Data Analysis Based on Data Relations and Trends by Techniques of Machine Learning

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***Abstract*—**Opportunities for integrating applications of machine intelligence into the daily lives of people are growing with the increasing popularity of computing systems, the widening diversity of web services, the growing popularity of portable devices that contain general-purpose operating systems, and ongoing inventions in human-computer interaction—including the cases of speech recognition, handwriting, and sketch-understanding interfaces. Much of machine learning (ML) research is inspired by problems and its solutions from biology, medicine, finance, astronomy, etc. In these paper relations between Machine Learning and data analysis is depicted and stresses on enhancement of Machine learning techniques in data relations based on analysis of data. It seeks to stimulate creative thought and research into a large but still relatively unaddressed issue that underlies much of the machine learning field.

This paper identify and describe the fundamental problem that is, the lack of connection between machine learning research and the world of scientific inquiry, suggests steps towards addressing this gap,, and the identification of several key obstacles to machine learning impact, as an aid for focusing future research efforts. Challenging areas of research include developing a better understanding of the best approaches to constructing generic models that can provide valuable, usable initial experiences with intelligent applications and services.

To bring the benefits of machine intelligence into daily life faces an array of interesting challenges—and with the challenges come opportunities for innovation. These challenges seek to capture the entire process of a successful machine learning endeavor, including performance, infusion, and impact. This paper gives analysis based on results obtained from data relations and data trends of a stock. It also presents challenges and several real obstacles on how ML can best make a difference. This paper proposes to give relations between various variables depending on their analysis of different parameters.

Keywords: Machine Learning, Regression, Technical analysis , Fundamental Analysis, Technical Analysis, KNN algorithm

1. Introduction

Over the last decade, technical and infrastructural developments have come together to create a favorable environment for developing applications of machine learning and reasoning—and for harnessing automated intelligence to provide value to people in the course of their daily lives.
These developments include technical advancements in machine learning and reasoning, the growth in CPU and memory capabilities within commonly available devices and platforms, the connectivity, content, services provided by the evolving Web, and the increasing availability of data resources. Need for integrating applications of machine intelligence into the daily lives of people are growing with the increasing popularity of computing systems, the widening diversity of web services, the growing popularity of portable devices that contain general-purpose operating systems, and ongoing innovations in human-computer interaction

2. Learning and Machine Learning

A common view holds that learning involves making changes in the system that will improve it in some way. These changes are adaptive in the sense that they enable the system to do some task or tasks drawn from the same population more effectively the next time.

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2.1 Types of Learning

In every learning situation, the learner transforms the information provided by a teacher (or environment) into some new form in which it is stored for future use. The nature of this transformation determines the type of learning strategy used. Several basic strategies have been identified,
These strategies are ordered in increasing complexity of the magnitude of transformation required from the information initially provided to the knowledge ultimately acquired.

Rote Learning: The rote learning is the simplest among all the learning. It requires the least amount of inferencing and is accomplished by simply copying the knowledge in the same form in which it will be used directly. A major concern here is how to index the stored knowledge for future retrieval.
Learning by Instruction: The learning which is next higher in efforts after rote learning is learning by Instruction. This is because the knowledge must be transformed into an operational form before it is integrated into the knowledge base. This is when a a teacher presents a number of facts directly in a properly organized form to the class. In learning by Instruction (or learning by being told), the basic transformation performed by a learner are selection and reformation (mainly at a syntactic level) of information provided by the teacher.
Deductive Learning: The deductive learning is carried out through sequence of deductive inference steps using known facts. Using this new facts and knowledge are logically derived.
Learning by Analogy: The analogical learning provides learning of new concept through the use of similar known concept or a solution.
Inductive Learning: We use inductive learning when we formulate a general concept after seeing a number of instance or examples of the concept. In any human learning activity a maximum of above strategies are usually involved.

2.2 Learning in daily Life

There is a difference between above strategies on the part of designing a learning system. We as learner, use almost use combination of strategies in our daily life. For example, remembering a telephone number we use rote learning, seeing someone wearing new dress every day, we learn that so and so is rich by Inductive learning; also learning that those who complete the home work in time, get more CPI, is also inductive learning.
We learn java having learnt the C++, is analogical learning; when we someone missed the class and learns the matter after discussing the notes from a friend, is learning by Instruction. When we asked to solve a puzzle (first time), it is discovery based learning. Whenever a teacher says very good to a student for asking an interesting question, or answering a question, for us it is enforcement based learning .When you have concluded based on some clues, that a teacher is not in a mood of teaching, most likely you have used deductive learning (or reasoning).

