

# A Study on Application of Artificial Intelligence and Machine Learning in Indian Taxation System

Ankit Rathi<sup>1</sup>, Dr. Saurabh Sharma<sup>2</sup>, Dr. Gaurav Lodha<sup>3</sup>, Dr. Manoj Srivastava<sup>4</sup>

<sup>1</sup>PhD Research Scholar, School of Business & Commerce, Manipal University Jaipur

<sup>2</sup>Associate Prof., School of Business & Commerce, Manipal University Jaipur

<sup>3</sup>Professor, School of Business & Commerce, Manipal University Jaipur (Corresponding Author)

<sup>4</sup>Professor, School of Hotel Management, Manipal University Jaipur

Email: <sup>1</sup>rathiankit321@gmail.com, <sup>2</sup>drsaurabh.sharma@jaipur.manipal.edu

<sup>3</sup>gaurav.lodha@jaipur.manipal.edu, <sup>4</sup>manoj.srivastava@jaipur.manipal.edu

## Abstract:

In a developing economy like India taxation is a main source of public finance. Indian taxation system always suffered from problems such as tax evasion, inefficient administration etc. Administration of taxation always needs such a system which will be less in error and prompt in decision making. Indian taxation system is suffering from lack of manpower to perform tedious tasks such as data entry, scrutiny of return, tax audit etc.

To manage the changing tax landscape alongside use of analytics recently Indian government announced the use of Artificial Intelligence/Machine Learning in tax assessment system. Artificial Intelligence or known as AI is a relatively new phenomenon in tax. Recently the government of India announced to use faceless tax assessment system empowered by AI/ML. In the Present paper we attempt to find out the role of AI/ML in Indian taxation system and on the basis of factors such as tax knowledge, tax education, legal sanction, complexity of tax system, relationship with tax authority, perceived fairness of the tax system, ethics and attitudes towards tax compliance, awareness of offences and penalties, tax education, possibility of being audited etc. we want to know about the perception of taxpayers towards adoption of Artificial Intelligence based tax system.

**Keywords:** Artificial Intelligence; Machine Learning; Indian Tax System; Tax Payers; Tax assessment; Tax Evasion;

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## Introduction

Development of Artificial intelligence in recent time allowed tax professionals to gain new analytical and statistical tools, providing convenience and improving efficiency. These tools have formed the basis for systematic frameworks that avoid the disorder and complexity of data processing and analytics in excel spreadsheets. Artificial Intelligence provides a simulated tax risk, which can help more Complex human judgments to be made.

Artificial Intelligence and machine learning will be the base for the new tax ecosystem and it will enhance the tax system by performing forecasting, clustering, virtual support system and natural language processing. With the help of this technology we can turn data into an asset. Digital transformation and tax administration can simplify compliance to

prevent errors and fraud. Artificial Intelligence can help to improve taxpayers' services by facilitating payment methods, issuing faster refunds and giving easier access to relevant information.

Tax is always an area of political interest. It is the main source for public revenue. Indian tax system is very complex in its nature and it is difficult to understand by the taxpayers; due to this complexity taxpayers hesitate to file their return and the government suffers from revenue losses. This complexity of the tax system motivates tax payers to seek professional help and due to that the path for tax avoidance is open. Harassment by Income Tax officials and corruption in the tax department is also reported by taxpayers. The main aim is to implement this technology to increase the transparency and accuracy in the tax system and to provide time bound services to taxpayers.

Artificial intelligence is going to be a great support for Indian taxation system. Indian taxation system was suffering from lack of manpower and tedious tasks for checking the tax return and doing the scrutiny; so in the year 2019 the government of India announced the use of Artificial Intelligence and Machine Learning in the tax assessment process. The main aim to implement this scheme is to remove the complexity of the tax system, facilitate faceless assessment and faceless appeal to remove corruption and compliance time and implementation of taxpayer charter.

**Objective of Research**

1. To find out the role of artificial intelligence in Indian taxation system
2. To know about the perception of taxpayers towards adoption of Artificial Intelligence based tax system.

**Research instruments and methodology of Data Collection**

Data collected from the respondents through a structured questionnaire. Adding to primary data, data also collected from secondary sources by referring various articles, research papers, publications, bulletins, reports of CBDT, GST and Reserve Bank of India and other web related information for references.

