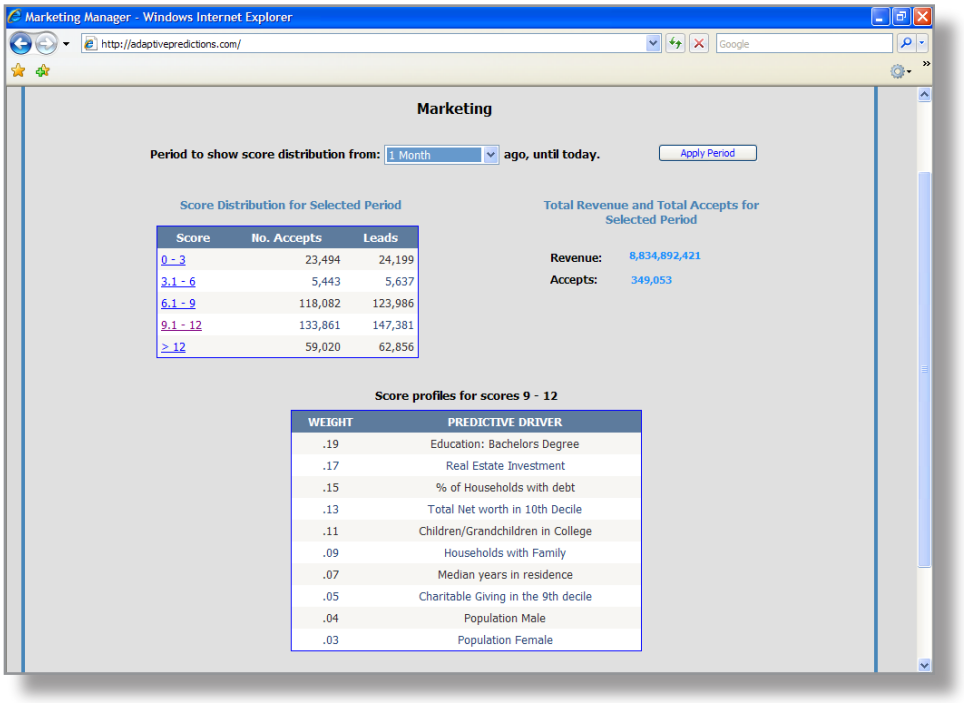
Value at Risk.

The target function is the worst case portfolio loss considering a multitude of possible scenarios. The agent that forecasts the largest losses drives the decision. All other agents are ignored.

Fraudulent Behavior.

The target function is a pattern of fraudulent behavior. Only entries that are selected as likely frauds via several distinct criteria will be selected. This requires a consensus vote by multiple agents. In all cases ATi presents a three-dimensional view of the consensus results to facilitate analysis by decision-makers.

The three dimensions to a layered approach to data analysis are the expected output, a confidence level or probability associated with this expected output, and the key drivers of the output. ATi's technology provides clients with actionable outputs that are readily interpretable, not more data to decipher. ATi provides Intelligent Information℠.



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Achieving Results: Case Studies

Customized Predictive Analytic Solutions

ATi has helped clients resolve business challenges and drive new opportunities with advanced technology and customized predictive analytic solutions. ATi has built its experience through a series of successful applications by solving problems from pattern recognition to data mining and dynamic forecasting. Some of the projects are briefly described below.

HEB – Improved Target Marketing

ATi developed a solution to provide a multi-perspective analysis of HEB marketing data to classify a population into various standard profiles of consumer preferences. Consumer preference profiles were then related to consumer demographic data to allow for more accurate assessment and targeting of HEB's customers. The overall classification accuracy was enhanced by over 15% through the use of ATI's consensus technology. This technology allows HEB to predict where to locate new stores, who to target with their promotional materials, and to predict the preferences of selected groups of customers.

DXCG – Reduced Costs by Better Managing Care

ATi agents analyze medical claims data on a population of patients to identify likely cost outliers that may be actionable through preventive care in a case management program. In this application of ATi's technology, several consensus methods are made available to the user through a choice of selection criteria. A user may select individuals with the highest average cost or, instead, focus on those with the greatest likelihood of incurring a very high cost. ATi's model outperformed DXCG's industry leading prospective explanation model by 27% in the identification of diabetics who will have the highest cost of care in the following year in the initial year of testing and by 66% in the subsequent year of comparison to an out-of-sample test carried out by DXCG.

AdapTrader™ - Immediate, Real-Time Decision Support

ATi provides a decision support system for equity trading that analyzes a multitude of possible technical price formation scenarios and ranks them by likelihood of occurrence. The scenario selection and rankings are refreshed based on the client's preference to remain up-to-date with evolving market conditions. The time scales are adapted to client preference.

