

Harnessing the power of Machine Learning for Automating the Repetitive Tasks

G. Shobana^{1*}, K. Pradeepa², D. Subashree³

^{1*}Department of Information technology, Loyola ICAM college of engineering and technology, Chennai, India

²Department of Information technology, Loyola ICAM college of engineering and technology, Chennai, India

³Department of Information technology, Loyola ICAM college of engineering and technology, Chennai, India

*Corresponding Author: pradeepa.21it@licet.ac.in

Available online at: www.ijcseonline.org

Abstract— Why to do hard work? When smart work pays off! There are about 7.6 billion people in the world who do many tasks every day, in which most of the tasks are repetitive. Repetitive tasks can be assisted and done by employing machine learning. Data is generated from these repetitive tasks, and this voluminous data is managed by Big Data Analytics and it is analyzed by Machine Learning and provides smart solutions. First of all Machine Learning creates a study pattern based on our daily routines and this data will be at a level of complexity that human minds will fail to comprehend. Machine Learning will make it possible for automated system to outthink the human brain by integrating broad information sets and finding correlations. A large number of repetitive tasks that involve manual labor can be automated through Machine Learning. Advances in Machine learning signify a future when devices run on self-learning algorithms and operate independently. They may deduce their own conclusions within certain parameters and develop a context based behavior to interact with human more directly than before. This could mean automating tasks of professionals like doctors (analyzing reports), advocates (for analyzing vast number of judgments and concluding outcomes), etc., even for routine jobs Machine Learning could uncover new potentials and enable human to make the best of their talents. In this article we would focus on how to minimize the time and energy spent on the repetitive and tedious tasks by assigning them to smart assistants using Machine Learning.

Keywords— Smart work, Machine Learning, Automating, Smart assistants.

I. INTRODUCTION

Ever thought of the time consumed on doing certain tasks which are often repetitive?! We spend about 35% of the day on doing such tasks. Automating these tasks can drastically save time which is now possible by applying the concept of Machine Learning. Machine learning is a part of computer science, involving programming. It focuses on analyzing the repetitive tasks and identifying the pattern and grouping as a format so that, the format can be used whenever needed in future. It is purely a computer program, with latest coding technologies like Python, R etc. Constituting advanced mathematical functions, function analysis, probability theory, sets theory, chaos and dynamic systems and calculus of variations among other areas. The new trend in machine learning is that, the resources are vast i.e. currently we are approaching 5G and the processor of smart phones in our hands can perform much better than the biggest computers of the past. Hence data is harnessed from sensors, raw data available in web etc. This raw data is analyzed automatically by machine learning programs and are grouped; human intervention should be there in grouping to make it more meaningful and useful. Once the successful format is created,

this format can be used whenever this task is done in future. That is precious time and energy invested in developing the foolproof formats for doing particular work is preserved.

The voluminous data is filtered by machine learning techniques and the relevant data is preserved as formats. This format is nothing but the valuable final decision. These are the assets. Machine learning must preserve these decisions/formats and prompt these decisions, whenever similar patterns are observed.

Machine learning uses the power of recent highly powerful processors and processes terra bytes of data to perform complex mathematical calculations and takes appropriate decision by itself. Depending upon the various situations it would analyze the data and prompt best possible action.

In this paper we would discuss the scope of machine learning that is its possibilities and its applications and we would discuss how the data is generated and the way of processing it and in the next section we would discuss about Naïve Bayes equation and an algorithm to manipulate this data to automate the repetitive tasks and a python code for its application also we would see how this data can be protected

using block chain technology, finally we have concluded on discussing the future enhancements of this idea.

II. SCOPE OF MACHINE LEARNING

Lately there has been an increasing want for an intelligent personal assistant which is the major reason for the success of Apple's Siri, Google's ok google, Amazon's Alexa. The main goal of this article is to apply Machine Learning to improvise such personal assistants into smart assistants, by doing so we could save a lot of time and energy.