**A. Population and Sample**

The population in this study is the individual taxpayers. Method sampling used purposive sampling, so it was taken based on criteria. Some of the criteria that can be done in the sampling as follows:

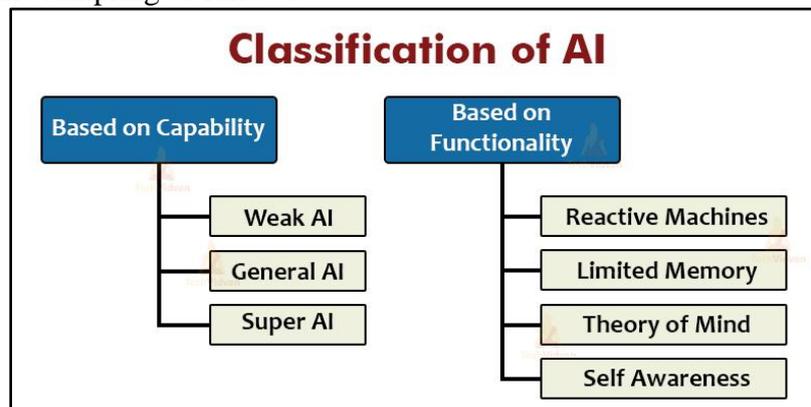
- Taxpayers who have a PAN CARD.
- Taxpayers who are active in paying tax per year.
- Taxpayers who have Post-Graduate/Master’s level education.
- Taxpayers who willing to fill out the questioner.

**B. Data Collecting Method**

This study has been carried out through questionnaires. Questionnaire is a data collection instrument consistent of a series of questions and other prompts for the purpose of gathering information from respondents. The questionnaire is measured by 5-point Likert, scale from 1: strongly agree to 5: strongly disagree. The questionnaire of variable was adapted by many study that has been conducted by many researcher.

**Artificial Intelligence and Tax - The development of AI in Indian Taxation system**

**Artificial Intelligence** - According to Merriam Webster Artificial intelligence is “A branch of computer science dealing with the simulation of intelligent behavior in computers. It is the capability of a machine to imitate intelligent human behavior.” With the development of AI we can divide it in two categories on the basics of capability and functionality as shown in fig. 1.



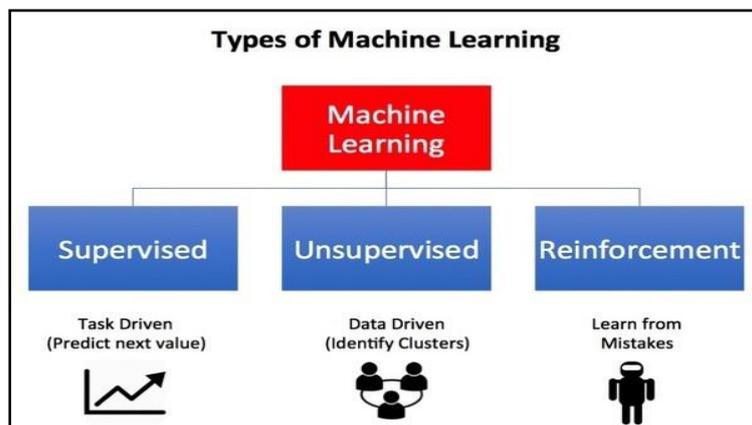
**Fig.1 Classification of Artificial Intelligence**  
 (Source <https://techvidvan.com/tutorials/wpcontent/uploads/sites/2/2020/05/Classificationof.g>)

The development of AI is to facilitate humans with such a power that humans can enhance their capabilities and be prompt their decision making process. AI is helping us on some key areas of decision making such as Learning, Reasoning, Knowledge, Government Decision making, Social intelligence etc.

**Machine learning**– It is a well known term along with AI and it is considered as subset of AI. According to Merriam Webster “Machine learning is the process by which a computer is able to improve its own performance (as in analyzing image files)

by continuously incorporating new data into an existing statistical model.”

Machine learning (ML) is a type of artificial intelligence (AI) that allows software applications to become more accurate at predicting outcomes without being explicitly programmed to do so. ML is divided in three types as shown below in fig. 2.



