AUTOMATION THROUGH MACHINE LEARNING METHOD AND USE OF NEURAL NETWORKS AND DEEP LEARNING

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Table of Contents

List of Figures

List of Table

1. Aim

Automation is a procedure which is being executed with less human assistance. With the help of neural networks and deep and machine learning reduces the chances of errors which can be made by human interference. The aim of the project is to develop an efficient process through which more accurate results can be observed.

2. Background, motivation, and relevance- literature review

2.1 Background

The automation is a technique or process through which a system can operate automatically without any human interference. With the help of neural networks and deep learning the efficiency of the process gets improved in an effective way. There are different advantages of neural networks that can be observed such as a complexity in the relationship between the linear and nonlinear variables. Other variables such as dependent and the independent variable where complexity has been reduced with the help of neural networks (Storie and Henry, 2018). Neural networks are known as trainable human brains which act like human brains. On the other hand, the uses of deep learning in the automation is helpful as it reduces the overall complexity of the procedures. The deep learning algorithm has the ability to choose the most appropriate method of doing any function without being told by the machine to do so. The deep learning algorithm helps to improve the automation procedure effectively. The automation is done with the help of this algorithm for which the efficiency gets improved. In order to use it in automation a set of workflows are used so that a logic is being created. The code is being made in such a way so that the automation system gets improved. Machine learning is a data analyst procedure and this has been automated at the time when it involves the same activity more than once (Gessert *et al.* 2018). This needs to function independently and for that different results have been found. With the help of different results different demands get fulfilled. Usually these procedures have been used in order to improve the automation system successfully.

2.2 Motivation

Automation is the procedure through which a system can be able to work automatically. Different applications of technology can help to control the whole procedure. Here, the uses of machine learning methods, neural network and deep learning can help to improve the efficiency of the automation. These procedures can help to reduce the complexity of the work

(Spampinato *et al.* 2017). The main purpose of using these techniques is to reduce the risk that are associated with automation. These procedures can make the system more efficient and doable. Automation consists of different things among them programmable instruction and control systems are the most important part. In order to improve the overall system and to reduce the human interference the neural network and the deep learning methodologies are used. Robots are associated with the automation procedures and for that reason to increase the effectiveness of the instructions these things are used (Plotnikov *et al.* 2018). Being a series of different algorithms the neural network help[s to do the job just the way a human brain operates the work. The neural network replaces the human brain because it produces accurate results in a faster way. With the use of deep learning computer algorithms can be examined for the improvement purposes and that is why it is used in automation. Deep learning mainly works with neural networks so that it can impersonate human thinking. The main purpose of these methodologies are to increase the efficiency of the automation. On the other hand, machine learning works by exploring different data, with minimal human interventions. At the time of performing the same data over again the machine learning is used and for that reason the efficiency of the automation system gets improved. Another advantage of using machine learning in automation is that it helps the system to perform independently so that different solutions can be achieved and for that reason, it can fulfill demands that are required for automation.

2.3 Literature review

The project plays an important part because through this process the efficiency of the automation can increase. In order to perform a large number of functions the application of machine learning, neural network and deep learning is important because with the help of these things the efficiency of the work can get improved and with less human interference the work will be done (Newby *et al.* 2018). The project is necessary in order to reduce the error which is caused by human interference.

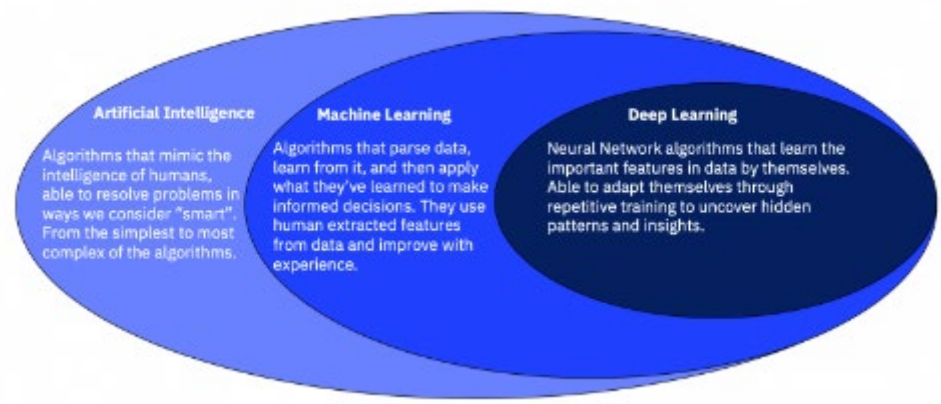


Figure 1: AI algorithm

(Source: Newby *et al.* 2018)