Pipeline Trading Systems – Increased Trading Productivity

Pipeline Trading Systems has partnered with ATi to deploy the Algorithm Switching Engine™, enabling its Institutional customers to seamlessly combine Pipeline Block Market's industry-leading fill rates for large block crosses with low-impact access to the retail markets. Pipeline's Algorithm Switching Engine utilizes ATi's patent-pending inventions and extensive experience on dynamically ranking agents by expected future performance to adapt to changes in market conditions. ATi's predictive analytics sorts through over 50 potential predictive drivers, from the asymmetry in the displayed bid ask quotes to more exotic

drivers such as the revealed reserve size which tracks executions that cannot be explained by changes in the displayed quotes, and predicts the performance of trading algorithms with a 5 minute horizon.

L'Oreal –Improved Consumer Experience

ATi developed a methodology to predict an individual's "new" hair color when hair dyes are applied. ATi's technology accurately distinguishes hair pixels from background pixels and updates a photographic image of the customer with the changes in hair color. A distinguishing feature of this product from competitors is its ability to accurately identify the resulting color when combined with current hair color, rather than showing the color of the dye itself. This system is used to market L'Oreal's hair color products and to advise clients on hair color selection.

Banking Analyst – Increased Sales and Marketing Effectiveness

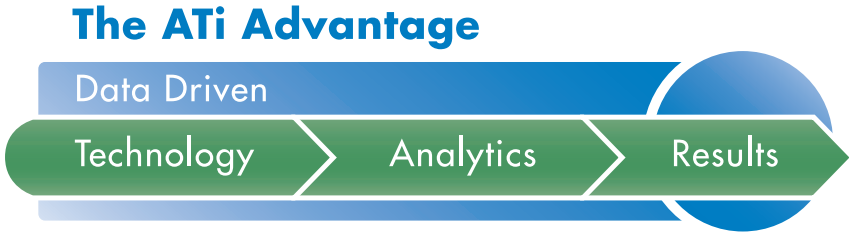
ATi provides the retail banking sector with the solution necessary to maximize relationships with their customer base. ATi integrates multiple internal and external data sets to provide the most robust understanding of a financial institution's client base and predicts to a number of end points for the client including, but not limited to, up sells, cross sells, profitability (revenue maximization), loyalty, and satisfaction. ATi's solution integrated with ExactTarget's e-mail solution and ePrintWerx's online digital printing solution provides the client with an end-to-end solution to communicate with their clients.

US Navy – Transformed Training and Personnel Assessments

The ATi SMART360 solution provides the US Navy an assessment tool that has transformed what is traditionally a manual process with individual averages as results into an enterprise 360 solution for the US Navy Center for Naval Leadership. The SMART360 provides an online assessment tool that pushes the analyses back to the individual, providing them insights and recommendations (predictions) based on assessments at all levels—self, superiors, peers and subordinates. SMART360 also provides leadership at various levels a view of anonymous, aggregated data demonstrating departmental, position, division and/or organizational strengths and opportunities. This gap analysis with predicted interventions, are key to continuous improvement of leadership at the individual and organizational levels for the Navy.

The ATi Advantage

The ATi Advantage uniquely provides organizations the capability to make data-driven decisions with Intelligent Information℠. ATi's combination of customizable analytics solutions and patented technology advances business intelligence and predictive analytics into confident decision-making for every size business, in every industry. Working with organizations, simple to complex, ATi takes cross-enterprise data and turns it into Intelligent Information that drives results. We are a trusted partner that grows with our clients, committed to helping them solve problems faster, reduce costs, innovate and strategize for profitable growth. Whether looking to improve customer loyalty, manage customer value, reduce costs, drive business change or predict risk – ATi is the logical partner to help organizations achieve superior results.



About Us

Adaptive Technologies, Inc. (ATi) helps business leaders make better decisions. We provide companies with tailored business intelligence and advanced predictive analytics solutions that turn enterprise data into intelligent, actionable information.

The ATi Advantage is our unique combination of patented technologies and proprietary analytics that produce Intelligent Information℠ for confident decisions, helping organizations achieve real and superior results.

ATi's expert team of scientists and software engineers has developed solutions that use the power of science, human insight and technology to create proven multi-dimensional modeling, behavioral profiles and predictions to empower decision makers with Intelligent Information. We create comprehensive solutions that enable organizations to be smarter about their data and to use it effectively for better decision making. Competence is our hallmark. Intelligent Information is what we produce. Confident decision making is what our clients consistently trust us to provide them. And, a strategic competitive advantage through cost reduction, optimized organizations and profitable customer and vendor relationships is our promise to our customers.

Founded in 2001 by Chris Stephens and Henri Waelbroeck, Adaptive Technologies, Inc. is privately held and based in Arizona. The company is led by Susan Cordts, President/CEO.

For Further Information

Learn more about ATi's proprietary technology and customized predictive analytic solutions by visiting www.adaptiveinc.com. For further information, contact ATi directly at 602-923-4200 or email us at info@adaptiveinc.com.