

Context Aware Teaching Environment

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Abstract

The world is moving towards automation rapidly in day today activities. Teaching learning environment is not an exception for this. Classroom 2000 project is an attempt to study the impact of pervasive computing on teaching learning environment [1]. In this paper we are proposing a context aware system for automating the teaching process by identifying the contexts related to a teacher with respect to class room as an environment and a class room environment with respect to a teacher & students. An architecture of how contexts related to a teacher and class room as an environment to automate teaching process is suggested. This paper is divided into following sections as introduction to context and context aware system, Entities and Actions, Contexts in Context Aware Teaching Environment, Architecture of Context Aware Teaching Environment and conclusion.

Index Terms- Context, Context Awareness, Context Aware System, Classroom Technology.

I. INTRODUCTION

Context: Context is any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves [2]. During interaction human beings may use information said by other person, information of that person, information of some object or information of some incidence. All these information can be referred to as a context of that person, object or an incidence. Similarly in dealing with computers human beings may use information related to computers or given by computers.

Context Aware System: A system is context aware if it uses context to provide relevant information and, or services to the user, where relevancy depends on users' task [2]. A system uses information from sensors, computers, humans, environment etc. and either represents it to the user as it is or processes and generates output for the user or performs some action for the user. Well defined contexts leads to accuracy in the operation of system.

II. ENTITIES AND ACTIONS:

An entity in Context Aware Teaching Environment represents either a person or an object. Below is a list of entities identified in Context Aware Teaching Environment:

1. Sensors to sense:
 - a. Entry of a teacher into classroom
 - b. Teacher coming close to smart display board
 - c. Teacher writing onto smart display board
 - d. Brightness into classroom
 - e. Temperature into classroom
 - f. Student entering into classroom
 - g. Peon entering into classroom
 - h. Another teacher entering into classroom when one is already present
2. Teacher
3. Student
4. Smart display board

Below is a list of actions identified during teaching process:

1. Teacher enters into classroom
2. ID is noted by sensor on smart display board
3. Teacher's teaching material is loaded into cache of smart display board for that lecture based on teaching plan loaded by teacher previously
4. Teacher's presence is recorded for that lecture into classroom to avoid conflict with other teacher's entry in between the session ongoing
5. Based on brightness into classroom lights will be put on and off or their brightness will be adjusted as per requirement
6. When teacher comes closer to smart display board and performs writing gesture, his teaching material will be loaded for that lecture
7. When teacher wishes to put off smart display board he just has to give gesture input

8. Teacher can give voice commands to display on board from internet or from his database by saying media file name (image, video, audio or any document). [Teacher may maintain files on lecture basis to avoid giving difficult names for them. Rather he can give simple names like assignment1, video1, image2 etc. for each lecture]
9. When teacher writes on board it will be recorded into cache of board first. When teacher leaves classroom at the end of session his records from cache will be saved into database and then deleted from cache of board so as to save the time of interacting with database server

III. CONTEXTS RELATED TO ENTITIES IN CONTEXT AWARE TEACHING ENVIRONMENT

Below is a list of entities with their contexts.

1. Teacher:
 - a. ID number of device
 - b. Teaching date
 - c. Teaching material date wise
 - d. Teaching plan
 - e. Voice commands
 - f. Gestures for writing, to put off board etc.
 - g. Distance from display board
2. Students:
 - a. ID number of device
 - b. Students learning material and assignments
3. Sensors:
 - a. Brightness of light
 - b. Motion of teacher
 - c. Gestures of teacher
4. Smart display board:
 - a. Distance of teacher from display board
 - b. Gestures of teacher towards display board
 - c. ID number of teacher
 - d. Voice commands from teacher

IV. ARCHITECTURE OF CONTEXT AWARE TEACHING ENVIRONMENT

Context Aware Teaching Environment system is divided into three layers as Database layer, Application layer and Data accumulation layer. Database layer includes Context Database to store all contexts identified for Context Aware Teaching Environment. Data will be provided to application layer for processing so as to respond to user inputs. Data accumulation layer includes all sensors to accumulate contexts from different entities and provide to application layer which will further process it with the help of database layer to respond. Students will not be given access to all these layers.

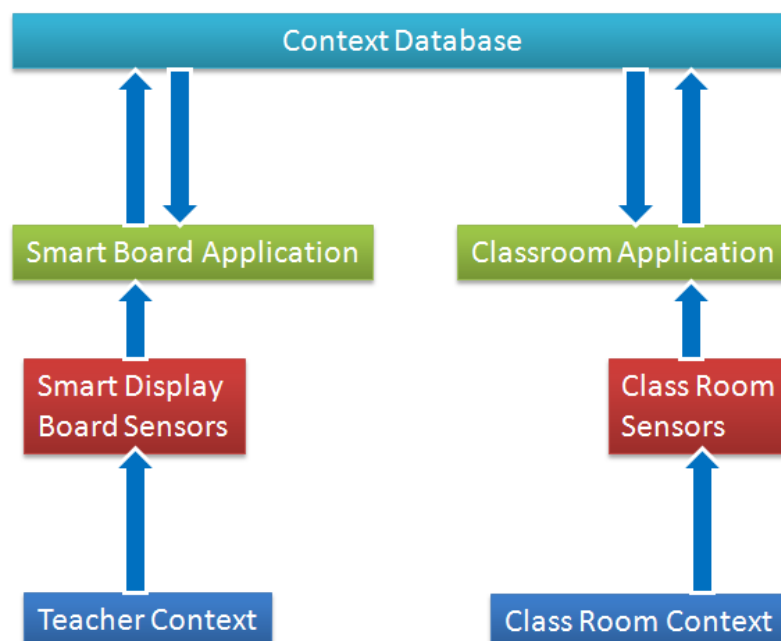


Fig. 1 Architecture of Context Aware Teaching Environment

V. CONCLUSION

In this paper we have proposed, from teacher's point of view, a Context Aware Teaching Environment system which identifies and uses those contexts of teaching environment to automate teaching process. This environment will reduce the task of notifying students about every teaching activity. Teacher does not have to keep track of his/her teaching activities on a daily basis. So time consumption in managing teaching process on daily basis is highly reduced for a teacher. Also it will help in reducing power consumption by automating the resources involved in teaching environment.

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