Automation is the reason for which scientific research gets improved with time and all the long term plans of engineering to provide semiautomatic functionalism gets fulfilled. The AutoML project is a tool which has been used to improve the machine learning experience in a positive way (Hutter *et al.* 2019). The AutoML is the process through which an in depth knowledge can get about the neural network.

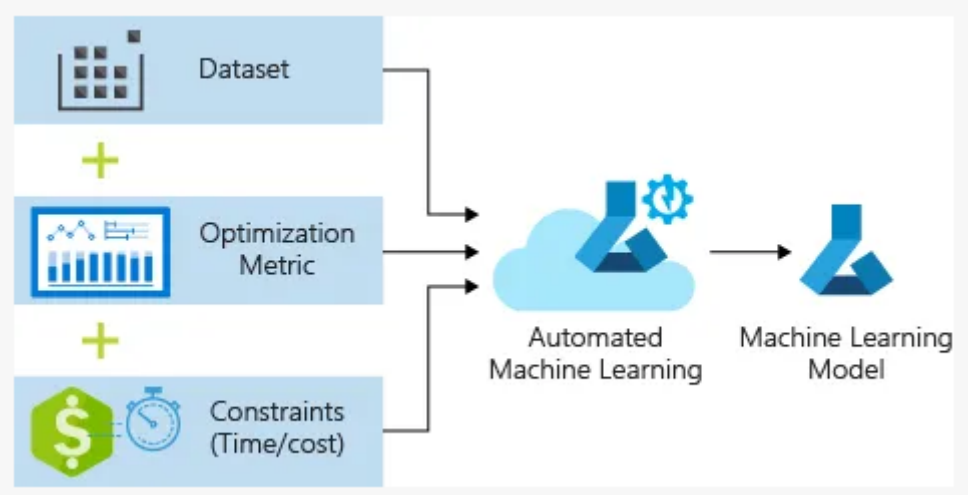


Figure 2: AutoML model

(Source: Hutter *et al.* 2019)

Understanding the work procedures of the human mind has helped to create a similar functionalism that is a neural network. With the help of neural networks the automation procedure gets resolved and for that reason the work efficiency gets improved. Applying human based features has helped to reduce the overall complexity in automation (Spampinato

et al. 2019). The RNN based approach has helped to understand overall functionalism of the automation according to the work requirement.

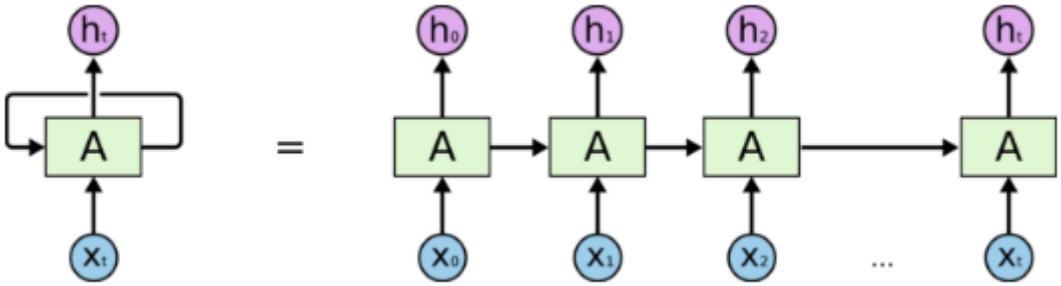


Figure 3: Understanding RNN

(Source: Spampinato *et al*. 2019)

The best known learning algorithms for deep learning is CNN (Convolutional neural network). The application of this process can make the automation system more effective and due to this reason the huge computational effects does not require each time while performing. The application of this process is to showcase each dimensionality in an effective way (Plotnikov *et al.* 2018). The ensemble modelling is the approach which consist of CNN and due to this reason this approach become very popular in automation.

