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Financial Product Trading Platform Artificial Intelligence R&D Tax Credits

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Research and Development tax incentives provide excellent opportunities for innovators in the Financial Industry.

Successful financial product traders use factual data and their developed trading acumen to execute profitable financial product trades. As result of huge new and growing amounts of data or so called Big Dataⁱ more potentially relevant data is available than a human trader can absorb. The fast growing field of Artificial Intelligence can pull in and analyze far more data than the human trader can. Of course a human expert has to decide what Big Data intelligence streams are most relevant for particular financial firms' overall business strategy. R&D tax credits are potentially available for innovative software and machine developments.

The Research & Development Tax Credit

Enacted in 1981, the federal Research and Development (R&D) Tax Credit allows a credit of up to 13% of eligible spending for new and improved products and processes. Qualified research must meet the following four criteria:

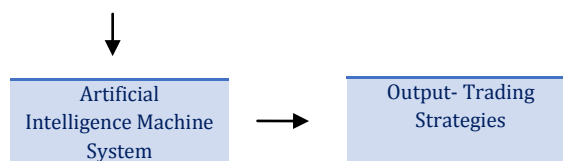
- New or improved products, processes, or software
- Technological in nature
- Elimination of uncertainty
- Process of experimentation

Eligible costs include employee wages, cost of supplies, cost of testing, contract research expenses, and costs associated with developing a patent. On January 2, 2013, President Obama signed the bill extending the R&D Tax Credit for 2012 and 2013 tax years.

Finance Inputs

The diagram below illustrates example Big Data Streams that could be included in Artificial Intelligence machine financial decision analytics.

Trading Platform Artificial Intelligence
Big Data Streams:
Social Media Eg: Twitter and Facebook Analytics
Macroeconomics Data Eg: GNP Data
Microeconomic Data Eg: Company Data
Environmental Opposition Inputs
Weather Sensor Data
Political Risk
Internet of Things (IoT data)
Other Data



Note: This is just a judgment selection of some basic major available data inputs. Other inputs can include numerous other data fields which can all be adjusted by the technical factors including Arbitrage, Multi-Agent models, etc.

Trading Man versus Trading Machine

Humans have instincts and perceptions that machines have yet to master. However machines don't have bad days, don't get distracted, are always focused, don't take vacations, can work 24/7, and don't have salary

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and bonus demands. Also machine traders are not going to engage in inappropriate behavior that is going to subject a firm to fines, penalties, or more severe sanctions.

New Finance Science AI Offerings

Warren Software

Named after famed investor Warren Buffet, a company called Kensho Technologies Inc. raised \$10 million in 2013 from Google Ventures to create a Siri- style intelligent investor for the financial industry. These computers do not just collect and process information; they draw inferences, answer questions and recommend actions, too. The company was started by Daniel Nadler a former quantitative analyst and Harvard University Ph.D. candidate.

The software is designed to answer natural language queries for investors much like IBM's "Watson"ⁱⁱ answers health questions posed by doctors. Still in its early stage, it can answer questions that are grammatically correct, with the object following the subject, on a limited number of topics.

A sample question for Warren would be "What happens to the share prices of energy companies when oil trades above \$100 a barrel and political unrest has recently occurred in the Middle East?"

By the end of 2014, the company expects Warren will be able to answer more than 100 million distinct types of complex financial questions.

Quill- Automated Financial Reports

In an offering characterized as narrative science, a company called Quill is an Artificial Intelligence engine that generates, evaluates and gives voice to ideas as it discovers them in the data.

Mines Data:

Business decisions no longer rely on data from a single source. Companies are spending millions of dollars on people, processes and technologies designed to integrate, warehouse, or export data from a variety of sources in an effort to obtain a comprehensive view of their business challenges.

Creates story:

Quill applies complex and sophisticated Artificial Intelligence algorithms that extract the key facts and interesting insights from the data and transforms them into stories. The

resulting content is as good as or better than your best analyst, and is produced at a scale and speed only possible with technology – technology that is now patented.

Delivers Insight:

These data insights can be delivered on demand or on a schedule (hourly, daily, weekly, monthly) in a chosen format, including mobile, HTML, dashboard annotations or any document type. Quill's process of deriving data and developing narratives is unlike any other business intelligence platform currently on the market. Quill delivers stories that are understandable, precise and expressive. Individuals benefit from sophisticated analysis they wouldn't be able to perform themselves.