In the figure 1 we see the difference of time consumed on doing a task repeatedly and the time saved on automating it using machine learning.

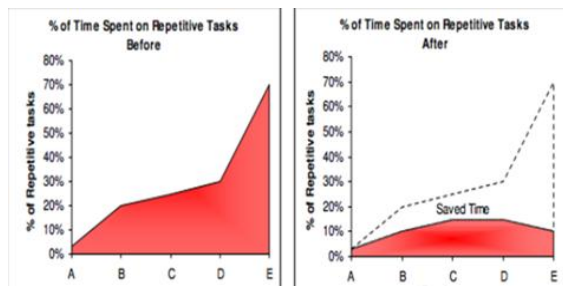


Figure 1: Time consumption of repeated tasks

On saving the time we spend doing repetitive tasks we can save nearly quarter of our time, also productivity of our work increases and the work is done in a most efficient way without any wastage. Also we would not miss an event or skip the schedule.

Certain tasks which we do daily involve complex logics and analysis. These tasks can be automated by building Machine Learning algorithms. Machine learning takes the input of raw data and uses if command to project various models/outcome with available data. This process is repeated by machine learning to automate decision making process. Machine learning consumes large amounts of data with respect to time and environment and automates the tasks based on our pattern.

III. POSSIBLE FIELDS OF APPLICATIONS

Consider some real life scenarios where in machine learning is already in use like, online sites for watching movie and videos. It provides the next set of choices based on the users' priority. Also online shopping websites which provide recommendations based on consumers' preferences, and lot more to list.

Another example is that most of us spend nearly 10% - 15% of a day on social media for various reasons; it is arduous seeing and replying for everybody's messages. Imagine how it would be if whatever you thought of replying is shown as suggestions and you just have to choose one of them and also instead of seeing all the posts on social media if you are shown only the needed ones based on your priority, similarly

instead of typing an e-mail which is already repeated, one have to just choose your mail content based on previous cases, isn't it nice to hear! Now all these facilities are possible by the technique Machine Learning. Not only on those tasks, tasks like paying monthly bills, taxes, loan installments are a just done with click without any effort. Also in case you don't have money to pay them right at that time it would also suggest you the most efficient and smart solutions to pay them up. So, no need of remembering deadlines and thinking how to sort it out. This technique is also used to help the professionals like doctors, engineers, advocates, etc., Consider the case of advocates, each time they handle a case they analyze various judgments and laws for it, but by Machine learning provides the best possible ways to win the case and the necessary laws, judgments related to it. Wouldn't their time be saved efficiently?!! Similarly in the case of monitoring old people, carrying daily chores if Machine Learning is used our time is saved and at the same time output of our work is more efficient.

Also machine learning could suggest the home makers what all grocery they need to purchase and which are in the verge of depletion and what are all your recent likes which all you would prefer also. It would inform the store to get those items. It is totally based on users' priority. Consider a situation where in a new business proposal is offered for a well-established organization, then machine learning would apply its' logics to proceed with the offer or not. It analyses the benefits of accepting it by past records of those companies and the cons of not accepting, also if it decides not to accept then what are all reasons for the rejection would be listed and thus machine learning provides a immediate intelligent solution than a human could ever provide. All these actions are performed based on the users' reaction so we can term it as, reaction- action process.

IV. DATA PRODUCED IN REPETITIVE TASKS

In this era of Big Data is constantly being collected and analyzed, which is major cause for advancements and also leading to economic development. Companies and organizations use the data they collect to personalize services, optimize the corporate decision making process, predict future trends and much more. There is an exponential increase in online availability of information from sources like web pages to emails, e-books, social media and also the data from sensors; cameras etc. are full of valuable content in unorganized form. This is when automated data classification part of Machine Learning comes into action. Data classification is a smart classification of content into categories. Thus these collected data is processed and saved. This saved data is grouped as frequent patterns and this pattern is then used in Machine Learning to automate the tasks which just makes the whole process super-fast and efficient.

