

PERVASIVE DATA MANAGEMENT (5 cfu)

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The availability of very small, cheap, and low power devices coupled with the advances in wireless networking made it possible to reverse the computing paradigm: no more a "person seated at a computer desk", but "many computers surrounding a person". The Pervasive Computing paradigm aims at relieving people of a cumbersome interaction with a passive tool by embedding the processing power in the environment and making it proactive with respect to the user (i.e. anticipating, in an autonomous way, the user's needs). Data management functionalities, besides traditional Databases, must take into account Data Streams management, where continuous queries send unsolicited data from the physical environment to some base station; mobility and context-awareness add further complexity to the typical DBMS functionalities. The application areas which can mainly benefit from this technology are industrial control systems and handheld mobile computation devices including Smart cards and cellular phones.

Therefore a Pervasive Data Management System must be:

- time- and location-sensitive
- responsive to external events
- oriented to real-time applications
- often very small in size
- mostly stored in main memory
- able to process data streams.

The course introduces the main features of streaming, real-time, and main memory databases comparing them with the structure of a DBMS for traditional Information System management applications. Moreover the following topics will be explicitly addressed:

- Distributed data management architectures
- Mobility
- Context-awareness and context management
- Data in Wireless Sensors Networks
- Pervasive data management languages

in view of the above listed properties; examples will be drawn from Wireless Sensors Networks and Very Small Databases applications

Aim of the course is to introduce students to advanced topics through a personal monographic study. It is composed by an initial part of lectures and seminars on advanced research topic in the domain of Pervasive Information Systems (about 28 hours) while, in the second part, students will be requested to present the results of a personal deepening of subjects agreed upon with the teacher, by means of a short public seminar and a written report. Possibly, some oral question can be asked on the whole course program. Alternatively, students will be asked to develop a small project on the topics treated during the course.

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