

Design and Analysis of a Novel Temporal Dissimilarity Measure Using Gaussian Membership function

Vangipuram Radhakrishna
 Department of Information Technology
 VNR VJiet
 Hyderabad
 India
 radhakrishna_v@vnrvjiet.in

P.V.Kumar
 Professor, Computer Science and Engineering
 UCOE, Osmania University (Retd.)
 Acharya Institute of Technology
 Bangalore
 pvkumar58@gmail.com

Shadi. A. Aljawarneh
 Software Engineering Dept
 JUST
 Jordan
 saaljawarneh@just.edu.jo

V. Janaki
 Computer Science and Engineering
 Vaagdevi College of Engineering
 Warangal, INDIA
 janakicse@yahoo.com

Abstract—Earlier research works addressing the problem of mining time profiled temporal association patterns did not address the possibility of using new similarity measures in the context of time stamped temporal databases except some of our previous works. This research throws focus on designing a new similarity measure for mining similarity profiled temporal association patterns. The objective is to design a fuzzy similarity measure which can be used to discover all valid similarity profiled temporal association patterns.

Keywords—temporal data; time stamp; support bounds; seasonal pattern, association pattern, temporal trend

I. INTRODUCTION

Similarity profiled temporal association pattern mining is one of the topics of wide research interest in the context of temporal data mining. The pioneering work to address the solution in this direction is by the authors, Jin Soung Yoo and Shashi Shekhar [1-3] using Euclidean distance measure. This research is inspired from [1-3, 19, 20]. From the extensive literature survey performed and also to the best of our knowledge, there are no significant findings recorded in the literature in the direction of proposing new measures to address the above said problem.

This fact has actually motivated us to come up with new similarity measures, so that these measures can be used to retrieve all valid similar temporal patterns w.r.t any chosen reference pattern. Some of our earlier works [4-10] propose new similarity (or dissimilarity) measures and approaches to estimate the supports of temporal association patterns. This

work extends our previous research by proposing a new dissimilarity measure for retrieving all possible and valid time profiled temporal association patterns from the given input time stamped temporal dataset.

II. RELATED WORKS AND PRELIMINARIES

In [4], we come up with a dissimilarity measure for mining temporal association patterns, all those patterns whose prevalence variations are similar to variations of a given reference. In this work, it is not addressed as to what deviation must be chosen for applying the dissimilarity measure. This drawback was later overcome and addressed by proposing the expression for computing deviation [12-17] and also for choosing proper threshold value corresponding to the deviation for each of these proposed dissimilarity measures. Mining temporal patterns from interval databases by proposing a temporal measure is addressed in [11]. Estimating supports of temporal association patterns is discussed in [6, 21, 22].

Summary, detailed information and implementation of various data mining algorithms and respective synthetic and real time datasets for sequential pattern mining, sequential rule mining, sequence prediction, frequent itemset mining, periodic itemset mining, high utility pattern mining, Association rule mining, time series mining, clustering and classification is available as open source [23]. The similarity measure designed may be applied to different applications related to [24-26]. Application of similarity measures for dimensionality reduction is discussed in [27-30].