# Time Context Aware Intelligent Global Mobile Model and Its Implementation

Dr.K.Chitra

*Dept of Computer Applications*
*Thiagarajar School of Management*
*Madurai, Tamil Nadu, India*
chitra@tsm.ac.in

***Abstract*— Context is defined as the interrelated conditions in which something exists or occurs. Although information about the current context may be available to mobile applications, how to effectively use that information is still a challenging problem for application programmers. In this paper, we design and implement a time context aware intelligent global mobile client that adapts to the changing time context. This model uses the time context information to make wise decisions on its own process. This context-aware application is able to gather, process and manage location and time information.**

***Keywords*— Time context aware, mobile client, intelligent global mobile client**

## I. INTRODUCTION

Pervasive/ubiquitous systems require context awareness to provide both a seamless computing infrastructure and adaptive context-aware applications to mobile users. Computing devices currently take many forms from traditional mobile devices such as mobile phones and handheld computers, to networked home appliances, wearable computers and "smart items" (objects with embedded storage, computing and communication capabilities [1] which can create communities of smart items and can interact with other entities).

Two technologies allow users to move about with computing power and network resources at hand: portable computers and wireless communications. Computers are shrinking and allowing many to be held by hand despite impressive computing capabilities, while the bandwidth of wireless links keep increasing. These changes have increasingly enabled people to access their personal information, corporate data, and public resources “anytime, anywhere”. Pervasive systems need to deal with mobility of users, their devices and their applications and also with users who may want to change their computing device whilst running some computing applications.

A pervasive computing infrastructure should allow users to move their computational tasks easily from one computing environment to another and should allow them to take advantage of the capabilities and resources of their current environment. As a result, pervasive systems have to be context-aware, i.e., aware of the state of the computing environment and also of the requirements and current state of computing applications. As mobile networks become more pervasive and mobile devices evolve to support multiple wireless technologies, enterprises are challenged with meeting and exceeding their business mobility goals.

With context-aware mobility, mobile users can go beyond simple anytime, anywhere connectivity to determine valuable information about devices, assets, and users. For example, when moving into a new building, a mobile user will now be able to quickly consult an instant messaging application to determine the location of other team members, their availability, and the best method for reaching them. Mobile users will now be able to answer business-critical questions about mobile assets and users, such as: Where are they? Where is it? What is the current condition? What is the asset or person’s status? Context-aware mobility can help enterprises enhance the experience of their mobile users and at the same time improve profitability. Beyond the factor ‘anytime’, by knowing the time context, the mobile client itself may take a wise decision while doing any process. In this paper, we model and implement time-context aware mobile client which will be able to act smart.

### *A. Definition of “Context”*

The word “context” is defined as “the interrelated conditions in which something exists or occurs”. Many researchers have attempted to define context by enumerating examples of contexts.

Schilit divides context into three categories [4]:

• Computing context, such as network connectivity, communication costs, and communication bandwidth, and nearby resources such as printers, displays, and workstations.

• User context, such as the user’s profile, location, people nearby, even the current social situation.

• Physical context, such as lighting, noise levels, traffic conditions, and temperature.

Time is also an important and natural context for many applications. Since it is hard to fit into any of the above three kinds of context, we propose to add a fourth context category as:

• Time context, such as time of a day, week, month, and season of the year.

More importantly, when the computing, user and physical contexts are recorded across a time span, we obtain a context history, which could also be useful for certain applications.

Combining several context values may generate a more powerful understanding of the current situation. “Primary”

contexts, including location, entity, activity and time, act as indices into other sources of contextual information [5].

