AIoT for Achieving Sustainable Development Goals

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Abstract

Artificial Intelligence of Things (AIoT) is a relatively new concept that involves the merging of Artificial Intelligence (AI) with the Internet of Things (IoT). It has emerged from the realization that Internet of Things networks could be further enhanced if they were also provided with Artificial Intelligence, enhancing the extraction of data and network operation. Prior to AIoT, the Internet of Things would consist of networks of sensors embedded in a physical environment, that collected data and sent them to a remote server. Upon reaching the server, a data analysis would be carried out which normally involved the application of a series of Artificial Intelligence techniques by experts. However, as Internet of Things networks expand in smart cities, this workflow makes optimal operation unfeasible. This is because the data that is captured by IoT is increasing in size continually. Sending such amounts of data to a remote server becomes costly, time-consuming and resource inefficient. Moreover, dependence on a central server means that a server failure, which would be imminent if overloaded with data, would lead to a halt in the operation of the smart service for which the IoT network had been deployed. Thus, decentralizing the operation becomes a crucial element of AIoT. This is done through the Edge Computing paradigm which takes the processing of data to the edge of the network. Artificial Intelligence is found at the edge of the network so that the data may be processed, filtered and analyzed there. It is even possible to equip the edge of the network with the ability to make decisions through the implementation of AI techniques such as Machine Learning. The speed of decision making at the edge of the network means that many social, environmental, industrial and administrative processes may be optimized, as crucial decisions may be taken faster.

Deep Intelligence is a tool that employs disruptive Artificial Intelligence techniques for data analysis i.e., classification, clustering, forecasting, optimization, visualization. Its strength lies in its ability to extract data from virtually any source type. This is a very important feature given the heterogeneity of the data being produced in the world today. Another very important characteristic is its intuitiveness and ability to operate almost autonomously. The user is guided through the process which means that anyone can use it without any knowledge of the technical, technological and mathematical aspects of the processes performed by the platform. This means that the Deepint.net platform integrates functionalities that would normally take years to implement in any sector individually and that would normally require a group of experts in data analysis and related technologies [1-322].

The Deep Intelligence platform can be used to easily operate Edge Computing architectures and IoT networks. The joint characteristics of a well-designed Edge Computing platform (that is, one which brings computing resources to the edge of the network) and of the advanced Deepint.net platform deployed in a cloud environment, mean that high speed, real-time response, effective troubleshooting and management, as well as precise forecasting can be achieved.

Moreover, the low cost of the solution, in combination with the availability of low-cost sensors, devices, Edge Computing hardware, means that deployment becomes a possibility for developing countries, where such solutions are needed most.

An AIoT implementation of Deepint.net has the potential to help achieve the 2030 Sustainable Goals for Development. There is growing concern over the fact that little progress has been made on some of the goals set out in the United Nations Agenda and others have gone backwards as a result of the Coronavirus pandemic. According to the information on the United Nations website “90 per cent of countries and territories are reporting one or more disruptions to essential health services” as a result of the pandemic. Thus, to successfully meet the 17 SDG, solving the problems caused by the pandemic is crucial. Moreover, AIoT Deepint.net could possibly make up for the lost progress if the society focused on implementing this technology for the 17 SDG, especially in the most affected, third world countries.

Source: Progress towards the Sustainable Development Goals - E/2021/58.
The role of Deepint.net would consist in data ingestion, management, analysis, visualization and exportation. Deepint.net can also create models for forecasting and decision-making support. Its modular design would make it possible to dedicate a separate module to each SDG; this would ensure that equal progress is made on all SDGs or that priority is given to the most urgent issues without overlooking other problems.

Below, possible use cases of Deepint.net for the achievement of some of the SDGs are described:

**Goals 1&8:** Deepint.net could help end poverty by helping governments keep track of their economy, of distribution of aids and investment, helping the economy grow which would lead to the creation of more jobs.

**Goal 2:** The tool could help end hunger by increasing crop and livestock production while enabling efficient use of scarce resources. This would be achieved through analyzing crop data, aiding in decision making regarding irrigation and animal healthcare, anticipating weather changes.

**Goal 3:** Deepint.net can be used in healthcare for countless purposes; it can improve healthcare services, curb Covid-19, enable rapid response to accidents and emergency situations, increase the accuracy of diagnosis and treatment.

**Goals 4 & 5:** In education and gender equality, the tool can help by analyzing different variables, such as political unrest, culture, economy, gender stereotypes, machismo, school distribution i.e., to explain reasons for low school attendance, drop-out rates and/or gender inequality. Learning in detail about the causes that hinder children and adults from receiving education in different geographical areas, will make it possible to counteract them.

In conclusion, all progress is based on increasing our ability to extract valuable knowledge from data and use it to find new solutions. Deepint.net is a comprehensive tool which in combination with IoT and Edge Computing under the AIoT concept, can provide remarkably fast and optimal response to the problems our society is experiencing.

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