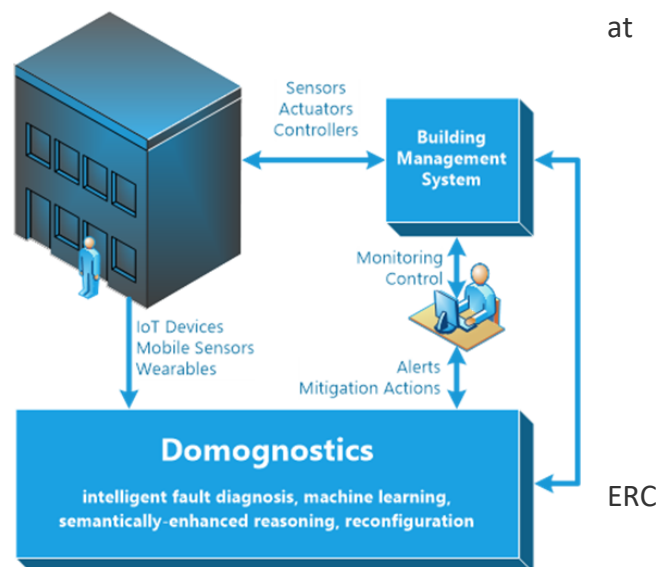


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A new ERC grant provides a novel solution for reducing energy losses in smart buildings

The KIOS Research and Innovation Center of Excellence at the University of Cyprus is coordinating a new ERC Proof-of-Concept project, entitled Domognostics, which aims at reducing energy losses in buildings using intelligent building automation diagnostics.

The ERC Proof-of-Concept Grants are available to existing ERC Grantees to help them capitalize on the value of their excellent research outcomes. This is achieved by funding specific activities that maximise the innovation potential of ideas arising from their research work. The theoretical foundations of this project's techniques were developed as part of the prestigious Advanced Grant "Fault-Adaptive", awarded to Prof. Marios Polycarpou.



Market need for an intelligent building automation diagnostics system

Buildings are responsible for 40% of the energy consumption in the EU and are responsible for 36% of the greenhouse gas emissions. The emergence of networked cyber-physical systems, in which sensor/actuator networks are integrated with software algorithms, facilitates the development of advanced Building Management Systems (BMS).

Unfortunately, it is estimated that 20% of the energy consumed in buildings is wasted due to component faults. For example, when a temperature or air quality sensor becomes faulty, this may lead to a degradation in performance, increase of energy costs and reduction of productivity or, even worse, in some cases it may lead to situations that would endanger people's lives. The issues of fault detection, diagnosis and automatic recovery in buildings will become even more crucial in the near future as internet-enabled devices, or devices that are part of the Internet-of-Things (IoT), are widely deployed in smart buildings and homes.



Novel Solution

Though the combination of automation and intelligent diagnostics, it is estimated that energy waste in buildings can be reduced significantly. Therefore, the Domagnostics ERC project will address a market need for an intelligent building automation diagnostic system, to facilitate continuous and effective monitoring of the buildings, to detect and isolate any component faults or unexpected events, and to reconfigure the operation of the automation system. This novel solution will interoperate with existing Building Management Systems to extend their capabilities, and will integrate directly with heterogeneous sensor types, such as internet-enabled devices and mobile sensors, to enhance the available information and measurements.

The Domagnostics platform will utilise intelligent fault diagnosis algorithms with machine learning capabilities to boost its capacity to learn from experience, and semantically enhanced reasoning to facilitate the flexibility of adding new sensors or replacing faulty components, as needed. The Domagnostics solution is also highly related to an improved living environment for inhabitants in terms of air quality, comfort and safety. It is estimated that 345,000 new jobs will be created worldwide by the implementation of nearly-zero energy buildings and a percentage of this could be linked with the building automation diagnostics market.

To achieve the above goals, KIOS collaborates with PHOEBE Research and Innovation Ltd. PHOEBE will be responsible for the integration of research results into a cloud-based real-time monitoring platform, and to conduct the business study for commercializing the innovative solution in Europe and internationally. The research team of Domagnostics consists of Prof. Marios Polycarpou as the Principal Investigator, Associate Prof. Christos Panayiotou, Dr. Demetris Eliades, Mr. Giorgios Milis and Dr. Demetris Stavrou.