2.4 Sources and uses of knowledge

2.4.1 Journals

Different journals are available based on machine learning procedures, the neural network and deep learning. In order to gather information the google scholar has helped in many ways. The availability of different articles, books has helped to gather information for which knowledge has been improved in a positive way. In IEEE the most relevant journals have been found. With the help of IEEE the automation process has been considered accordingly (Paschek *et al.* 2017). Different published papers have helped to gather information and for that reason the resource gathering process gets improved.

2.4.2 The Aspects of journals for publication

In order to publish journals different aspects need to be reviewed such as all the guidelines need to be followed according to the requirement. The page layout and the page style need to be reviewed and IEEE need to have an accurate reference format. The page layout needs to be an A4 with a margin of 19mm in the top and 43 mm in the bottom. In both left and right the margin needs to be 14 and 32 mm respectively. The paragraphs of the articles need to be

justified and must be written in the Times New Roman format. An affliction of an author is needed and paragraph font needs to be 10 pt. regular font style. All the cells of tables and the email address must be in the 9 pt. format (Leofante *et al.* 2018). The figure caption and the reference list format must be in 8 pt. The referencing format is different for IEEE with respect to others.

The formatting style would be "A. A. "Author of article," *Title of the Journal,* vol. 1, no. 1, pp., month and year."

2.4.3 Relevant authors and journals

In order to understand the automation different help from articles has been taken.

Mind Map

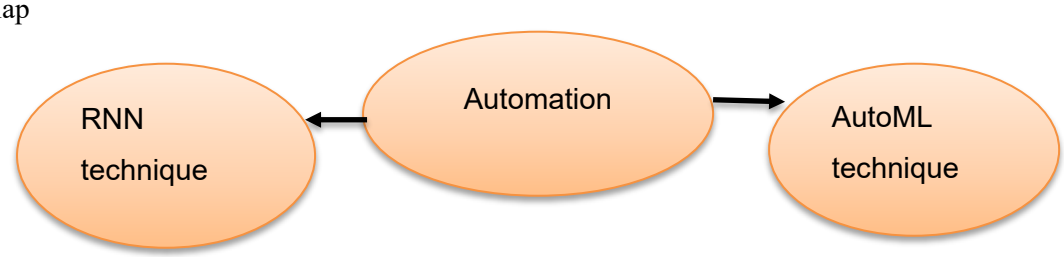


Figure 4: Mind Map

(Source: Created by learner)

3. Scope, objective and risk

3.1 Scope

The scope of the project is to perform automation with the help of different techniques such as machine learning method, neural network and the deep learning method. Each technique needs to be performed in an accurate manner so that the efficiency of the automation system gets improved based on the requirement. Different techniques are used to improve the overall efficiency of the automation system (Gandhi *et al.* 2018). This project is included different scopes and these are,

In order to identify all the features and techniques through which the efficiency of the project can be improved.

- To develop a system where complexity of performing procedures can be reduced and using these techniques the efficiency of the whole system gets improved.

- Identifying all the techniques which can help to improve the overall performance and for that reason a comparative study can be observed in order to assess the performance.
- Another scope of this study is to improving performance of automation by making intelligent decisions by structuring algorithms accordingly (Hoermann *et al*. 2018).
- Other reasons for the scope is to achieve the desired result with less effort and less human involvement.

3.2 Objective

The objective of the study is to make the automation system more efficient according to the requirement. Applying different techniques can help to achieve the goals through which human involvement can get reduced. This reduces the complexity and the chances of getting complex. The main objective of the project is to do automation with the help of different methods so that the automation can happen in a specific time and with improved quality of services. The purpose of machine learning in automation is to predict the user data. The prediction can help to function further based on the need. With the help of different applications the cost and the efficiency of the machine can be assessed before performing any action. Deep learning and the neural network helps to solve problems when a conflict in decision making is generated (Sevillano and Aznarte, 2018). The neural network helps to make effective decisions based on the previous inputs of humans. The neural network acts just like the human brain and with the help of deep learning an output can be given by assessing complex entities. The performance can be explained with the help of different logic gates and truth tables.

