

Context-Aware Software Development for Mobile Devices

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Motivation

Context-aware applications are systems whose behaviors are governed by the user's current context. Unlike traditional applications whose behaviors are only decided by the user's input, a context-aware application can perceive the user's current environment and situation through hardware or software sensors, and then decide its behavior automatically according to some pre-defined rules. The key point of context-aware applications is that they make computing devices smarter and more thoughtful for users. As pointed out by many analysts, context-aware applications can ease people's lives significantly and will become a key future technology.

How to make an application context-aware is a central issue in context-aware computing research. Such research raises questions on context acquisition, context representation, interpretation and abstraction, as well as programming models and development support.

Methodology

The objective of our research presented is to explore a way in which context-awareness can be facilitated in the development of such applications. In particular, we focus on providing a programming model, an implementation framework and a development environment that can free designers from details of sensing techniques, reduce the development cost and make target applications more easier to change.

The programming model is implemented by the combination of a proposed system implementation framework and user-defined application code. Based on the programming model and the implementation framework, we have designed a context-aware programming system that includes a context-aware programming environment, a context-aware application simulation environment, a context-aware application deployment environment, and a context-aware application runtime system for mobile devices.

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Demonstration Applications

Sound Assistant: Play music, record or replay record according to your location and surrounding voice level.

Moose Alerter: Alert when you are driving and a moose is approaching.

Maze Game: Play a game with your buddy to explore a maze. Whether obtaining gold or losing life point depends on the location, the time and your luck.

