

Accepted Manuscript

Short-term time series prediction using Hilbert space embeddings of autoregressive processes

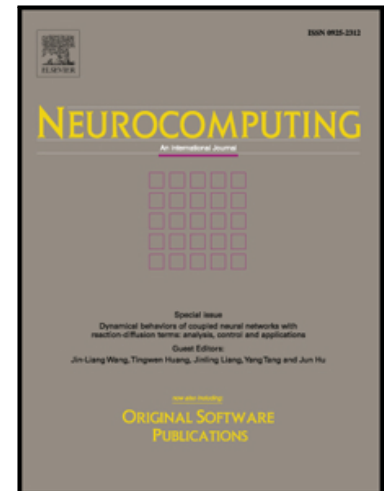
Edgar A. Valencia, Mauricio A. Álvarez

PII: S0925-2312(17)30954-2
DOI: [10.1016/j.neucom.2017.05.067](https://doi.org/10.1016/j.neucom.2017.05.067)
Reference: NEUCOM 18485

To appear in: *Neurocomputing*

Received date: 18 March 2016
Revised date: 7 April 2017
Accepted date: 27 May 2017

Please cite this article as: Edgar A. Valencia, Mauricio A. Álvarez, Short-term time series prediction using Hilbert space embeddings of autoregressive processes, *Neurocomputing* (2017), doi: [10.1016/j.neucom.2017.05.067](https://doi.org/10.1016/j.neucom.2017.05.067)



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Short-term time series prediction using Hilbert space embeddings of autoregressive processes

Edgar A. Valencia^a, Mauricio A. Álvarez^{b,*}

^a*Department of Mathematics, Faculty of Basic Sciences, Universidad Tecnológica de Pereira, Colombia, 660003.*

^b*Department of Computer Science, Faculty of Engineering, The University of Sheffield, UK, S1 4DP*

Abstract

Linear autoregressive models serve as basic representations of discrete time stochastic processes. Different attempts have been made to provide non-linear versions of the basic autoregressive process, including different versions based on kernel methods. Motivated by the powerful framework of Hilbert space embeddings of distributions, in this paper we apply this methodology for the kernel embedding of an autoregressive process of order p . By doing so, we provide a non-linear version of an autoregressive process, that shows increased performance over the linear model in highly complex time series. We use the method proposed for one-step ahead forecasting of different time-series, and compare its performance against other non-linear methods.

Keywords: Autoregressive process, Hilbert space embeddings, cross-covariance operator, time series forecasting

1. Introduction

Autoregressive processes are useful probabilistic models for discrete time random processes. The basic idea in an autoregressive process is that the random variable at time n , can be described as a linear combination of the p past random variables associated to the process, plus white Gaussian noise. The value of p determines the order of the autoregressive process [1].

*Corresponding author

Email addresses: evalencia@utp.edu.co (Edgar A. Valencia), mauricio.alvarez@sheffield.ac.uk (Mauricio A. Álvarez)

Download English Version:

<https://daneshyari.com/en/article/4946968>

Download Persian Version:

<https://daneshyari.com/article/4946968>

[Daneshyari.com](https://daneshyari.com)