3.3 Risk

Risks	Risk Value (1-100)	Risk management strategy	Review date
Working with the three different technologies that are machine learning, neural network and deep learning can make the	50	A proper guidance can help to reduce the complexity	While researching

system more complicated			
There are no risk of people can be observed	0	/	/
No environmental risk has been observed	0	/	/
Having limited knowledge about automation can affect the research in a negative way	50	Need to do research about the topic while understanding the topic	While researching
There is no security issue can be observed	0	/	/
Need to understand all the basics of machine, deep learning, and networking	30	Need proper training and guidance	While researching

Table 1: Risk assessment format

(Source: Created by the learner)

Different risks are identified while performing the automation with different methodologies. These risks have been listed here which can help to mitigate the risks in an effective way.

4. Ethical, legal, social and professional issues

4.1 Ethical issue

The project does not breach any ethics and carries out any type of risks. All the information has been provided does not cross ethics in any term. No issue regarding data confidentiality has been found (van den Ende and Ampuero, 2020). All the data which has been provided are taken from the public domain and for that reason no ethical issues have been observed.

4.2 Legal issue

All the information is collected from the public domain and for that reason no legal issue can be observed in this study. This research study is purely made based for academic purposes and for that reason no legal barrier can be observed here. This study does not violate any legal issue at any stage.

4.3 Social issue

No social conflict can be observed and conduct any problem for the society. The main purpose of making this project is to increase the efficiency of the automation system by applying different technologies. The project does not affect the society in any way.

4.4 Security issue

Collecting all the information from the public province can be a reason through which no issues related to security can be observed. All the databases which have been used in this project are made by the researcher or available in the public zone that is why it can be said no security issues is occurred here.

4.5 Professional issue

No professional issues can be observed as this project is purely made for the academic purposes and no involvement of people can be observed here (Zhang *et al.* 2016). On the other hand, all the information is available in the public domain and for that reason no professional issue can be seen here. For publishing purposes all the professionals will be done accordingly for which no professional issue can be observed in the future. An ethics form has been filled up to follow all the steps of the study accordingly.

5. Scheduling activities

In order to perform all the activities to fulfill the requirements a schedule structure has been made before starting the assessment. Based on the requirement the project plan is divided into sub parts. In order to fulfill all the requirements, scheduling the work is important. The scheduling can help to execute the whole work according to the requirement. With the help of a Gantt chart the work progress can be assessed and this has helped the researcher to understand where to work more. The work process needs to be completed in a time bound and for that reason scheduling the work is very important. In the time span all the days including holidays have been calculated for completing the project.

