UNIVERSITY OF WESTMINSTER

INFORMATICS INSTITUTE OF TECHNOLOGY

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TRENDS IN COMPUTER SCIENCE

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2.C) OVERVIEW OF MACHINE LEARNING. HOW DOES THE NEED FOR A COMPUTER SCIENTIST/SOFTWARE ENGINEER TO FAMILIARISE THEMSELVES WITH MACHINE LEARNING RELATE TO A CODE OF PRACTICE

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CONTENTS

1. INTRODUCTION

This report contains an overview of machine learning and also about importance of a code of practice to a computer professional. Purpose of this report is to give the reader a basic idea about machine learning and highlight importance of a code of practice in machine learning sector

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2. OVERVIEW OF MACHINE LEARNING

2.1 What is Machine Learning?

Machine learning is a remarkable technology that has been a part of many applications we use in our day today life. It has a big impact on peoples' activities with or without their knowing.

In general, machine learning can be referred to a process where a machine can learn and predict new knowledge or information from data it has gathered previously. There are lots of different ways that a machine can learn. They are called algorithms

There are multiple ways to define machine learning. But the one which is perhaps most relevant, concise and accepted universally is the one stated by Tom M. Mitchell, Professor of Machine Learning Department, School of Computer Science, Carnegie Mellon University. Tom M. Mitchell has defined machine learning as

'**A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks in T, as measured by P, improves with experience E.**'

What this essentially means is that a machine can be considered to learn if it is able to gather experience by doing a certain task and improve its performance in doing the similar tasks in the future. When we talk about past experience, it means past data related to the task. This data is an input to the machine from some source. (Dutt, Chundramouli, Das, 2018)

2.2 History of Machine Learning

Machine learning has been subjected to hundreds of experiments, setbacks, and successes along the way to reach its current level.

The origin of machine learning in its modern sense is usually associated with the name of the psychologist Frank Rosenblatt from Cornell University, who, based on ideas about the work of the human nervous system, created a group that built a machine for recognizing letters of alphabet. (Farkov,2020)

From there on, machine learning has achieved a remarkable development in next 60 years.

However, most of people started to give their attention towards machine learning only after in 1997 a computer program called deep blue defeated the world chess champion Gary Kasparov from a chess game

2.3 New Trends of Machine Learning

One special feature of machine learning is that it always keeps changing and developing. There for new trends are often introduced. Here are some brief descriptions about few new trends.

I. Using machine learning in healthcare sector

Machine learning and Artificial intelligence (AI) have demonstrated great progress in the detection, diagnosis, and treatment of diseases. Deep learning, a subset of machine learning based on artificial neural networks, has enabled applications with performance levels approaching those of trained professionals in tasks including the interpretation of medical images and discovery of drug compounds (Topol, *Nat. Med.* **25**, 44 (2019))

II. Using machine learning in Autonomous vehicles

connected and autonomous vehicles (CAVs) are an important component of intelligent transportation systems (ITS) in which vehicles communicate with each other and with communications infrastructure to exchange safety messages and other critical information One of the main driving forces for CAVs is the advancement of machine learning methods, that are used for decision making at different levels. (IEEE Communications Surveys & Tutorials,2020)

Apart from vehicles driving on roads, ‘mayflower’ the first automated ship to sail by itself has successfully travelled over Atlantic Ocean and reached Canada few months ago

3. NEED FOR A COMPUTER PROFESSIONAL TO FAMILIARISE THEMSELVES WITH MACHINE LEARNING RELATED TO A CODE OF PRACTICE

3.1. What is a Code of Practice?

Computing professionals' actions change the world. To act responsibly, they should reflect upon the wider impacts of their work, consistently supporting the public good (ACM Code of Ethics and Professional Conduct, 2018)

For that, maintaining a code of practice can be very helpful.

In general, a code of practice can be referred to a set of Principles, values, standards, or rules of behaviour that guide the way of carrying out a certain task in a professional manner. A code of practice is adopted by a profession to regulate that profession

3.2. Need of Following a Code of Practice

3.2.1. How Machine Learning Connects with a Code of Practice

By referring above pages, it is clear how useful and convenient machine learning can be. There for managing such a powerful asset always comes with a great responsibility. so, a computing professional has to act according to a defined code of practice when it comes to machine learning.

For example, banking and transaction systems highly relies on machine learning for fraud detection and identifying other illegal activities. but same machine learning technology can also be used do numerous frauds and other cybercrimes. So, it's always in the hands of the person who is using the technology, only he can decide whether his actions may result in positive or negative way.

To take correct and professional decisions a standard set of rules and regulations which are accepted by the majority of professionals in the certain relevant sector can be very useful. That is the point where a code of practice connects with machine learning or any other computing sector. A code of practice will ensure that computer professionals take correct and professional decisions at crucial encounters.

4. CONCLUSION

This report provides a basic explanation about overview of machine learning and need for a computer professional to familiarise themselves with machine learning related to a code of practice. By referring all the facts, can conclude that machine learning has rapidly developed from its early days and has become an essential part of modern computer technology.

Also, can conclude that it is always a good thing for a computer professional to follow a code of practice when working with machine learning because it will guide them to work in a professional manner and not following a code of practice will bring out some bad results to the society

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