## II. Context Aware Intelligent Global Mobile Model

### *B. Activity Diagram – TCA SMART CALLS*

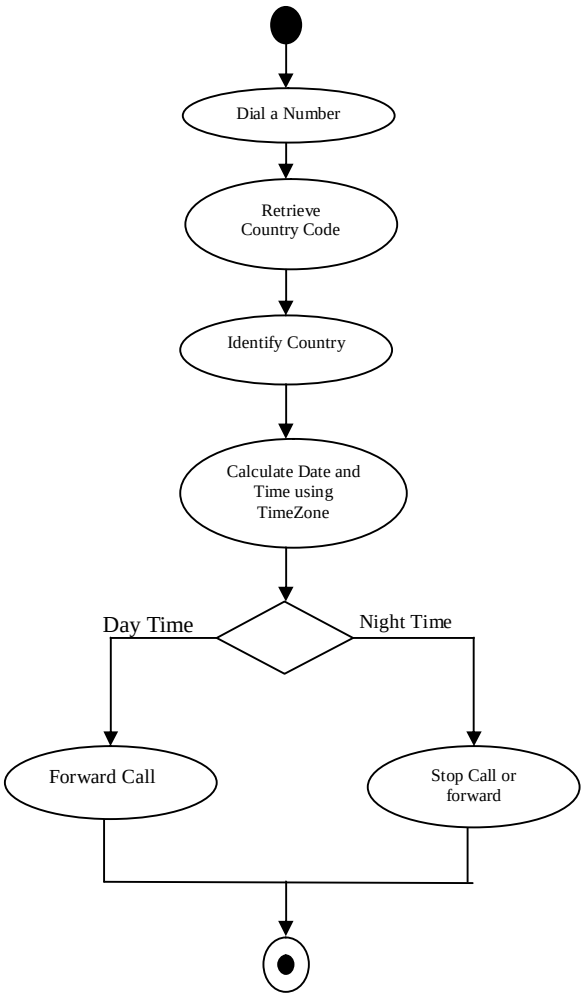


Fig. 1. Activity Diagram – TCA Smart Calls

In this section, we design an intelligent mobile client which can collect location and time contextual data, manipulate them and act accordingly. And it is important to note that when we make calls to foreign countries the time varies between country to country. The mobile client itself is made aware of the time callee's country and makes wise decision whether to proceed with the call or not as shown in the figure 1. The mobile client is made time context aware (TCA) when the calls are made from that mobile client. In TCA global model, when a call is made, the mobile client retrieves the country code. Based on the country code, the country is identified then it identifies the date and time of that country using TimeZone. Hence the mobile client itself decides to forward the call if it is day time or terminate the call or send SMS if it is night time in that country. It reduces the time of call, waste calls, network usage and bandwidth usage.

## III. Context Aware Intelligent Global Mobile Implementation

Time context aware intelligent global mobile model is implemented in J2ME using Java TimeZone and Calendar using NetBeans 6.7.1 which is an Integrated Development Environment (IDE) to develop J2ME applications. The source file was compiled and executed in that IDE and made JAD file for execution in mobile devices like cell phone. The device must be a Java enabled device. The performance of TCA model is shown in the figures 2a & 2b.

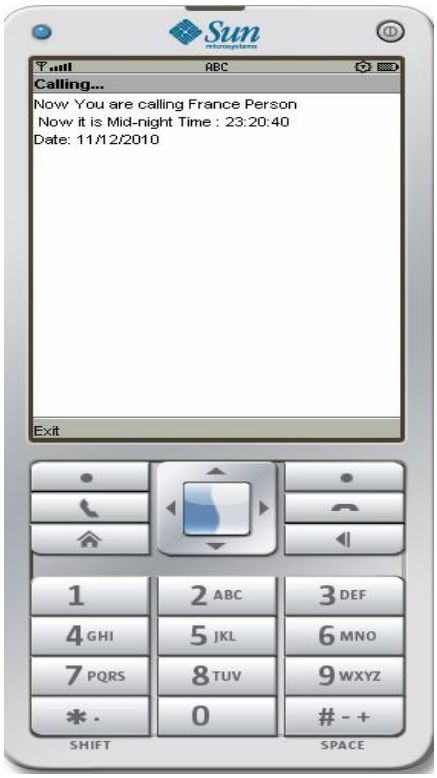


Fig. 2a Implementation of TCA Model

We performed user study analysis with twelve male and eight female participants on various locations and various types of people like students, office goers, family relatives, and professors in the age between 23 to 32 years. The goal was to find out the users' rating of the Time Context Aware Intelligent Global Mobile Model. Thereto, the participants completed a series of usage tasks two times in randomized order. The tasks covered all TCA specific actions such as calling in day time to different countries and calling in midnight to different countries.