Big Data Short Term Consumer Loans

Three new startups are focused on short term loans and at providing alternatives to payday loans. The three startups are LendUp, ZestFinance Inc. and Think Finance Inc. LendUp is backed by Google Inc.'s Google Ventures. ZestFinance is backed by PayPal founder Peter Thiel and led by former Google executive Douglas Merrill. Think Finance is backed by venture firm Sequoia Capital. These companies use Big Data that includes thousands of new variables they believe will result in better predictions of creditworthiness. The new variables include borrowers' rent records and data from small credit bureaus, which can include information on prior payday loans, transactions with pawn shops and collections.ⁱⁱⁱ

Foreign Currency Artificial Intelligence (AI) Applications

There are only five major international banks that make up the majority of global foreign currency trading including Deutsche Bank AG (DBK), Citigroup, Barclays Plc, UBS Ag and HSBC.

The ongoing scandal and indictments involving foreign currency trading is making many leading banks wish they did not have particular human traders.

Almost 70% of foreign currency trading is already computer automated. In theory this means that with ongoing technology enhancements 100% AI managed currency trading is increasingly plausible.

Ongoing AI Applications at Financial Institutions

At Fidelity Investments, 30% of Fidelity's 12,000 staff members are employed in IT. Fidelity is currently testing both Warren AI software and Quill narrative science applications^{iv}.

Wealth Management and Data Clusters

Predictive Analytics and AI present an excellent opportunity in the private wealth management area since large amounts of demographic data is already available. Demographic data is typically organized in data clusters with common attributes.

Demographic data might include the clients' age, income, asset amounts and categories, number of family members, address, and estimated retirement income. This data can be organized in common clusters and bridged or integrated with a variety of data bases.

Financial Results Output

The results of AI analysis can be reported in a variety of ways depending on the user's preferences. There are a wide variety of graphic outputs including pie charts, bar graphs and heat diagrams. With heat diagrams preferred results can be segregated by darker heat shades of red or orange. The results can also be presented in text such as the narrative science results discussed above.

The Daric Platform

Daric, a new peer to peer lending platform that is in SEC registration and uses Big Data and Analytics is getting a lot of attention. High profile backers include former Wells Fargo CEO Dick Kovacevich, Franklin Resources COO & EVP Jennifer Johnson and Goldcrest Investments Chairman & CEO Adam Ross.

Tableau Software, one of the country's fastest growing software companies enables Big Data to be presented in the form of tables and graphs. On March 5, 2014, Tableau announced a partnership with Splunk. Splunk Analytics Software pinpoints bottlenecks in companies' applications and networks.

10 Million Dollars for "In Mind" Carnegie Mellon AI Yahoo Collaboration

On February 18th, 2014, Yahoo announced a ten million dollar 5 year collaboration agreement between its Yahoo Labs R&D unit to use Yahoo data and Artificial

Intelligence. The agreement includes new Yahoo sponsored fellowship programs to provide financial support to computer students and facilities interested in machine learning. Yahoo Labs focus on the developing technology such as machine learning, personalization, mobile, advertising science, image processing and natural language processes. This initiative will result in more data being utilized for Artificial Intelligence and Predictive Analytics.

Conclusion

Big Data Artificial Intelligence technologies are rapidly improving. The finance service industry can utilize federal and state R&D tax credits to support their innovation efforts.

ⁱ R&D Tax Aspects of Big Data Charles G. Goulding, Charles C. Goulding, and Jacob Goldman, Corporate Business Taxation Monthly, May 2013.

ⁱⁱ The R&D Tax Credit Aspects of Cognitive Computing, Charles R. Goulding, Andressa Bonafe, and Charles G. Goulding, August 2013

ⁱⁱⁱ 'Big Data' Doesn't Yield Better Loans, Elizabeth Dwoskin, The Wall Street Journal, March 18, 2014.

^{iv} <http://www.ft.com/intl/cms/s/2/dc895d54-a2bf-11e3-9685-00144feab7de.html#axzz2v7rRttyc>