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**Machine Learning Types**

“Now, it’s my belief that Python is a lot easier then to teach to students programming and teach them C or C++ or Java at the same time because all the details of the languages are so much harder. Other scripting languages really don’t work very well there either.”

~Guido van Rossum

Topics covered in this Chapter

6.1 What is Machine Learning

6.2 History of Machine Learning

6.3 Why Python in mobile app

6.4 Kivy Architecture

6.5 Python developed mobile apps

6.6 History of Kivy

6.7 Why not Cordova

6.8 Kivy Versions

6.9 How, its different from cross-platform app development framework?

6.10 System Requirements

6.11 Installation of Kivy in various platforms

6.11.1 Installation in Windows

6.11.2 Installation in Mac OS

6.11.3 Installation in Linux

6.11.4 what are Wheels and pip

6.11.5 Cython Installation in Linux

6.11.6 Verifying installation

6.12 Creating First Hello World App

6.12.1 Event Handling in Kivy

6.12.2 Event Dispatcher

6.12.3 Main Loop

6.12.4 Custom Events

6.13 Anatomy of Kivy application

6.13.1 Running Kivy Application

6.13.2 Listing and uninstalling Kivy

Summary

Key terms

**Review Questions**

**Module Objective**

In this module, you will learn get an understanding of the different kind of machine learning algorithms. You will understand in detail the functioning of these algorithms and the various scenarios in which they are used.

**Ensemble Learning Method**

Machine Learning is all about developing algorithms that allow a computer to learn from data. Learning may not essentially involve in outline the perceptions but it is all about matter of finding statistical regularities or other patterns in the data. So most of machine learning algorithms will hardly look like how human approach a learning task and continue the same process time and again to gain experience. Through, machine learning algorithm can give inference and insights into the relative difficulty of learning in various diverse and complex environments.

Ensemble modeling is very influence and a powerful approach to improve the performance and accuracy of your model. These ensemble method are just like other learning algorithms, but at the same time are difference too as these are very powerful way to improve the performance and accuracy of your models.

The word assemble means a ‘group’. So these ensemble methods engage number of predictive models to pull of better accuracy and model stability. Ensemble methods are known to convey supreme boost to tree based models.

Just like other models, even tree models also suffer bias and variance.

Bias means, ‘how much on an average are forecast-ed value different form the actual value’

Variance means, ‘how different will the forecasting of the model be at the same point of different samples are taken from the same population’.

ML algorithms are ordered into taxonomy, primarily based on the desired or defined outcome of the algorithm. Common algorithm types are:

1. **Supervised Learning-** The supervised machine learning is a task of learning a function that maps an input to an output based on example input-output pair. This technique in machine learning can only be applied on labeled data. For example discerning digits from images. Supervised learning algorithms apply respective mathematical and statistical pre-defined functions which maps input to desired outputs. Here there will be a target variable which can be forecast by various other independent variable using statistical formulation applied on the data. Supervise learning techniques attempt to discern results and learn by trying to find patterns in a labeled data set. Human interaction is required to label data.
2. **Unsupervised Learning-** Its generally true that most of the large data sets don’t have labels on their data. So unless you sort through it all and give it labels, the unsupervised learning approach to data will not work. We must take the approach that will work with this data because:
   * We can study the distribution of the data and infer truth about the data in different part of the distribution.
   * We can study the structure and values in the data and infer new , more meaningful data and structure from it.

Many techniques exists for each of these unsupervised learning approach. How ever in the real world you are always working towards a research goal defined in the first phase of the data science process. So you need to combine or try different techniques before a data set can be labeled which enables supervised learning techniques. The algorithm is used to draw insights and interference from the input data of data sets without label and target variable. Mostly unsupervised learning is used in cluster analysis and also used for exploratory data analysis to find hidden patterns or grouping in the data. This kind of algorithm labeled example are not available. Primarily tree based learning algorithms are mostly used in supervised learning methods. The method allows predictive model with high accuracy along with good stability and ease of interpretation.

1. **Semi-supervised Learning-** This technique needs labeled data and therefore human interaction, to find patterns in the data set, but they can still progress towards a result and learn even if unlabeled data set.
2. **Reinforcement Learning-** Behavioral psychology is the core concept behind reinforcement learning. It is similar to commutative rewards given as incentive to people in order to motivate for better results. This method used to maximize the accurate learning behavior. Learn through a policy or per-defined rules of the best way to act when observation of the real world is given. Every action have its own impact on the environment and environment provides feedback that guides the learning algorithm.

## **Summary**

* Ensemble modeling is very influential and powerful approach to improve the performance and accuracy of your model.
* The word “ensemble” means a ‘group’, so these ensemble methods engage number of predictive models to pull of better accuracy and model stability.
* Supervised learning techniques attempt to discern result and learn by try to find patterns in labeled data sets. Human interaction is required to label data.
* Unsupervised learning algorithm used to draw insights and inferences from the input data of the data sets without label and target variable.
* Semi-supervised learning needs labeled data and therefor human interaction, to find patterns in the data sets but they can still progress towards a result and learn even if unlabeled data is given.
* Behavioral psychology is the core concept behind reinforcement learning. It is similar to commutative rewards given as incentive to people in order to motivate for better result. This method is used to maximize accurate learning behavior.

## Review Questions

1. What is Kivy and it architecture?
2. How to create custom event handler?
3. What are benefits using Kivy over Cordova like cross platform frameworks?
4. What is the main Kivy developed application?
5. Write is Cython and how it’s good for your program?
6. How to install Cython?
7. What is life cycle of Kivy Application?

## **Exercise**

**Learning Check** and **Tick the correct option**

1. \_\_\_\_\_\_\_\_ in machine learning can only be applied on labeled data.
   1. Variance
   2. Supervised Learning
   3. Unsupervised Learning
   4. Reinforcement Learning
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_means, ‘how much on an average are the predicted values differenct from the actual value’.
   1. Bias
   2. Variance
   3. Variation
   4. Data analysis
3. Behavioral psychology is the core concept behind reinforcement learning.
   1. True
   2. False
4. Is this kind of algorithm labeled example are not available?
   1. Ensemble
   2. Supervised Learning
   3. Unsupervised Learning
   4. Reinforcement Learning
5. The algorithm is used to draw insights and inferences from the input data of the data sets without labeled or target variable?
   1. Supervised Learning
   2. Semi-supervised Learning
   3. Unsupervised Learning
   4. Reinforcement Learning

**Answer:**

1. B Supervised Learning
2. A Bias
3. A True
4. C Unsupervised Learning
5. C Unsupervised Learning

**Fill in the Blanks**

1. Kivy has powerful support of \_\_\_\_\_\_\_\_\_algorithms to minimize big operation in this channel we supports CPU, GPU, TPU, etc.
2. Every iteration of loop events are generated from\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are rendered to display.
3. Kivy helps you to export\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for each and every platform for production environment.
4. Easily you can describe your UI with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. inputs are handled by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_class.

Answers

1. Cython C lavel
2. user input, hardware sensors and frames
3. executable code
4. Kivy language
5. tourch()