Afterwards, the participants filled out a questionnaire. In average, the participants rated (Scale 1-5) Time Context Aware Intelligent Global Mobile Model's capabilities to use time contextual data wisely. 19 of the participants stated that

they would prefer the system with support of wise decisions made by the mobile client itself so that they can reduce the bill paid for the mobile phone when they make foreign calls and reducing the wastage of using mobile network bandwidth as the mobile client itself takes wise decision by informing the time of foreign countries to the caller.

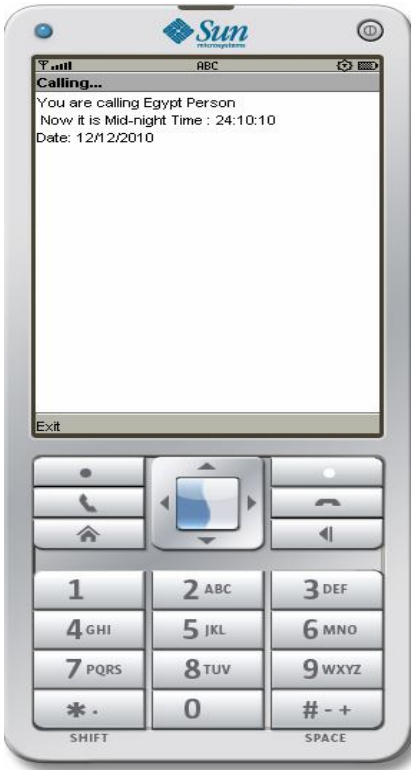


Fig. 1b Implementation of TCA Model

## IV. Conclusions

Time Context Aware Intelligent Global Mobile Model takes time contextual data, user location information to create a context-aware client phone that provides smart features that aim to improve the overall usability of the cell phone. It can either eliminate unwanted interruptions or actively notify the user of an outgoing call by identifying location and time of the callee. This intelligent global mobile model saves energy and bandwidth of the mobile network by deciding itself not to make a call by finding the country/location of the callee and the time of that country. The user study analysis clearly delineates that this intelligent mobile model helps the mobile users from unnecessary disturbance during night privacy schedules.

## References

[1] Beigl, M., Gellersen, H., Schmidt, A.: Mediacups: Experience with design and use of computer-augmented everyday artefacts. Computer Networks,Special Issue on Pervasive Computing 35 (2001) 401-409.

[2] Chen, Y., X.Chen, Ding, X., Rao, F., Liu, D.: Bluelocator: Enabling enterprise location-based services. In: Proceedings of the Third International Conference on Mobile Data Management, IEEE Computer Society (2002).

[3] S. Myles, G., Friday, A., Davies, N.: Preserving privacy in environments with location based applications. IEEE Pervasive Computing 2 (2003) 56-64.

[4] Schilit, W. N.; Adams, N. I., Want. R.: Context-aware Computing Applications. In: Proc. 1st International Workshop on Mobile Computing Systems and Applications, Santa Cruz, IEEE, 1994; pp. 85-90.

[5] Daniel Salber, Anind K. Dey, and Gregory D. Abowd. The context toolkit: Aiding the development of context-enabled applications. In Proceeding of the CHI 99 Conference on Human Factors in Computing Systems: The CHI is the Limit, pages 434-441, Pittsburgh, PA, May 1999. ACM Press.

[6] Hao Yan and Ted Selker. Context-aware office assistant. In Proceedings of the 2000 International Conference on Intelligent User Interfaces, pages 276-279, New Orleans, LA, January 2000. ACM Press.