**Fig.2 Types of Machine Learning**

(Source - [https://miro.medium.com/max/753/0\\*-068ud\\_-o3ajwq\\_z.jpg](https://miro.medium.com/max/753/0*-068ud_-o3ajwq_z.jpg))

Machine learns the way human brain learn as at first human learning is task driven then as it grows by age it starts learn by itself by selecting the data itself and then it learn from its own mistake so do the machine. We can define machine learning as the sub set of Artificial intelligence that uses computer algorithms to analyze data and make intelligent decisions based on what it has learned, without being explicitly programmed. Machine learns with the help of data and this big data help machine to create its own understanding towards data. Previously computers understood only

mathematical language but now with the help of Deep Learning, Natural Language Processing; Image processing; Speech recognition; object recognition etc. we are having plenty of data which is enough to make machine learn and help to understand Bias.

**Indian taxation system**-India is heaving a three tire tax structure which is taken care by Central government, State government and Local body. Indian tax system based on the Self assessment process where tax payer declare its income on the basis of self

assessment and file its tax return to Tax department in prescribed format. Indian tax structure is very complex in its nature. Indian taxes can be divided in two parts on the basis of their nature Direct tax and Indirect tax. Direct tax is directly collected from whom it imposed and indirect collected by third party and deposited to tax department.

After implementation of GST government is heaving enough data to make machine learn hence it announced to use AI/ML in the taxation so that it can foster the process of tax administration and make the system transparent.

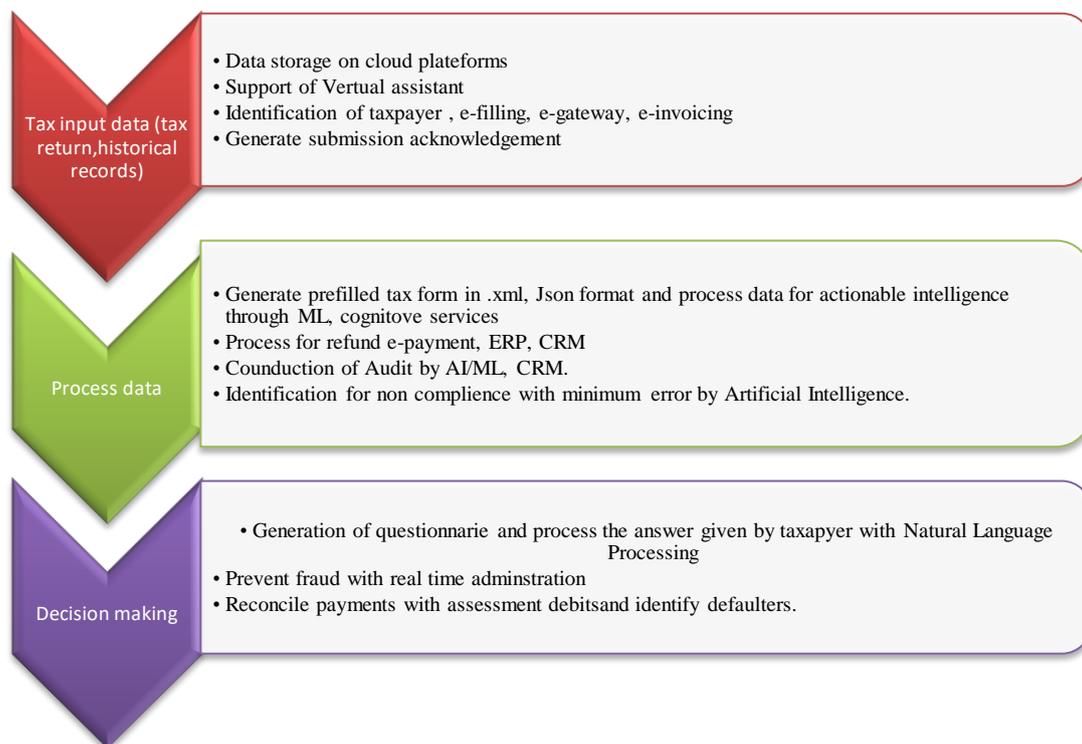
Indian tax structure was facing a huge problem of tax evasion and corruption and due to that people was losing their trust on the current tax assessment process. Tax department is also receiving complain about the corruption and false call from the assessing officer about the tax compliance.

At the starting point Indian government is applying AI/ML in the administrative process only; government is not applying it towards taxpayers ease. Due to the complexity of the system and delay in the process of scrutiny it is difficult for the tax

administrates to complete the process by time and as well tax department is not having such man power to do this process on time. Now system will use structured electronic data to learn the process of scrutiny and it will apply it with high accuracy so that department will get much deep and low error or error free in this process.

