



A VERSATILE LATTICE BASED MODEL FOR SITUATION RECOGNITION FROM DYNAMIC AMBIENT SENSORS

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Abstract-

Recent advances in acquisition, storage, and transmission of data from sensors in digital format has increased the need of tools to support users effectively in retrieving, understanding, and mining the information contained in such data. Extraction of domain specific actionable information like occurrence of one of the predefined “situations” is desirable. Major difficulties in achieving this extraction are 1) Source of Data, that is, number and type of sensors deployed is highly variable even for one type of application, 2) Availability of domain specific labeled training data is critical for computation of situations. In this paper, we propose a versatile method based on formal concept analysis to overcome these difficulties in modeling sensor based situations. Our method, making use of contexts as intermediate form of sensors data, works on any number and type of sensors. It is also instance-independent and eliminates need of training, when applied to various instances of

similar application. For illustration, we model and perform real time recognition of activity of a person in indoor home environment with ambient sensors. The embedded sensors capture usage and proximity of human beings to objects. We apply the model learnt from one house, for activity recognition of new persons across different new houses. The recognition results obtained have high precision and recall.

Index terms: Wireless Sensor Networks, Ambient Intelligence, Formal Concept Analysis, Situation Modeling, Activity Recognition, Lattice based Classification.