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Optimization analytics of Artificial Intelligence based Enhancing Marketing Strategies

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ABSTRACT

Marketing and marketing analytics are going through an evolution. In present scenario it is not at all acceptable to send out bulk email or to use mass communication to an entire customer list for any marketing campaign. Marketers today have understood that they need to be much more selective and to be more unique in their all dealings with customers. Customer journeys nowadays have become more dynamic than ever before. Hence, they require multitude of channels to deal with and want to understand the customer journey across them. Potential customers, they are dealing with are increasingly both tech savvy and data savvy. Marketers are more liable than ever to verify the value of marketing campaigns. Marketing analytic involves the technologies and processes marketers used to evaluate the outcome and value of their marketing initiatives. Marketing analytic gathers data from across all sources and marketing channels and coalesces into a single view, from which marketers extract analytical results, further used to evaluate performance of marketing initiatives and to identify opportunities for improvement.. In order to achieve this, marketers use advanced analytics focusing on customer behavior, customer intelligence and marketing optimization.

This research paper centers around how AI can be connected to upgrade marketing analytics and marketing techniques to help organizations both better comprehend their customers and convey an incredible experience to them.. It likewise gives a model too to demonstrate on how associations can utilize what they may as of now be doing to wind up increasingly viable in advertising.

Keywords :- Artificial Intelligence, Marketing Analytics, Machine Learning, Natural Language Processing, Optimization

I. INTRODUCTION

As marketing raises in complexity with tracking marketing effectiveness and ROI operating under different constraints, including privacy policies, budgets and more, optimization becomes extremely pivotal. Additionally, there is a need for promptness to adjust their (organization's) functioning in real time, while they are actively engaged with customers. In these circumstances, organizations need to make optimization a strategic priority, and need to analyze how they can use technology to accomplish marketing optimization goals. It is obvious to say that optimization runs on the power of analytics, with AI and machine learning on the leading edge. Analytical optimization allows organizations to make use of various mathematical techniques to find out how to exercise best direct marketing efforts under constraints, with the goal of reducing inefficiency and defining alternatives for improvement. Analytics incorporated with optimization enables organizations to consider variables, use different tools to run "what-if" scenarios, and apply optimization strategies to balance goals and constraints.

As of now there are such a significant number of channels to achieve purchasers, where it has achieved the phase when human advertisers are unequipped for breaking down information themselves to totally profile their own computerized or online networking reactions physically. Notwithstanding attempting to draw near to it by physically setting up various crusades to focus on every single one of their distinctive gatherings of people is incredibly time- taking and long.

Prior to requiring some serious energy in setting up the most recent battles to go out crosswise over various stages to contact diverse groups of onlookers, complete advertising capacity could spend endless hours penetrating down and examining information to make client profiles. What's more, in such a quick moving industry, postponing by even a moment likely methods you're late to the gathering and pass up a great opportunity. Likewise, and maybe most fundamentally, think about how that time can be better spent as to really concentrating on creating inventive, head-over the-parapet substance to send to clients and get their consideration, as opposed to dedicating worker hours on the snort work of sending essential messages out.

Indeed, this is the place advertisers need a stage or a program that can lead information investigation with included machine-learning and Artificial Intelligence (AI) to help their crusades. For any advertiser genuine about driving collaborations with their group of onlookers' cross-stage, AI and machine-learning are a blessing from heaven. Advertisers really required an answer that will take advantage of their current gathering of people information for them and investigate it. At that point they require to get the most recent advanced and web-based social networking exercises of those clients to guarantee its building a 'solitary perspective on reality' in view of the most recent market and brand understanding, all that continuously. Here portion of the activity is finished. Be that as it may, the genuine worth of AI and machine-learning isn't simply in the investigation, it's in the execution.

