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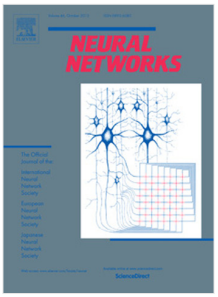

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F. Dornaika, R. Dahbi, A. Bosaghzadeh, Y. Ruichek

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Efficient Dynamic Graph Construction for Inductive Semi-supervised Learning

F. Dornaika[a,b], R. Dahbi[c], A. Bosaghzadeh[a], Y. Ruichek[c]

[a] *University of the Basque Country, UPV/EHU, San Sebastian, Spain.*
[b] *IKERBASQUE, Basque Foundation for Science, Bilbao, Spain.*
[c] *Le2i FRE2005, CNRS, Arts et Métiers, Univ. Bourgogne Franche-Comté, UTBM, F-90010 Belfort, France.*

Abstract

Most of graph construction techniques assume a transductive setting in which the whole data collection is available at construction time. Addressing graph construction for inductive setting, in which data are coming sequentially, has received much less attention. For inductive settings, constructing the graph from scratch can be very time consuming. This paper introduces a generic framework that is able to make any graph construction method incremental. This framework yields an efficient and dynamic graph construction method that adds new samples (labeled or unlabeled) to a previously constructed graph. As a case study, we use the recently proposed Two Phase Weighted Regularized Least Square (TPWRLS) graph construction method. The paper has two main contributions. First, we use the TPWRLS coding scheme to represent new sample(s) with respect to an existing database. The representative coefficients are then used to update the graph affinity matrix. The proposed method not only appends the new samples to the graph but also updates the whole graph structure by discovering which nodes are affected by the introduction of new samples and by updating their edge weights. The second contribution of the article is the application of the proposed framework to the problem of graph-based label propagation using multiple observations for vision-based recognition tasks. Ex-

Email addresses: dornaika@ehu.es (F. Dornaika), radouan.dahbi@utbm.fr (R. Dahbi), alibossagh@yahoo.co.uk (A. Bosaghzadeh), yassine.ruichek@utbm.fr (Y. Ruichek)