IV. PROCESS

The concept of Machine Learning is a little complex as it involves a large amount of data and, out of which we try to find out meaningful predictive patterns and models to produce smart solutions. It's all about asking the right question, and that acts as a beginning to Machine Learning process. After that, we need the right and structured data to answer the question, and this is the part which takes most of the time in a complete Machine Learning process. That model is updated from time to time, to adapt the changes that happen periodically, and finally the model is deployed.

Machine learning is proactive concept as it uses self-learning algorithm based on which data library is created. Further frequent pattern library is formed and success rate library is derived and within that the most successful solution is used. In this paper, we use Naive Bayes equation for formulating such algorithm.

This system studies our daily pattern our day to day habits, and predict our next move in a most probable way. Mostly we do our works through smartphones and pcs; hence the work we do is saved or recorded for future reference. The algorithm is self-updated whenever a new pattern or new action is taken; these pattern collections can also be done for complex tasks too and the probability condition can be changed such that instead of checking frequent number of times we can check for how successful the move was and based on this decision is prompted as told earlier human intervention should be there for making the move beneficial and meaningful

The figure 2 is a diagrammatic representation of the working of Machine Learning process. It involves data generation, this generated data is now processed and frequent data pattern is formed and whenever repeated pattern is observed is used for predictive analysis to give an optimized solution. We'll briefly see how it could be done practically using Naive Bayes algorithm.

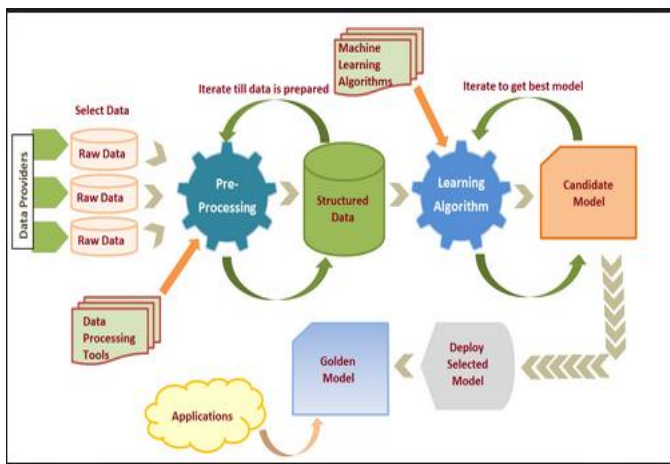


Figure 2. Working of Machine Learning Process

V. NAIVE BAYES ALGORITHM:

Naïve Bayes is a grouping or classification technique where Bayes theorem is applied with a supposition of impartiality between two cases. In other words it does classification based on the probability of two outcomes and the outcome with higher probability is chosen and done. For example, furniture may be considered to be a chair if it has 4 legs not able to move by itself and nonliving. Even if these features depend on each other or upon the existence of the other features, a naïve Bayes classifier would consider all of these properties to contribute independently to the probability that it is a chair.

Look at the equation:

$$P(C|X) = \frac{P(X|C) * P(C)}{P(X)}$$

$$P(C|X) = P(X_1|C) * P(X_2|C) * \dots * P(X_n|C) * P(C)$$

Bayes theorem provides a way of calculating posterior probability $P(c|x)$ from $P(c)$, $P(x)$ and $P(x|c)$. Here, $P(c|x)$ is the posterior probability of class (target) given predictor (attribute). $P(c)$ is the prior probability of class. $P(x|c)$ is the likelihood which is the probability of predictor given class. $P(x)$ is the prior probability of predictor