Showcasing effort keep running with AI and machine- learning can consequently work out which of your present advertising messages need to go to which group of onlookers – and on which social or advanced stage. All with as much intercession as the advertiser esteems proper. Both AI and machine-learning take the profiles and use them to deal with personalization – and with substance custom fitted to their inclinations and past practices. Subsequently in such a soaked and complex commercial center, we've hit a point where an AI/machine-learning program is the best way to run that outreach at scale.

In reality advertisers have a great deal on their plate to complete their occupations - Right time, opportune individuals, right message, right stage – and all at scale? That is intense for an advertiser to would like to accomplish physically. Be that as it may, getting AI and machine- learning on-board in their promoting effort can carry out the responsibility and that's only the tip of the iceberg – ensuring shoppers are getting the customized substance they require to cooperate with the brand.

AI practices and machine learning helps organizations to filter through large and diverse sets of data volumes to arrive at precise definition of constraints. Predictive analytics supported by machine learning can be appraised by organizations to achieve a clearer understanding of how to optimize marketing to desired outcomes.

AI and machine learning are exceptionally complementary to marketing because of the efficiency and adaptability they bring to marketing analytics and the reporting system. This is mainly helpful when it comes to set up a foundational layer on which a panoramic view of customer touch points can be built.

AI can successfully replace spreadsheets, reports, one-off dashboards or multiple systems needed earlier to go to get a holistic view of marketing. This makes the integration of any new data extremely speedy, as compared to former times. Nowadays marketers can start reporting on their newest campaigns immediately.

II. LITERATURE REVIEW

As per the father of Artificial Intelligence JMcCarthy, AI is "The science and engineering of making intelligent machines, especially intelligent computer programs". Artificial Intelligence is technique of creation a computer, a computer-controlled robot, or a software think & sense intelligently, in the same way or manner the intelligent humans can think. AI is created by studying and learning how human mind thinks, and how human brains observe, learn, decide, and work while looking for the solution to a problem, and then utilizing the results and outcomes of this study as a base for developing intelligent software and systems.

AI is recognized as a subdivision of Computer Science in 1956 at Dartmouth College (Agarwal & Golfarb 2010, 17). From its inception, as a field of study in 1956 it has passed through variety of hype cycles and has faced AI Winters, the phases of reduced funding and interest. During the period of AI winters, it has confronted criticism, disappointments, and financial lows as companies and academia failed to provide results against overstated promises (Agarwal & Golfarb 2010, 17-28).

Current progress in AI shows that data is more important element than algorithms in solving any problems, and even moderate algorithms can give great results when provided with enough data. Since then, usage of AI has become more widespread and many industries have started its utilization. (Agarwal & Golfarb 2010, 27-28.)

In the current scenario Artificial Intelligence has achieved noteworthy attention of media and its usages are increased practically in personal and business areas. According to Mikael.M(leading researcher in the field), Artificial Intelligence has been recently geared up, mainly because of the factors such as complex & advanced algorithms, large sets of data and bigger computational power. Artificial Intelligence nowadays is being termed as the new electricity which has now become an everlasting spring. (Mikael,M 25 January 2017).

The issue with the explanation of Artificial Intelligence is in the universally acknowledged definition of intelligence when it comes to computer systems and machines (Michael C.Harris, 2007). As per Harris: "Intelligence is whatever

machines haven't done yet". Artificial Intelligence effect is the phenomenon, whereby as soon as Artificial Intelligence (AI) achieves a milestone long thought to indicate the attainment of true artificial intelligence, e.g., defeating a human at chess, it suddenly gets downgraded to not real. As a matter of fact, many standard Artificial Intelligence problems are now resolved and the techniques like optical character recognition are part of our day to day lives (Garg.V 2018, 113-116). Some other examples are: natural language processing, speech recognition, computer vision text, document classification, games, recommendation systems, fraud detection and search engines.

Improvement in Artificial Intelligence and its practical usage in other areas, have led into the development of systems very helpful for marketers. Enormous data is available to exercise for Artificial Intelligence systems because of current digital marketing scenario. Artificial Intelligence systems can help out marketers in various areas such as monitoring of social media, market research, churn analysis and customized experience for customers (Sterne, J 2017, 145-217).