5.1 Work breakdown structure

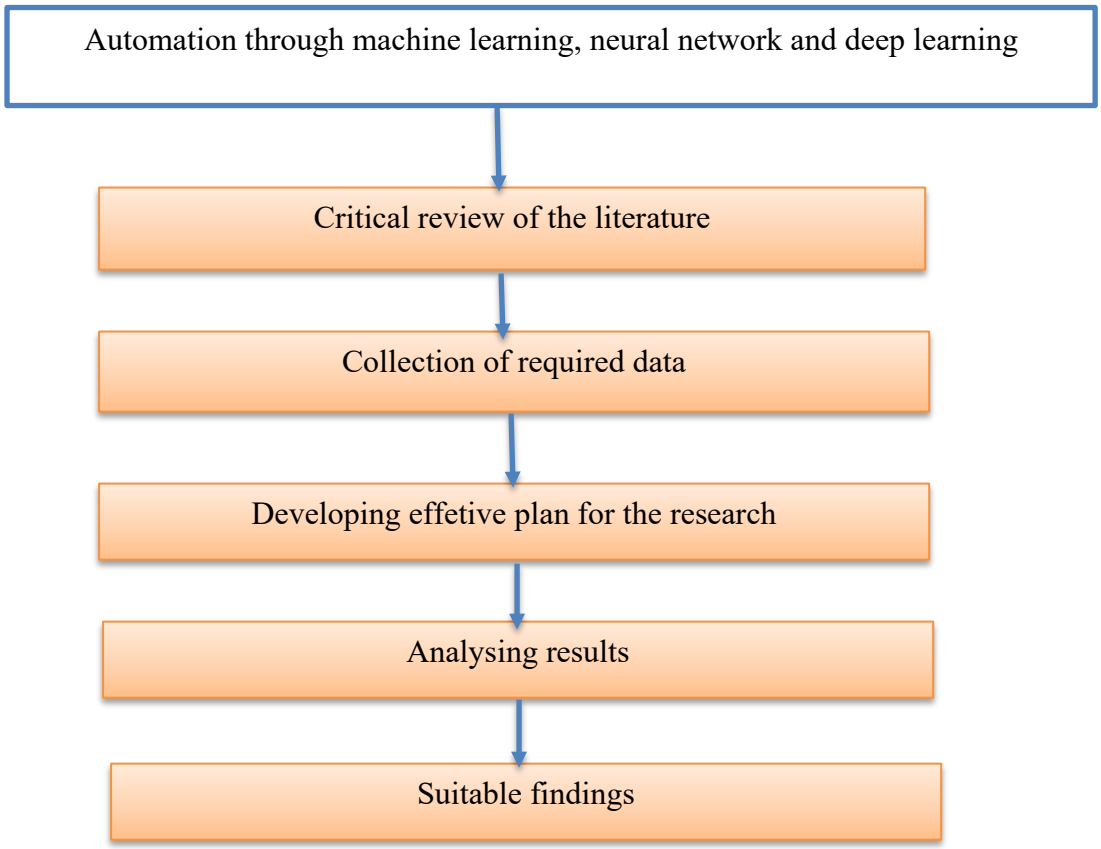


Figure 5: Work breakdown structure

(Source: Created by the learner)

5.2 Tasks list

Task number	Task name	Time duration
1	Method used in literature	9 days
1.1	The AutoML is studied	5 days
1.2	The RNN procedures has been reviewed	4 days
2	Plan development and evaluation	14 days
2.1	Development of an automation plan	4 days
2.2	Evaluation a knowledge about the neural network and the deep learning	4 days

2.3	Development of ANN plan	3 days
2.4	Evaluation of all the required network parameters	3 days
3	Post processing	5 days
3.1	Writing the importance of neural network and deep learning in automation	2 days
3.2	Discussing different procedures	2 days
3.3	Understanding different aspects of automation and recommendations	1 days
4	Review process	4 days
4.1	Reviewing different journals in order to gather knowledge	2 days
4.2	Reviewing all the procedures according to the requirement	2 days
5	Date for submission	2 days
6	Arranging the meeting with supervisor	2 day

Table 2: Tasks list

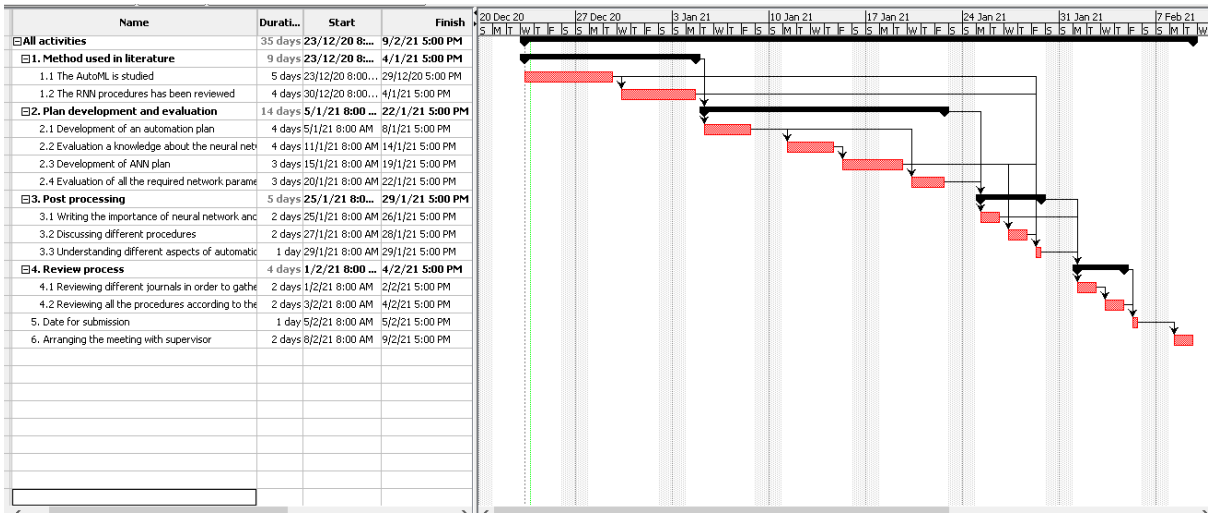
(Source: Created by Learner)