In this process Artificial intelligence will be used for eliminating repetitive tedious task such as processing documents and adhering to complains etc; to make decisions regarding the correctness of the return and to find out the flaw regarding non compliance of the tax law. It will also use for gathering information with the help of natural language processing and help people with virtual support systems.

Whereas Machine learning will be use for clustering of data, finding patterns of similarity and dissimilarity in between taxpayers, understanding the behaviour of taxpayers, extracting key data from documents, formulating questioner etc. Following are the certain areas where AI\ML can be applied in tax system is shown below in fig 3.



**Fig. 3 Application of AI/ML in Indian Taxation System**

**Taxpayer’s perception towards adoption of Artificial Intelligence based tax system**

When a reform takes place it is always difficult to adopt such a change by time. In a country like India where taxpayers tax education is very low and they seek for professional help to file their tax return. So in this research we developed the following hypothesis to check the perception of taxpayers towards adoption of artificial intelligence based tax system.

H<sub>1</sub>: Taxpayers indicated positive perception towards adoption of artificial intelligence based tax system

H<sub>2</sub>: Taxpayers indicated positive perception towards integration of artificial intelligence will reduce complexity of tax system.

To know the perception of tax payers we examined factors such as tax knowledge, tax education, legal sanction, complexity of tax system, relationship with tax authority, perceived fairness of the tax system, ethics and attitudes towards tax compliance, awareness of offences and penalties, tax education, possibility of being audited etc. Through the circulated questioner and obtained the following result

**Correlations**

	It is our responsibility to pay tax.	Government needs artificial intelligence to collect tax.
Pearson Correlation	1	.346*
It is our responsibility to pay tax. Sig. (2-tailed)		.014
N	50	50
Pearson Correlation	.346*	1
Government needs artificial intelligence to collect tax. Sig. (2-tailed)	.014	
N	50	50

\*. Correlation is significant at the 0.05 level (2-tailed).

From the above result we can conclude that as positive correlation is there between the variables so as the use of artificial intelligence will increase taxpayers will be more responsible towards payment of tax

but as the Pearson correlation value is 0.346 that means increase in use of AI will not have high impact on taxpayers responsibility towards payment of tax hence H<sub>1</sub> is accepted.

**Correlations**

	Artificial intelligence will help in filling the tax return.	Do you agree that with artificial intelligence, tax system will be user friendly?
Artificial intelligence will help in filling the tax return.	Pearson Correlation Sig. (2-tailed) N	1 .817** 50
Do you agree that with artificial intelligence, tax system will be user friendly?	Pearson Correlation Sig. (2-tailed) N	.817** .000 50

\*\* . Correlation is significant at the 0.01 level (2-tailed).

From the above result we can conclude that as the Pearson correlation value is 0.817, High positive correlation is there between the variables and so as the tax system will be integrated with Artificial intelligence it will reduce the complexity of tax system and increase fairness of the tax system hence H<sub>2</sub> is accepted.

**Conclusion**

In a country like India which is yet at the developing stage, we need some transformational changes in the tax structure or in our tax system to increase the tax revenue of Government. Use of Artificial Intelligence and Machine Learning will lead us to foster Indian tax administration process, transparency in tax process, find out new tax payers, and prevent tax fraud, tax evasion etc.

We know that change is inevitable; AI will be industrial revolution 4.0 in world like in previous century computers, electrical energy were there. Now a day's AI is applied in many sectors and it is growing day by day but we need to understand that to make this success in Indian tax structure. We need to provide the correct data for the training to the machine so that it will reduce the bias or it will get the correct bias.

Our study shows that though taxpayers observe that it is their responsibility to pay

tax but Artificial Intelligence is going to have lesser impact on their tax filling experience and we can say that there is less awareness about the concept itself. Government is making a lot expenditure to make tax system integrated with the artificial intelligence but if taxpayers are not aware about the system then it will be difficult to make this reform success.

Government requires a system which is based on Artificial intelligence and taxpayers are ready for upcoming technological change in the system but they do not want to end the human intervention. Taxpayers strongly believe that using a tax system which is based on artificial intelligence will be safe, secure and comfortable to use.

If the taxpayers trust on entire tax system then only they will provide the correct data and due to that we will be able to get a very strong tax administration system but for that government need to make people aware about the system and make the system transparent so that it will build the taxpayers trust and they will accept this as a helping tool for fair and transparent Indian Tax System.

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