Artificial Intelligence systems for marketing can be generally referred to customized AI systems for individual **usage** and to vendor-provided software and software-as-a- service solutions with AI features. Tailored and original Artificial Intelligence systems can be developed either by organizations' internal Artificial Intelligence team or external service providers and/or by both. In some cases, vendor-provided marketing AI platforms further need tailoring for individual use cases. (Sterne, J 2017, 218-231.)

Lot of software marketing and SaaS providers has invested in Artificial Intelligence. Software Company like IBM is providing its own marketing automation platform with IBM Watson Campaign Automation that has incorporated Artificial Intelligence. The world's best Customer Relationship Management software provider Sales force is also entering into the Artificial Intelligence domain with Sales force Einstein, Artificial Intelligence integrated into their platform. (Sterne, J2017, 218-231.)

III. METHODOLOGY

In this section we will explain about the methodologies which we have used.

A **decision tree** is a graphical representation of possible solutions to a decision based on certain conditions. It's called a decision tree because it starts with a single box (or root), which then branches off into a number of solutions, just like a tree. Decision trees are helpful, not only because they are graphics that help you 'see' what you are thinking, but also because making a decision tree requires a systematic, documented thought process. Often, the biggest limitation of our decision making is that we can only select from the known alternatives. Decision trees help formalize the brainstorming process so we can identify more potential solutions.

Random forests or random decision forests are an ensemble learning method for classification, regression and other tasks, that operate by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes (classification) or mean prediction (regression) of the individual trees. Random decision forests correct for decision trees' habit of over fitting to their training set. The first algorithm for random decision forests was created by using the random subspace method which, in Ho's formulation, is a way to implement the "stochastic discrimination" approach to classification proposed by Eugene Kleinberg.

An **Artificial Neural Network**, often just called a neural network, is a mathematical model inspired by biological neural networks. A neural network consists of an interconnected group of artificial neurons, and it processes information using a connectionist approach to computation. In most cases a neural

network is an adaptive system that changes its structure during a learning phase. Neural networks are used to model complex relationships between inputs and outputs or to find patterns in data. The inspiration for neural networks came from examination of central nervous systems. In an artificial neural network, simple artificial nodes, called "neurons", "neuroses", "processing elements" or "units", are connected together to form a network which mimics a biological neural network.

In machine learning, **support vector machines** (SVMs, also support vector networks) are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns new examples to one category or the other, making it a non-probabilistic binary linear classifier (although methods such as Platt scaling exist to use SVM in a probabilistic classification setting).

K nearest neighbors is a simple algorithm that stores all available cases and classifies new cases based on a similarity measure (e.g., distance functions). KNN has been used in statistical estimation and pattern recognition already in the beginning of 1970's as a non-parametric technique [14-15].

IV. RESEARCH METHODOLOGY

This study is based on the following main hypothesis: "There is no effect of applying artificial intelligence in shaping marketing strategies in the industrial companies listed in Indian stock market. From this hypothesis stemmedthe following sub-hypothesis:

a. Application of artificial intelligence does not affect in developing cost leadership strategy.

[2]. Application of artificial intelligence does not affectin developing cost differentiation strategy.

[3]. Application of artificial intelligence does not affectin developing focus strategy.

[4]. Application of artificial intelligence does not affectin developing alliance strategy.

[5]. Application of artificial intelligence does not affectin developing direct marketing strategy.

A. The Study`s Population and Sample

The study population consisted of hundred manufacturing companies listed in Indian stock market. Questionnaires were designed accordingly and were send to marketing managers through e-mail using census method.

B. Analysis Unit

To fulfil the research objectives, the researchers gathered information and data about the present research's factors relying upon a testing unit which incorporated all marketing managers in the modern organizations recorded in Indian stock exchange.

