Background

Current trends in the design of pervasive systems have concentrated on the problem of isolated smart spaces (such as smart homes) via a fixed infrastructure. This is likely to lead to the evolution of islands of pervasiveness separated by voids in which there is no support for pervasiveness.

The primary objective of the PERSIST project was to implement a user-centric smart space, the Personal Smart Space (PSS), that provides a minimum set of functionalities which can be extended and enhanced as the user encounters other smart spaces. They are capable of learning and reasoning about users, their intentions, preferences and context. Personal Smart Spaces can provide pervasiveness and context awareness at anytime and anywhere. Their ability to inter-operate with other smart spaces permits Personal Smart Spaces to automatically adapt environments to satisfy user preferences, to resolve conflicts and to facilitate a migration from smart places to smart regions.

Technology Description

The PERSIST technology set enables sharing selected information and resources with neighbouring Personal Smart Spaces for mutual benefit. It allows balancing limited resources between users, services and devices, and resolution of conflicts between the preferences of multiple users. It allows detection of a user’s context, prioritisation of intent, and acting upon predicted behaviour or using it for recommendation forming. It allows reasoning and selection of the most appropriate identity, based on the data required, for typical user interactions.

Context – A flexible context modelling scheme is used incorporating information quality, and capturing location-based data structures. Distributed context management allows efficient context query handling. A History of Context (HoC) component supports aggregation of context information to provide a rich history of past behaviour, and supply the learning and reasoning components with training or inference data sets.

Service Discovery & Service Sessions – PSSs need to support ad-hoc service advertisement and usage, especially in mobile environments. Furthermore, advanced service management facilities are provided, for controlling services.

User Intent – In order to properly personalise a pervasive environment, it is necessary to know what a user aims to achieve and which user action will follow.

Pro-active Behaviour – Based on the intent model, the system can invoke specific system behaviour in advance of user requests.

Learning and Reasoning – Automated learning of preferences by the system presents an opportunity to obtain accurate preference data without forcing the user to enter these manually. The context inference capability allows the deduction of high level / quality context information based on low level context data collected by sensors and context sources in general.

Grouping and Sharing – When personal smart spaces overlap, it will be necessary to reconcile the preferences of more than one user. Sharing of context information between users and balancing the allocation of resources amongst multiple users are facilitated.
Example scenarios

The example opposite shows three use-cases:

At the bus stop, Andy’s PSS makes use of Betty’s PSS to check when the next bus is due. Betty acts as a micro-operator of connectivity.

A patient has a PSS that includes sensors capturing his vital signs. Upon entering the Doctor’s surgery this data can be uploaded to the surgery infrastructure, for the doctor alone to access.

The driver of the rental car has a PSS that personalises the ergonomics of the car, e.g., adjusting the seat height automatically. Personal preferences for the climate control can be merged from all PSSs in the car.

Market Opportunity

PERSIST uses a collection of technologies including user privacy protection, multi-identity management, detection / collection of a user’s wider context, learning of user preferences and semi-automation of repetitive actions. These technologies are available to be exploited in various vertical domains, for example, automating company processes by learning the typical user behaviour.

IP Status

WIT has a very progressive approach to licencing of our IP to commercial entities and we welcome approaches from interested parties.

Contact

If you would like to learn more visit:

http://www.ict-persist.eu/

For further information on ways to engage with the TSSG/WIT, please contact:

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