Medicon Agriculture & Environmental Sciences
Volume 5 Issue 4 November 2023
Article Type: Short Communication
ISSN: 2972-2691

Application and Significance of IoT in Forest

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Received: October 19, 2023; **Published:** October 28, 2023

Introduction

In the past few decades, the term "sustainability" has gained significant traction when applied to the utilisation of energy resources. According to Marchi et al. (2018), "Sustainable Forest Operations (SFO)" seems a comprehensive strategy and approach that integrates forest activities with economically, environmentally, as well as social sustainable development goals in an effort to effectively address present and future challenges. The FAO provides a definition for a forest as a land area that is larger than 0.5 ha, has a tree canopy cover that exceeds 10%, and is primarily free from agricultural or other non-forest land use activities. The forest serves as the centre of terrestrial biodiversity on Earth. In addition to mitigating climate change and carbon emissions, forests are vital to sustainable food production and a source of income. As of 2020, the estimated forest area stands at 4.06 billion hectares, accounting for 31% of the overall land area. This equates to 0.52 hectares of forest area/capita, despite the fact that forests are not distributed geographically or globally among people (Forest area, 2021).

Forest biodiversity encompasses the ecological functions and life forms that are found within forested regions. In addition to trees, it comprises an extensive assortment of forest-dwelling organisms, creatures, and plants, along with their genetic diversity. Recent trends in ecosystems and biodiversity impede progress towards the SDGs. In our forest, transformational changes such as the conservation of biodiversity and the integration of agriculture and food consumption with the natural environment are necessary. Environmental degradation must be isolated from unsustainable resource utilisation and associated trends in production and consumption, as well as from economic development. Furthermore, the research assessed the extent to which inhabitants of adjacent woodland regions depend on fuel wood, food, small timber, and bamboo. It was found that over 17,000 villages throughout India are situated in close proximity to forests.

IoT (Internet of Things)

The Internet of Things (IoT) is a revolutionary and instantaneous technology that has had a significant impact on numerous sectors by introducing intelligence and intelligence to physical objects (Kim et al., 2020). Real-time supervision of the natural setting of forests is made possible through the deployment of IoT in the forest. This includes the monitoring of forest harvesting, continuous assessment of the plants, and tracking of fire accidents. As sensor technology and wireless communication technology advanced, the implementation of IoT emerged as an innovative and cost-effective method for addressing the forest's challenges. By means of the wireless communications protocol, forest sensory data can be transmitted to a cloud server in order to facilitate real-time monitoring and analysis of forest activities. The sensory data may be subsequently accessed via the graphical user interface (GUI) after having been retained on a cloud server's storage. The IoT refers to the integration of tangible objects with a digital environment via Internet Protocol, or IP, connectivity. The IoT components offer a distinct capability that will augment conventional applications. The constituent elements of the IoT are delineated and illustrated in Figure 1.

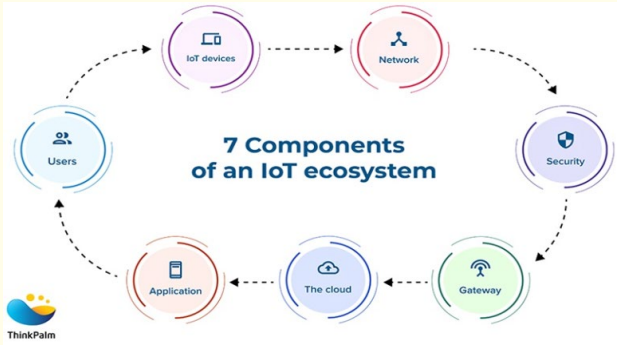

Figure 1: IoT components.

Applications of IoT

- ***Forest Fire Prediction and Detection:*** The Sensor Node possesses the capability to identify the occurrence of fire in its immediate surroundings by using the sudden changes in infrared (IR), lux, temperatures, and humidity readings. Following this, an instantaneous activation of a fire status forecast system will occur at the central analysis node in response to the identification of a fire occurrence. The system will consider multiple factors, including the temperature variations across distinct nodes of sensors positioned in opposite directions, the velocity of the wind in the vicinity, and the information supplied by the Common Vector (CV) node concerning the vegetation type in the vicinity.
- ***Flora analysis and Minor Forest Produce:*** Minor Forest Produce (MFP), alternatively referred to as non-timber forest products (NTFP), serves as a significant means of sustenance for a considerable population of Scheduled Tribes (STs) residing in close proximity to forested areas. The provision of vital sustenance, nutritional resources, pharmaceutical provisions, and monetary assistance is extended to numerous scheduled tribes (STs). The MFP cycle, which is an Internet of Things (IoT) application, facilitates the movement of raw materials through the forests to the final product. The MFP cycle has various divisions, namely gathering, handling, addition of value, packaging, distribution, retailers, and consumers.
- ***Wildlife tracking, assessment and conservation:*** The Internet of Things (IoT) has long been seen as a viable solution for addressing this particular issue. The availability of wireless sensor network configuration presents distinctive opportunities for monitoring species in danger and their habitats, particularly in remote and challenging environments, with the aim of safeguarding their well-being.

Conclusion

The loss of wildlife has been attributed to the combined effects of forest degradation and poaching activities carried out by hunters. The endangerment of animals can lead to an imbalance in the natural system. In order to optimise vegetation growth, save endangered wildlife, and improve the well-being of tribal communities, it is imperative to employ real-time technology capable of monitoring and detecting real-time occurrences within the forest ecosystem. The integration of Internet of Things (IoT) modules within forest environments is a potential solution for the implementation of real-time monitoring systems. This article focuses on the overview of application of Internet of Things (IoT) framework which can be utilised for the purpose of monitoring environmental conditions, wildlife conservation and detecting fires.

References

1. Marchi E., et al. “Sustainable Forest Operations (SFO), A new paradigm in a changing world and climate”. Sci. Total Environ 634

(2018): 1385-1397.

2. Foundation CDR. Main Report (2020).
3. Forest area (% of land area) | Data, (n.d.).
4. PDN. Fuelwood studies in India: myth and reality (2002).
5. Kim WS, Lee WS and Kim YJ. "A Review of the Applications of the Internet of Things (IoT) for Agricultural Automation". J Biosyst. Eng 1 (2020): 16.

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