Faculty of Computers And Artificial
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Research proposal for the degree of MSc under title:

IoT Integration with Cloud Computing in Ecosystems

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Abstract:

In the near future, we will be able to identify and address all objects on Earth. Such objects can be monitored, monitor their physical environment, and perform actions in the such environment on behalf of human users. These so-called smart objects are also equipped with wireless communication capabilities. Using proprietary addressing, wireless devices, and existing protocols and standardized formats, smart things can be integrated into the Internet and accessed like any other web resource. In this context, the Internet of Things (IoT) will enable smart things to actively interact with each other and with other physical and virtual objects available on the web to provide users with high-added value. It is evolving to a paradigm that provides information and functionality. The IoT paradigm has recently shown the potential to significantly impact people's daily lives, largely due to the use and interaction of physical devices in multiple domains, including complex systems composed of other systems. In this study, we will try to propose an architecture for IoT ecosystems utilizing the modern computational paradigm. cloud computing is a modern computational paradigm that provides many computation capabilities with various configurations and shapes. Many computational challenges in the IoT ecosystem system will be addressed in this research utilizing cloud computing capabilities. Some of the main challenges in IoT real-time devices are data storage, management, and exchange between devices.

Keywords: Internet of Things (IoT), Advanced Cloud Computing, EcoSystem, Integration

Introduction:

The Internet of Things (IoT) has become an integral part of human life with the advent of smart technology. IoT-based applications are everywhere, from individuals to government agencies.
The proliferation of devices also drives the need for more efficient technology to keep systems running smoothly. The whole functionality of IoT devices is dependent on the communication framework. **[8]**. Depending on the intended use of the IoT device, the communication framework may differ. In weather monitoring applications, the battery of IoT-based devices is of utmost importance, and surveillance sensors need to work for longer periods of time. **[1].**

Sensor accuracy is also important for fitness applications. Efficient communication is an important part of ecosystem IoT applications involving surveillance.

IoT's ability to communicate needed information in near-real time can provide the ecosystem with sustainable solutions that benefit both patients and medical staff. Some of the potential benefits that IoT can provide are Low-cost solutions, Ease of deployment, Scalability, End-to-end connectivity, and effective monitoring.

IoT is a new communication paradigm composed of various interconnected smart devices such as sensor nodes, actuators, and low-power devices. Today, everything in our everyday life is connected to the Internet. From small appliances to large industrial devices, they all contain tiny microcontrollers, transmission modules, standard communication protocols, and memory.

Multi-purpose IoT devices are now used, where a single sensor can perform multiple tasks. As in other areas, IoT is playing an important role in the ecosystem. In an ecosystem, IoT is being used

for a variety of applications, including routine checkups, health monitoring, personal fitness, and elderly care.

IoT sensors are also used to monitor the function of various organs in the body. Compared to traditional ecosystem devices, IoT-based devices are economical and easy to use.
An ecosystem consists of compassionate personal data and information, making it more vulnerable to cyberattacks.

The field of nursing informatics usually deals with the integration of nursing information and combines that knowledge with information management techniques. This is made possible by the usage of IoT in this area. IoT offers an entirely new approach to enabling real-time wireless condition monitoring powered by cloud computing.

Cloud computing is a client-based requirement that offers many resources intended to be shared as a service over the Internet. These services must be managed and scheduled to make optimal use of cloud computing resources such as storage, applications, and other services. The main idea behind scheduling is to minimize wasted time and workload and maximize throughput. Therefore, planning tasks is essential to achieve accuracy and precision in task completion. A block diagram of an IoT-enabled and cloud computing-based smart ecosystem is presented in Fig.1

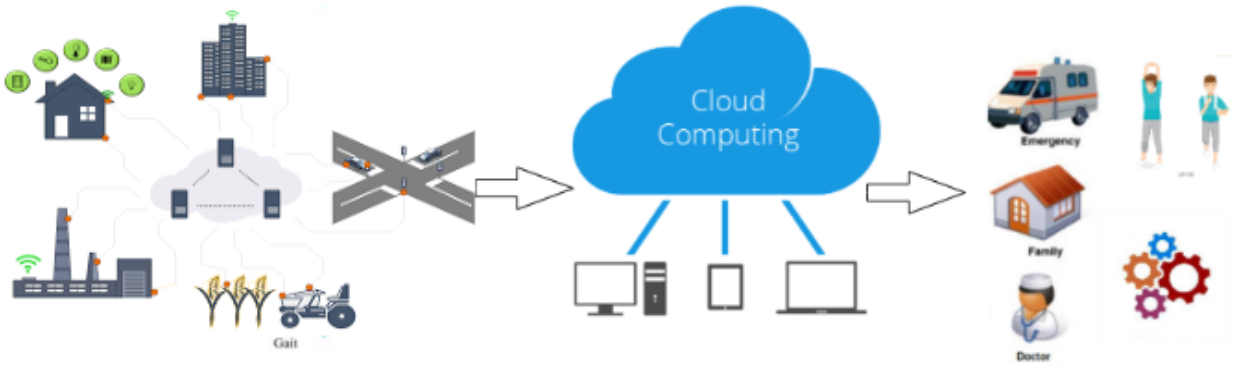

Fig.1 Block diagram of a cloud computing-based smart ecosystem for the IoT.