Figure 3 shows how Naïve Bayes classifies the data

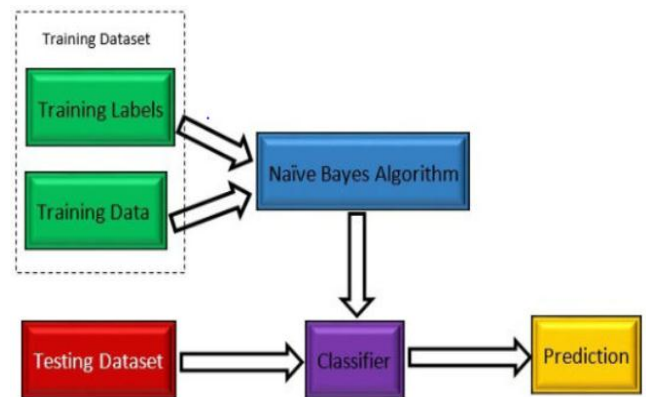


Figure 3. Data Classification using Naive Bayes algorithm

Why to use Naive Bayes algorithm when there are many algorithms for Machine Learning, it is due to these reasons,

- Naive Bayes Algorithm is a fast, highly accessible algorithm.
- Naive Bayes can be used for both Binary and Multiclass classification. (flexible)
- It provides different types of Naive Bayes Algorithms like Gaussian NB, Multinomial NB, and Bernoulli NB.
- It is a simple algorithm that depends on doing a bunch of counts on the voluminous datasets

- Great choice for Textual Classification problems.
- It's a best choice for spam email classification.
- It can be easily trained on small dataset.
- Suitable usage and application

VI. ALGORITHM

Algorithm for studying your pattern and giving replies of your thought:

Necessitate: Collection of data done in various tasks

Confirm: Incremental encounter of frequent patterns, stored in frequent patterns discovered database, permission access.

For all data, slice it in quanta of contacts and received situation

In database do {Data is processed in slices of contacts and received situation}

Determine database size (for storage purposes)

Mine frequent patterns in in the data base of db_contacts_received_situation

for all Frequent Pattern Data Base db_contacts_received_situation do

Search a frequent pattern in data base if Frequent Pattern found then

Update frequent pattern in the frequent pattern library

else

Add a new Pattern to DataBase

end if

end for

For all Frequent Patterns in Database increment Database Size

end for

For every similar pattern observed

prompt a message of the previous sessions

end for

end for

(The reply message is given by Naive Bayes equation: $P(c | x) = \{P(x | c) * P(c)\} / P(x)$ Higher probability replies are found and suggested for the user) the solution is suggested like this:

Similarly, we can calculate the time spent on seeing a post or looking at a product and the time taken and the thing seen, and show the probability of various products and posts of the users' priority using Naïve Bayes equation

$$P(c | x) = \{P(x | c) * P(c)\} / P(x)$$

Show the posts and products of the users' priority with the higher probability items.

Here a sample python code is given to execute this algorithm,

#Import Library

from sklearn.naive_bayes import GaussianNB

#Assumed you have, X (predictor) and Y (target) for training data set and x_test(predictor) of test_dataset

Train the model using the training sets and check score

model.fit(X, y)

#Predict Output

predicted= model.predict(x_test)

Thus Naive Bayes algorithm is used to ponder over voluminous data and to provide efficient solutions.

VII. BLOCK CHAIN TECHNOLOGY

This process involves huge amount of data and these data are confidential as these systems analyse and create an individual's pattern and can predict the next move of him where his privacy and security is under risk for this we use block chain technology to safeguard these data.

Usage of block chain technology:

- Data is kept as Blocks
- End to end data is encrypted
- Data is distributed to all nodes, hence everywhere it is available. But it cannot be changed.

