

# A Context Modelling System and Learning Tool for Context-Aware Recommender Systems

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**Abstract.** A critical contextual modelling issue in context-aware recommender systems research has to do with developing domain and application specific models that offer no reuse and sharing capabilities. Developers and researchers struggle to design their own models without any guidance, often resulting in overspecialized, inefficient and incomplete context models. On the basis of a prior work, we have developed an online context modelling system and learning tool that is able to guide and teach CARS developers and researchers through the process of CARS context modelling, on how to build their own context models in a way that offers sharing and reuse, while at the same time it teaches them important modern concepts derived by CARS research, significantly advancing as a result their knowledge in the field.

**Keywords:** Context Modelling Learning Tool, Context Modelling Framework, Context-Aware Recommender Systems, Context-Awareness.

Context-aware recommender systems (CARS) use context data to provide better and more personalized recommendations [1]. Context modelling is often used to model the contextual parameters to be used during the recommendation process. A critical contextual modelling issue in CARS is related to developing domain and application specific models that only represent information on the particular application domain (e.g. movies, restaurants nearby). Our review on recommender systems that use contextual and conceptual models [2] had revealed that most CARS and semantic recommenders in the literature are domain specific. Domain specific models cannot be applied in other domains, while application specific models cannot be applied to other recommenders even of the same application domain. By constructing domain and application specific contextual models, many different and very specific models are produced with no reuse and sharing capabilities. Moreover, developers and researchers struggle to design their own models as they think appropriate and according to their own knowledge and skills, with no reference model to use, no guidance and strictly based on the application at hand, often resulting in overspecialized, inefficient and incomplete contextual models.

We have attempted to address the above contextual modelling problem in a prior work by proposing a generic, abstracted contextual modelling framework for CARS, which developers and researchers can use for guidance through the process of properly defining the context for their application [2]. The modelling framework is

essentially a model template designed and built as a UML class diagram by using the Eclipse EMF. The framework is thoroughly described in [2]. Although this framework was developed as a UML class diagram, it could be mainly used in a theoretical manner, as a schematic reference rather than a modeling tool: (i) it is not an easy and straightforward procedure for developers to extend or instantiate a UML class diagram in order to build their own context models, (ii) it is time consuming, (iii) it requires programming knowledge and skills and (iv) it does not offer guidance and learning of important concepts. Therefore, based on [2], we have developed an easy to use, easy to extend online web-based system called “Context Modelling System and Learning Tool” [3]. The tool, through appropriate interfaces and clickable components is able to guide and teach developers and researchers towards a more efficient, effective, easy and correct selection and usage of context properties for building their own application-oriented context models and context instances, allowing at the same time for sharing and reuse of context models and instances among applications, regardless of their domain. CARS developers are guided through the process of uniformly modelling the most important contextual parameters for their applications, as well as on how to use the modelling system to build and/or extend context models and instances in order to be applied for their own application. The system is also able to introduce to developers and new researchers modern concepts derived by CARS research that they might not be familiar with, such as the “context dependent rating data”, the “supposed context”, the “static/dynamic context”, the “context weights”, etc., as well as the role of such concepts in a context model and a recommendation process.

We are currently in the stage of evaluating our system by urging postgraduate students and researchers to use the system to learn about CARS and their concepts, build their own context models, applications and context instances and provide valuable feedback on both the learning process and the context model building process. Note that evaluators are not supported with lessons, guidelines or other information relevant with the system prior to their actual interaction with it. Based on this feedback, the context modelling system and learning tool is continuously updated and extended. As future work, an important goal is to enable CARS developers to attach recommendation algorithms to their context models in order to create CARS in an innovative and straightforward way that also supports sharing and reuse of context models.

## References

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