C. The Study`s Type and Nature

This study can be considered as a descriptive analytical study as the researchers utilized the engaging technique to depict the ideas identified with computerized reasoning and showcasing procedures and advertising investigation notwithstanding dissecting its factors to manage when testing its speculation and proclaiming the outcomes and proposals of the investigation.

D. Data Sources

The researchers collected data from two kinds of sources: Secondary sources such as management books, scientific materials, and specialized bulletins and periodicals that look into artificial intelligence ,marketing analytics and marketing strategies; as well as primary sources through designing and developing a written questionnaire for the subject matter of this study.

E. Data Analysis and Hypothesis Test

The information in table shows the arithmetic means and standard deviations of artificial intelligence and kinds of marketing strategies variables.

Natural language processing (NLP): NLP involves examining, understanding, and generating responses to ultimately enable interfacing with systems using human rather than computer languages. NLP often employ semantics to parse sentences for concepts (words and phrases that indicate a particular idea), entities (people, places, things), themes (groups of co-occurring concepts), or sentiments (positive, negative, neutral). In present scenario, NLP is often used in text and social media analytics tools to analyze issues and opinions.

Cognitive computing: Cognitive computing depicts technology platforms that combine machine learning, natural language processing, reasoning, speech, vision, human computer interaction that imitates the functioning of the human brain and helps to improve human decision making.

Optimization: Optimization includes selecting how to best use limited resources to find the best option for a given set of constraints through maximizing desired factors and minimizing undesired ones. A famous example of optimization occurs in the airline industry which uses optimization to sift through millions of flight itineraries to get the optimal price at any point in time to maximize their profits.

Decision management: This includes systems that automate and optimize repeatable and operational business decisions. Best examples include credit card or car loan approvals, or recommendations to customers. Decision management technology usually uses some sort of rules engine in conjunction with predictive models. Many of these technologies are already in use, jointly and individually, to help improve marketing analytics.

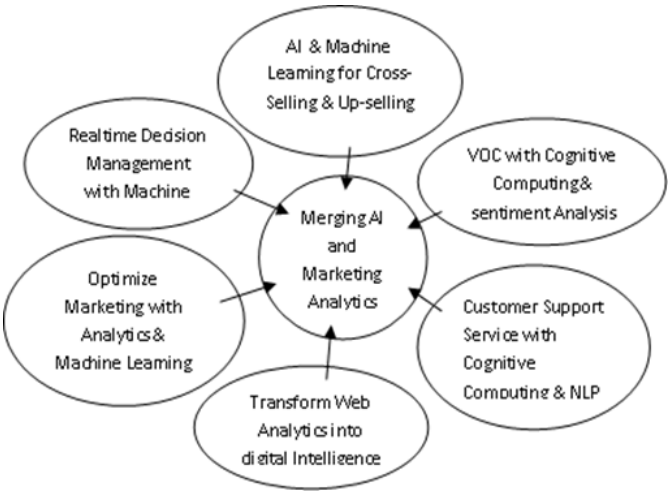

Figure 1: Merging of AI and Marketing Analytics

DNN based Classification:- In Artificial Intelligence, a machine learning subset is called deep learning, which has the potential of learning unstructured or unsupervised data. Input layer, output layer and hidden layers are the essential components of the DNN framework. The proposed DNN framework is specified in Figure 2.