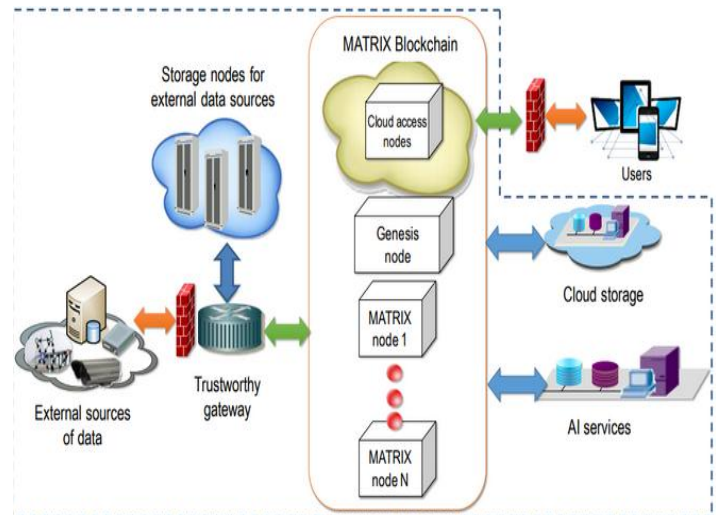


Figure 4. Block Chain

VIII. CONCLUSION AND FUTURE ENHANCEMENTS

The concept of machine learning which is going to rule the technological world is applied in this article to various tasks in our day to day to automate it and produce more efficient outcomes. We have presented a model for recognizing human activity patterns which is used to minimize the time and energy spent on the repetitive and tedious tasks by assigning them to smart assistants using machine learning.

Thus the concept of Machine Learning can be used to the extent of helping people by being their highly efficient virtual assistant, has been emphasized.

This project can be further used to automate the complex tasks such as stock market analysis, case surveys, medical reports analysis, weather reports predictions, and tasks which involve high mathematical computations and are very difficult to comprehend by human brain. This could be possible, by employing more effective approach. Many algorithms like Markov's decision making approach can be used in future to extend this model that it could be more beneficial.

ACKNOWLEDGMENT

1. We would like to convey our hearty thanks to Ms.Shobana. G AP/IT in Loyola ICAM College of Engineering and Technology for encouraging us to exhibit our ideas in an efficient way.

2. We would also like to thank LICET library management for the valuable resources provided.

REFERENCES

- [1] ABDULSALAM YASSINE, SHAILENDRA SINGH and ATIF ALAMRI, "Mining Human Activity Patterns From Smart Home Big Data for Health Care Applications"
- [2] Taking the Human Out of the Loop: A Review of Bayesian Optimization The paper introduces the reader to Bayesian optimization, highlighting its methodical aspects and showcasing its applications. By Bobak Shahriari, Kevin Swersky, Ziyu Wang, Ryan P. Adams, and Nando de Freitas
- [3] Decentralizing Privacy: Using Block chain to Protect Personal Data Guy Zyskind MIT Media Lab Cambridge, Massachusetts Email: guyz@mit.edu Oz Nathan Tel-Aviv University Tel-Aviv, Israel Email: oznathan@gmail.com Alex 'Sandy' Pentland MIT Media Lab Cambridge, Massachusetts Email: pentland@mit.edu
- [4]Analytics vidya (website)
Available: <https://www.analyticsvidhya.com/blog/2017/09/common-machine-learning-algorithms/>
- [5] Digital doughnut (website) Available:
<https://www.digitaldoughnut.com/articles/2017/june/machine-learning-accelerates-transformation>
- [6] Matlab&Simulink (website)
Available:
<https://www.mathworks.com/discovery/machine-learning.html>
- [7] kd nuggets (website)
Available:
<https://www.kdnuggets.com/2016/08/10-algorithms-machine-learning-engineers.html>
- [8] dezyre (website)
Available:
<https://www.dezyre.com/article/top-10-machine-learning-algorithms/202>

Authors Profile

PRADEEPA. K pursuing B.Tech IT in Loyola-ICAM College of Engineering and Technology currently living in Chennai who is highly proactive and interested and looking forward for technological developments, she looks everything in a different and productive way.



SUBASHREE. D pursuing B.Tech IT in Loyola ICAM College of Engineering and Technology currently living in Chennai who is energetic and does works efficiently, she is a self- motivated person who does things in a very constructive manner.