Related Work:

In **(2012) [14]** proposed a definition of IoT business ecosystem (d. H. Definition of IoT ecosystem from a business perspective) as a metaphor taken from biology. It is well known that natural living ecosystems are biological communities of interacting organisms and the physical environments in which they interact. Similarly, the IoT business ecosystem is defined as a community of individuals and companies interacting with the socio-economic environment.

In **(2019) [13]** The enterprise IoT ecosystem consists of five key players: (1) software platform developers, (2) hardware platform developers, (3) network technology developers, (4) application/solution developers, and (5) users and customers. The architecture of the enterprise

IoT consists of a perception layer, network layer, processing layer, application layer, and service management layer. This paper presents three categories of IoT applications: operational enterprise IoT, analytical enterprise IoT, and collaborative enterprise IoT. Recognizing that many enterprises invest in a variety of IoT services for their business model innovation, this paper discussed how the IoT services contribute to business model innovation in terms of the four components of the IoT service business model: value proposition, networking activities, resources, and sustainability. Then this paper illustrates the use of the IoT service business model for smart hotel room development. The IoT ecosystem provides a valuable source of insightful data to assess the prospects of the IoT sector. Enterprises must keep an eye on new technologies to adapt to the disruptive nature of IoT innovation and to deliver innovative new IoT services. In addition to innovative IoT technologies and tools, 5G cellular technologies and solutions are expected to bring great opportunities and challenges to the IoT development of enterprises.

in **(2020) [16]** A proposed IoT-enabled cloud-based asset management system would collect real-time data to form a closed-loop visibility and traceability mode, allowing project authorities to determine the location and status of key physical assets associated with the project. to be monitored. You can more closely monitor project progress for casting precast segments, transporting them to the assembly site, and assembling precast segments. Errors, interruptions, and delays during the construction process that lead to project time overruns and cost overruns are therefore greatly reduced.

in (2020) [17] Cloud platform selection criteria, The proposed selection criteria rate includes four elements: Technology provision, strategy, market presence, certification, and recommendations. Percentage weights for each factor remain the same Platform evaluator for specific project needs Because it usually varies from project to project.

present a comprehensive list of IoT cloud platform features and best practices. This not only helps you compare different cloud platforms but also creates a hardened cloud framework when developing from the ground up.

Even though it is a huge platform, it lacks many features and functions. These IoT cloud platforms are expected to continue to mature in the coming years. The main benefits of using such a platform are faster time to market and significantly lower costs. Until 2015, the goal was to build an IoT cloud platform for your company's needs. Market adoption of reputable and mature platforms is expected to increase, especially given that some heavyweights are currently entering the market. IoT cloud platform providers that also offer products on the embedded or things side receive relatively more preference when it comes to platform selection.

in (2020) [18] The Internet of Things is a vast field, covering an incredibly diverse range of applications. Architecturally, cloud infrastructure fits well with IoT. IoT can benefit from the limitless possibilities and resources of cloud computing. This is because the cloud has scalable capacity. There is no one-size-fits-all solution, so IoT companies should consider their own solutions and Use cases in determining if the cloud makes sense for them. In addition, cloud infrastructure can be accessed anytime, anywhere with low investment and operating costs. We have come to the conclusion that the Internet of Things, Big Data, and Cloud Computing will open up new horizons for decision support systems. again, Combining IoT, big data, and cloud computing can provide new opportunities and applications in all areas.

in **(2022) [15]** We can now provide a definition of the IoT ecosystem that blends the technical and business perspectives of the IoT domain. This broadening of the definitional scope of the IoT ecosystem is motivated by the fact that, from a commercial perspective, IoT presents a great opportunity for most companies to enter new markets and increase revenue. IoT ecosystems connect disparate, resource-constrained devices in a managed way to create efficient and secure systems. Its ultimate goal is to provide a practical service to the community, including various stakeholders. At a high level of abstraction, the actors involved are Industries that provide IoT technologies, developers of IoT solutions, and customers (individuals, companies, or machines).

Problem Statement:

IoT-based Ecosystem monitoring systems including "Internet of ecosystem Sensors". It contains huge data that are difficult for humans to manage, so It is important to use cloud computing services to store IoT data. It's difficult to find the proper way to integrate this service with an IoT device. The research tries to explore IoT services on AWS classification to find the appropriate architecture, so when selecting the proper cloud service and building the appropriate architecture; this will be applicable to a case study in the ecosystem.

Research Design and Methods:

The proposed research will include the following tasks

- Survey of the ecosystem of IoT and Cloud Computing
- Gather/build some datasets related to specific cases.
- Training on the cloud environment and running some of the features such as AWS, Azure, and Google platforms to decide which one is the most proper for our research
- Experimentation with the proposed techniques
- Apply on case study

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Time Table for Completing the Thesis

	2022			2023											
	Oct-Dec			Jan-Mar			Apr-Jun			Jul-Sep			Oct-Dec		
Literature Review															
Research Proposal															
Survey of the ecosystem of IoT and Cloud Computing															
Gathering some data related to specific cases.															
Experiment station with the proposed techniques															
Apply to the case study															

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