Learning algorithms can be summarized as:

Learning = Representation + Evaluation + Optimization

2.3 Machine Learning

A scientific field is best defined by the central question it studies. The field of Machine Learning seeks to answer the question:
"How can we build computer systems that automatically improve with experience, and on what are the fundamental laws that govern all learning processes?"
Learning, like intelligence, covers such a broad range of processes that it is difficult to define precisely. A dictionary definition includes phrases such as "to gain knowledge, or understanding of, or skill in, by study, instruction, or experience," and "modification of a behavioral tendency by experience."Zoologists and psychologists study learning in animals and humans. It is intersection of Computer science and statistics.
There are several parallels between animal and machine learning. Certainly, many techniques in machine learning derive from the efforts of psychologists to make more precise their theories of animal and human learning through computational models. It seems likely also that the concepts and techniques being explored by researchers in machine learning may illuminate certain aspects of biological learning. As regards machines we might say very broadly that a machine learns whenever it changes its structure, program or data (based on its inputs or in response to external information) in such a manner that its expected future performance improves. Some of these changes, such as the addition of a record to a data base, fall comfortably within the province of other disciplines and are not necessarily better understood for being called learning.

But, for example, when the performance of a speech-recognition machine improves after hearing several samples of a person's speech, we feel quite justified in that case to say that the machine has learned. Machine learning usually refers to the changes in systems that perform tasks associated with artificial intelligence (AI). Such tasks involve recognition, diagnosis, planning, robot control, prediction, etc. The "changes" might be either enhancements to already performing systems or ab initio synthesis of new systems.

3. Deriving Data Relations from Data Analysis

Machine Learning can be used effectively in establishing the relationships between data sets by observing their behavior and patterns. Various examples of the integration of automated learning and reasoning into daily life have been appearing as extensions to traditional systems and services, and also in prototypes and systems that provide qualitatively new kinds of experiences. Various theories can be proposed based on the previous data behavior and patterns they exhibits. It can be said that machine learning learn programs from data.

3.1 Stock Market Prediction using Machine Learning

Stock Prices are considered to be very dynamic and susceptible to quick changes because of the underlying nature of the financial domain. An intelligent trader would predict the stock price and buy a stock before the price rises, or sell it before its value declines. Though it is very hard to replace the expertise that an experienced trader has gained, an accurate prediction algorithm can directly result into high profits for investment firms, indicating a direct relationship between the accuracy of

the prediction algorithm and the profit made from using the algorithm.

In practice, there are 2 Stock Prediction Methodologies:

Fundamental Analysis: Performed by the Fundamental Analysts, this method is concerned more with the company rather than the actual stock. The analysts make their decisions based on the past performance of the company, the earnings forecast etc.

Technical Analysis: Performed by the Technical Analysts, this method deals with the determination of the stock price based on the past patterns of the stock .

When applying Machine Learning to Stock Data, Technical Analysis is done to see if algorithm can accurately learn the underlying patterns in the stock time series. Machine Learning can also play a major role in evaluating and forecasting the performance of the company and other similar parameters helpful in Fundamental Analysis. In fact, the most successful automated stock prediction and recommendation systems use some sort of a hybrid analysis model involving both Fundamental and Technical Analysis.

3.2 Proposed Seasonal Model for predicting values of certain stocks

By the application of technical analysis and observing the previous values of 5 years of different months for stocks belonging to medical field and applying different techniques of machine learning, future trends can be predicted.

A survey was conducted on past values of CIPLA, a pharmaceutical brand for asthma medicines. After data analysis, it is found that in certain months of November and December the value of this stock gets increased every year. Since change of weather occurs and in increases the asthma patients, so sale of CIPLA products increased.

After applying Fundamental and Technical analysis , it is found that trend is always positive in those months. Thereafter , machine learning techniques –Regression and support vector machine (SVM) are applied to train the machine.

Hence , it can be said that in the month of November and December this particular stock will definitely gives profit.

4. Results

The Efficient Market Hypothesis (EMH) hypothesizes that the future stock price is completely unpredictable given the past trading history of the stock. With huge datasets available on hand, Machine Learning Techniques can seriously challenge the EMH.

Value of %k and (open-close)
for Nov.-Dec.

2007	2008	2009	2010	2011	2012
0.82 (33.4)	**0.47 (4.9)**	**0.69 (50.85)**	**0.81 (14.9**	**0.63 (26.35)**	**0.76 (48.2)**

Table :1

Since in the month of Nov. & Dec value of % K shows always positive trends and it is seen that in these two months the difference of opening and closing values is also positive, so it can be inferred that as compared to other months of the year , it is better to invest in these months**.**

5. Conclusion

Machine learning offers a set of useful ways to approach problems that otherwise defy

manual solution. However, much current Machine Learning research suffers from a growing detachment from those real problems. Many investigators withdraw into their private studies with a copy of the data set and work in isolation to perfect algorithmic performance. The worlds of law, finance, politics, medicine, education, and more stand to benefit from systems that can analyze, adapt, and take (or at least recommend) action. This paper identifies some Challenges and several real obstacles in the hope of inspiring a lively discussion of how Machine Learning can best make a difference.

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