

# Chapter 28

## Programming Language Support for Implementing Machine Learning Algorithms

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### **ABSTRACT**

*Machine learning provides the system to automatically learn without human intervention and improve their performance with the help of previous experience. It can access the data and use it for learning by itself. Even though many algorithms are developed to solve machine learning issues, it is difficult to handle all kinds of inputs data in-order to arrive at accurate decisions. The domain knowledge of statistical science, probability, logic, mathematical optimization, reinforcement learning, and control theory plays a major role in developing machine learning based algorithms. The key consideration in selecting a suitable programming language for implementing machine learning algorithm includes performance, concurrence, application development, learning curve. This chapter deals with few of the top programming languages used for developing machine learning applications. They are Python, R, and Java. Top three programming languages preferred by data scientist are (1) Python more than 57%, (2) R more than 31%, and (3) Java used by 17% of the data scientists.*

### **MACHINE LEARNING**

Machine learning (ML) is one of the essential applications of artificial intelligence (AI) that makes the computer system to automatically learn and improve their performance from its own experience without being explicitly trained. ML refers to the set of techniques meant to deal with huge data in the most intelligent way in order to derive actionable insights. The purpose of ML is to automate the data analysis process by constructing algorithms and make appropriate prediction on the new input data that

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arrives their by enhancing the system performance. 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 (Singh, 2018). Machine learning algorithms are classified into four main types, such as:

- **Supervised Learning Algorithm:** Learning maps an input to an output based on the label value (i.e input-output pairs).
- **Unsupervised Learning Algorithm:** System learns from data which has not been labeled or categorized. Systems can infer a function to describe a hidden structure from unlabeled data.
- **Semi-supervised Learning Algorithm:** Combination of supervised and unsupervised learning. In this approach the system learns by make use of a small amount of labeled data for training from a large amount of unlabeled data in-order to maximize the learning capability.
- **Reinforcement Learning Algorithm:** System ought to take action in an *environment* so as to maximize the *reward*.

### **Steps Involved in Machine Learning**

Machine learning is a method of data analysis that automates analytical model building. I t can learn from data identify patterns, and make decisions with minimal human interventions. The steps involved in solving the given problem are:

- Problem definition
- Data preparation
- Algorithm evaluation
- Performance analysis
- Visualizing results

## **LANGUAGES SUPPORT FOR MACHINE LEARNING**

*“Machine Learning – The Scorching Technology Fostering the Growth of several industries”*

While you update technology news, you could probably see and hear machine learning everywhere from retail to space for any good reasons. Everyday a new app, product or service discloses that it is using machine learning to get smarter and useful results. It can be used at machine domains starting from on your way to work (Google Maps for suggesting Traffic Route, making an online purchase (on Amazon or Walmart), and for communicating with your friends online (Facebook). Figure 1 shows the popular machine learning languages and tools.

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