

A spatio-temporal interpretation of domesticity - Formal specifications for TIMESPACE software

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Abstract

This paper is concerned with the micro-use of space in the domestic environment attempting to relate household activities with the daily pattern of domestic routines. The aim is to capture and present the morphology of domestic experience throughout the day.

In order to achieve the representation of domestic experience we present in this paper, a formal mathematical model for the storage and retrieval of time-related architectural spatial information. The model caters for the representation of time in data structures that are used to store data regarding architectural spaces in the domestic environment. The representation of time is achieved through the extension of these structures with lifespans. A lifespan is a list of non-overlapping time intervals ($[s_1, e_1]$, $[s_2, e_2]$, ..., $[s_n, e_n]$) - s_i denoting the start and e_j the end of a time interval-period ($1 \leq i, j \leq n$) - that represent the time during which a space is used. Such a lifespan can be associated with a space and the users of the particular space.

The introduction of lifespans into data structures representing spaces and users of spaces will allow us to manipulate the stored data and produce very useful information (textual and graphical) related to the time, usage and uses of spaces. A few examples of the possible questions that we will be able to answer are: which space is used the most/least, which users use a space during a particular time, which spaces are used by different users at the same time, etc.

In order to produce such information from the data structures, we need to define a query language which will allow us to write queries. In this paper we formally define the basic operators which provide the basis for the development of such a query language.

Our current and future work involves the implementation of the proposed formal model using a database system such as Oracle or Microsoft Access. The implementation of the data structures and the query language will result in a software package TIMESPACE, which will be used for storing and manipulating such time-related architectural spatial information. Currently such processing is done through the use of statistical and other non specialized software packages.

Keywords

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Thus, the main contribution of this paper is the definition of the formal specifications of specialized software which will deal with time, architectural spaces, and in particular domestic spaces and users of these spaces. Based on these formal specifications TIMESPACE will be developed. As far as we know, TIMESPACE will be a unique specialized software package dealing with such information.

The paper will finally suggest that the interpretation of domestic space needs to take account of and represent time as an aspect of space.

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