5.3 Project monitoring and control

The project needs to be monitored according to the requirement and all the aspects needs to be understand. With the help of project monitoring the basic requirements needs to be done effectively. The project monitoring can affect the project in a positive way and all the sides of the project gets calculated. The calculation of the project involves many things such as

different techniques through which the efficiency of the project can be improved with time. The project monitoring helps to improve the decision making capability in an effective way (van den Ende and Ampuero, 2020). This process helps to understand all the associated risk in one place and for that reason the performance of the project can improve according to the requirement.

5.4 Gantt chart



Name	Durati...	Start	Finish
All activities	35 days	23/12/20 8:...	9/2/21 5:00 PM
1. Method used in literature	9 days	23/12/20 8:...	4/1/21 5:00 PM
1.1 The AutoML is studied	5 days	23/12/20 8:00...	29/12/20 5:00 PM
1.2 The RNN procedures has been reviewed	4 days	30/12/20 8:00...	4/1/21 5:00 PM
2. Plan development and evaluation	14 days	5/1/21 8:00 ...	22/1/21 5:00 PM
2.1 Development of an automation plan	4 days	5/1/21 8:00 AM	8/1/21 5:00 PM
2.2 Evaluation a knowledge about the neural net	4 days	11/1/21 8:00 AM	14/1/21 5:00 PM
2.3 Development of ANN plan	3 days	15/1/21 8:00 AM	19/1/21 5:00 PM
2.4 Evaluation of all the required network parame	3 days	20/1/21 8:00 AM	22/1/21 5:00 PM
3. Post processing	5 days	25/1/21 8:0...	29/1/21 5:00 PM
3.1 Writing the importance of neural network anc	2 days	25/1/21 8:00 AM	26/1/21 5:00 PM
3.2 Discussing different procedures	2 days	27/1/21 8:00 AM	28/1/21 5:00 PM
3.3 Understanding different aspects of automatic	1 day	29/1/21 8:00 AM	29/1/21 5:00 PM
4. Review process	4 days	1/2/21 8:00 ...	4/2/21 5:00 PM
4.1 Reviewing different journals in order to gathe	2 days	1/2/21 8:00 AM	2/2/21 5:00 PM
4.2 Reviewing all the procedures according to the	2 days	3/2/21 8:00 AM	4/2/21 5:00 PM
5. Date for submission	1 day	5/2/21 8:00 AM	5/2/21 5:00 PM
6. Arranging the meeting with supervisor	2 days	8/2/21 8:00 AM	9/2/21 5:00 PM

Figure 6: Gantt chart

(Source: Created by learner)

5.5 Short description of the project

The automation system needs to be produced with the help of machine learning, neural network and the deep learning procedure. These techniques are the process through which the efficiency of the automation system can be improved over time. The effectiveness of the machine learning system needs to be updated with time and for that reason it is very important to understand all the above mentioned procedures according to the requirement. The machine learning procedure is a technique where human interference can make the system even more complex. In order to keep everything same different approaches needs to be applied and the work needs to be remain same as human brain do. The neural procedure is a type through which the work remains same without the human interference. The main purpose of this study is to improve the efficiency of the automation is same but with less human interference. The less human interference can leads the system in profit and due to this process accessibility gets improved. The main motto of the project is to increase the efficiency and due to this reason accessibility gets improved in an effective way.

The improved procedure has helped the automation system to increase its efficiency and for that reason without the human involvement the complexity in liner and non-liner variables gets resolved.

Understanding all the aspects of CNN and AutoML can help to have a depth knowledge and for that reason the automation procedure gets improved according to the requirement.

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