Horse Racing Prediction Using Artificial Neural Networks

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Abstract: - Artificial Neural Networks (ANNs) have been applied to predict many complex problems. In this paper ANNs are applied to horse racing prediction. We employed Back-Propagation, Back-Propagation with Momentum, Quasi-Newton, Levenberg-Marquardt and Conjugate Gradient Descent learning algorithms for real horse racing data and the performances of five supervised NN algorithms were analyzed. Data collected from AQUEDUCT Race Track in NY, include 100 actual races from 1 January to 29 January 2010. The experimental results demonstrate that NNs are appropriate methods in horse racing prediction context. Results show that BP algorithm performs slightly better than other algorithms but it needs a longer training time and more parameter selection. Furthermore, LM algorithm is the fastest.

Key-Words: - Artificial Neural Networks, Time Series Analysis, Horse Racing Prediction, Learning Algorithms, Back-Propagation

1 Introduction

Artificial Neural Networks (ANN) were inspired from brain modeling studies. Implementations in a number of application fields have been presented ample rewards in terms of efficiency and ability to solve complex problems. Some classes of applications that ANNs have been applied to include classification, pattern matching, pattern completion, optimization, control, data mining and time series modeling [1]. Time series analysis is used for many applications such as predictions [2].

Prediction is making claims about something that will happen, often based on information from past and from current state. One possible way for predicting future events is finding approximations, for example regression of a predicted variable on other events that is then extrapolated to the future. But finding such approximation can be difficult, too [3]. Also, the relationship chosen for regression tends to be linear. The other difficulty with regression is that, the regression equation applies across the entire span of input space [4]. So, we use NN for prediction, a general method of prediction which avoids these difficulties.

ANNs have been employed to predict weather forecasting, traveling time, stock market and etc. Also, ANNs have been applied in predicting game results, such as soccer, basketball, animal racing, etc.

Some works were done in predicting animal racings. Chen *et al* [5] investigated greyhound racing, it was a very similar environment to horse racing. In their research, they investigated the use of BPNN in predicting races. After that, Jannet Williams and Yan Li in [6] used BPNN to predict horse racing by a network with one hidden layer. Nowadays, horse racing software products, such as Brain Maker, are very popular [7].

In this paper, ANNs have been applied to predict the horse racing in AQUEDUCT Race Track, USA, and acceptable predictions were made. ANN has been used for each horse to predict the finishing time of each horse participating in a race. The best architecture of NN has been investigated by trial and error and different architectures have been compared according to MSE (Mean Squared Error) measure of ten times of running NN for each horse. Therefore, the best architecture is the one which has the minimum MSE measure.

The rest of the paper is organized as follows: The structure of NN and its training algorithms are presented in Section 2. In Section 3 we briefly presented the concept of prediction and some common methods for prediction. Experimental results are presented in Section 4. Finally the paper is concluded in Section 5.

2 Artificial Neural Networks

The brain consists of a large number of highly connected elements called neurons. These neurons have three principal components: the dendrites, the cell body and the axon.

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RS Peters

Horse Racing Prediction Using Artificial Neural Networks:

The book delves into Horse Racing Prediction Using Artificial Neural Networks. Horse Racing Prediction Using Artificial Neural Networks is a vital topic that must be grasped by everyone, ranging from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Horse Racing Prediction Using Artificial Neural Networks, encompassing both the fundamentals and more intricate discussions.

1. This book is structured into several chapters, namely:

    ○ Chapter 1: Introduction to Horse Racing Prediction Using Artificial Neural Networks
    ○ Chapter 2: Essential Elements of Horse Racing Prediction Using Artificial Neural Networks
    ○ Chapter 3: Horse Racing Prediction Using Artificial Neural Networks in Everyday Life
    ○ Chapter 4: Horse Racing Prediction Using Artificial Neural Networks in Specific Contexts
    ○ Chapter 5: Conclusion

2. In chapter 1, this book will provide an overview of Horse Racing Prediction Using Artificial Neural Networks. This chapter will explore what Horse Racing Prediction Using Artificial Neural Networks is, why Horse Racing Prediction Using Artificial Neural Networks is vital, and how to effectively learn about Horse Racing Prediction Using Artificial Neural Networks.
3. In chapter 2, the author will delve into the foundational concepts of Horse Racing Prediction Using Artificial Neural Networks. This chapter will elucidate the essential principles that need to be understood to grasp Horse Racing Prediction Using Artificial Neural Networks in its entirety.
4. In chapter 3, the author will examine the practical applications of Horse Racing Prediction Using Artificial Neural Networks in daily life. This chapter will showcase real-world examples of how Horse Racing Prediction Using Artificial Neural Networks can be effectively utilized in everyday scenarios.
5. In chapter 4, this book will scrutinize the relevance of Horse Racing Prediction Using Artificial Neural Networks in specific contexts. This chapter will explore how Horse Racing Prediction Using Artificial Neural Networks is applied in specialized fields, such as education, business, and technology.
6. In chapter 5, this book will draw a conclusion about Horse Racing Prediction Using Artificial Neural Networks. The final chapter will summarize the key points that have been discussed throughout the book.
This book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Horse Racing Prediction Using Artificial Neural Networks.

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