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Patent Search

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Abstract:

The current invention reveals an Ambient Intelligence Computing Ecosystem that is intended to facilitate seamless, adaptive and intelligent communication amongst heterogeneous digital devices in dynamic real-world settings. This system incorporates Context Acquisition Layer, Context Interpretation Engine and Context-Aware N Interaction Layer to form an integrated system that can perform autonomous device coordination and user-oriented service provision. Environmental sensors, user behavior patterns, space-related indicators, device telemetry, and time-related conditions are all multimodal data that are continuously gathered and handled by sophisticated context fusion and inference models. The interpreted environment of communication allows devices to interact and negotiate roles, as well as work together in a dynamic orchestration module capable of dynamically assigning tasks, optimizing resource usage, and ensuring continuity of user experience. The hybrid edgecloud processing architecture is guaranteed to be real-time responsive to local actions, and at the same time, enables learning and predictive analytics on a large scale in the cloud. This introduces a personalization engine, which modifies the behaviours of devices depending on the habits and preferences of the users, their mobility and response to different circumstances. In order to achieve secure operation, the invention involves privacy preserving context management framework that uses encryption, selective sharing, and controlled access. The offered system is very modular, scalable, and domain-independent and can be used at smart homes, healthcare, industrial automation, retail settings, as well as smart city infrastructures. In summary, the invention turns the traditional networks of devices into a context-aware, self-configuring and auto-coordinated ambient intelligence ecosystem that can provide proactive, intuitive, and human digital experiences.

Complete Specification

Description: The current invention can be associated with the sphere of ambient intelligence, ubiquitous computing, and intelligent human-machines interaction systems. To be more precise, the invention pertains to the Ambient Intelligence Computing Ecosystem that offers the integration of the context-aware sensing, adaptive data processing and multi-device interaction mechanisms, to facilitate a seamless real-time coordination of the heterogeneous digital devices. This invention also applies to distributed computing architecture, edge-cloud collaborative intelligence and situational awareness models created to understand environmental, behavioral, and device context. The suggested system will allow making autonomous decisions and proactive service delivery and facilitate intelligent communication across devices via a shared layer of interaction. The invention can be used in many fields, such as smart home, healthcare monitoring, industrial automation, smart cities, immersive environments, and next-generation IoT ecosystems, where intelligent and context-sensitive multi-device interaction is required. It also applies to the improvement of AI-based personal ambient sensing systems, and responsive user experience technology.

BACKGROUND OF THE INVENTION

The blistering pace of smart environment development, ubiquitous sensing and inter-connected digital ecosystems has increased the pressure on computing systems to be capable of getting to know the context of the user and autonomously change their behavior based on evolving real world conditions. The problem is that traditional computing architectures are not yet capable of viewing multimodal inputs of various devices, combining environmental and behavioral information, and providing seamless interactions between heterogeneous platforms. The vast majority of the existing solutions depend on single-performance device intelligence, isolated communication protocols or simply rule-based systems that are unable to conduct deep context analysis and multi-device coordination in the real time. An environment that is more complex, encompassing homes, work environments, industrial, transportation systems and infrastructures of the public is necessitating the next generation intelligent

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