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Image processing within an integrated teleradiology services network

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ABSTRACT

One of the many added-value services that can be provided over an integrated teleradiology services network is access to high-performance computing facilities in order to execute computationally intensive image analysis and visualization tasks [1]. Although an enormous amount of work has been devoted in developing medical image processing algorithms and systems, we currently lack a framework that can integrate prior achievements in the field and provide the added-value features that support and in essence realize what we call a 'service'. In this paper we present DIPE, a novel distributed environment which has been developed to support medical imaging processing services within the integrated regional health telematics network, currently under development by the Institute of Computer Science, Foundation for Research and Technology - Hellas, on the island of Crete [2].

DIPE is based on a distributed, autonomous, cooperating agent architecture. It is designed so that it is modular, scaleable and extensible, and is implemented on different hardware and software platforms, and over heterogeneous networks. Major features of DIPE include mechanisms for the "plug-and-play" integration of already existing heterogeneous software modules; easy access and user transparency in terms of software, hardware, and network technologies; computational resource management and intelligent execution scheduling within a local or regional network; and methods for the integration with other services available within an integrated health telematics network. The environment can be extended to provide various added-value services, such as sophisticated charging mechanisms based on quality of service, as well as intelligent and customizable mechanisms for the description, management, and goal oriented retrieval of image processing software modules so as to ease the work of medical (not technical) personnel. It can also support mobile modules, thus ensuring that image processing services are also available to diagnostic mobile units and ambulances. DIPE can be viewed as the natural evolution of traditional medical image processing systems towards a service over the emergent health care telematics networks.

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