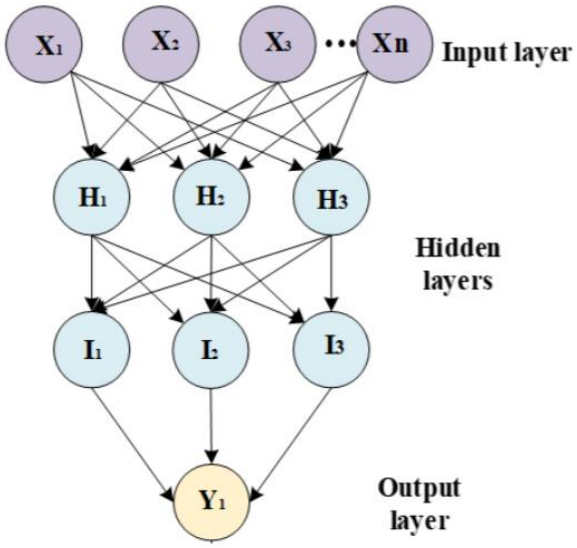

Figure 2: Artificial Intelligence Architecture

DNN indicates the type of ML (Machine Learning) while the system utilizes many layers of nodes to derive high-level functions from input information. It means transforming the data into a more creative and abstract component. Nodes are little parts of the system, and they are like neurons of the human brain.

When a stimulus hits them, a process takes place in these nodes. Some of them are connected and marked, and some are not, but in general, nodes are grouped into layers. The system must process layers of data between the input and output to solve a task. Creative and analytical components of information are analyzed and grouped to ensure that the object is identified correctly. The creation of neural network is inspired by the working of human brain and its functions. Artificial intelligence and machine learning, which is a subset of AI, play an essential part in its functionality. It starts working when a developer enters data and builds a machine learning algorithm, mostly using the "if ... else ..." principle of building a program. The deep neural network does not only work according to the algorithm but also can predict a solution for a task and make conclusions using its previous experience.

V. SIMULATION RESULTS

The advent of online channels has changed marketing more than anything else. Roughly overnight, any company engaged with customers online desires Web analytics to measure, analyze, and report on Web traffic. Corporate executives as well as marketing managers, everyone wanted to know how the organizations are doing on the Web. They required at least observing simple click stream analysis reports, particularly after important marketing and advertising campaigns. At times, the fixation with Web analytics overshadowed analysis of customer engagement inother channels.

Today, organizations have recognized that the Web is not an island to be analyzed in isolation; it is vital to the performance of all channels. To be customer-oriented, organizations need to integrate collection and analysis of data about online customer activity with that from their other channels to gain a complete view. They required understanding how marketing campaigns and engagement in Web channels relate to those in other channels, including mobile. Unfortunately, Web analytics can be tough to integrate with data and analytics generated in other channels because mostly Web analytics lives in its own silo and utilizes data that is highly cumulative and structured specifically for Web analytics reporting.

As organizations endeavor to do more with less, marketing campaigns need to be efficient and effective so that they return value, do not waste customers' time with irrelevant offers, and stay within budget. The chase to achieve these objectives is optimization, which has long been vital for supply chains, manufacturing, and other process-oriented activities. Now, marketing optimization is hitting the mainstream.

As marketing develops in complexity—with abundant campaigns running across multiple channels and operating under a variety of constraints, including budgets, privacy policies, and more—optimization becomes vital and critical. The requirement for speed is also driving demand for optimization as organizations attempt to adjust offers at or near real time, while they are actively engaged with customers. Marketing optimization can also coerce automated decision management. Thus, organizations must make optimization a strategic priority and evaluate how they can use software to achieve marketing optimization goals.

It wouldn't be an overstatement to say that optimization runs on the power of analytics, with AI and machine learning on the leading edge.

VI. CONCLUSION

There is an impact of applying man-made consciousness in forming cost leadership, differentiation, cost focus and other relevant marketing strategies of the organizations, as these applications obliges the organization to decrease the

expense of its items with keeping an adequate dimension of value. The nexus of big data analytics and the various forms of AI including machine learning, predictive analytics, and deep learning supports well-informed and efficient customer interactions that benefit both customers and businesses.

The prior examples should provide some reassurance that although AI sounds futuristic but there are projects that organizations can implement today by using the concepts of AI. These can include using certain algorithms—such as machine learning and NLP—as well as automating analytics using decision-management tools and techniques.

Organizations and vendors are also giving solutions that make these algorithms easier to use via guided interfaces that hide the complexity from the user. The time is accurate for organizations to evaluate the latest marketing analytics technologies to determine if AI can help them meet business objectives.

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