Role of Sustainable Development in Smart Cities for a Better Life Style

Mehtab Alam, Dr. Ihtiram Raza Khan
Jamia Hamdard

Abstract :- The world is changing and the countries throughout the world are staring at huge population increase. With this gigantic increase in population, rises the problem of over exploitation of natural as well as man-made resources. To deal with the problem, rises the need of sustainability. Governments throughout the world are working to deal with the issue of sustainability and resource preservation for the future. Sustainability goals have been set and we are working to achieve these goals. The Smart City concept is no more a new concept. It proposes a very good solution for the sustainability problem. It aims to make the life and lifestyle of the citizens better and at the same time saving resource utilization and wastage with smart technologies which in turn would increase sustainability.

IoT facilitates smart cities to gather intelligent inputs from the connected devices and sensors. Using this arrangement, smart cities can deal with the pollution and traffic control problems and control both pollution levels and traffic congestions. AI on the other hand, uses AI algorithms to help build intelligent systems through automation and control day to day activities of the municipal boards/Nagar Nigam. Intelligent use of IoT and AI helps in improving smart cities and leads the way for better future of municipalities across the world. This concept pushes towards a smart sustainable city where outdoor parking space, waste disposal management, traffic control and management, public safety, water and power management is smart and efficient.

From making living conditions for city residents better to facilitating cities to be more competitive, IoT and AI are making Smart sustainable city concept a reality.

Keywords :- Smart Sustainable Cities, Internet of Things, Artificial Intelligence, Machine Learning, Information and Communication Technology (ICT), Big Data

Introduction :- These days, taking benefit from IoT and AI based solutions for smart cities aids in accelerating socio-economic growth, improving overall infrastructure and environment process, enhancing transportation model and optimizing the costs of regulating public assets.

Smart City is a concept of using latest technological advances and connected data sensors to enhance and become strong in terms of infrastructure and city operations. This includes monitoring and managing of public domain assets, efficient transportation systems, citizens, power plants, water supplies, information systems, civil bodies and other community services.

With the advent of Internet, the world was happy to be connected together without any physical boundary. The Internet started helping the eager world to connect with static information available but people wanted more from the Internet. Now Internet is helping the world to build links and connections from human to human, human to physical entities and physical entities to other physical entities. The world is changing fast, with a click of a button we are connected to remote sites sharing critical data and information. For example, patients can now take advice from experts sitting in other countries without having to travel all the way.

IBM and IDC have in their papers talked about data generated and its usage and the extent to which there would be usage of Internet and sensor enabled devices by 2030 and how the concept of Smart sustainable cities would be possible [2,3,4,5].

We are living in an increasing technical world, challenging us as human beings.

1. Smartcity :- There is no standard commonly accepted definition which would help to precisely define a Smart City [6]. In simple words, Smart City is an urban area that uses Information and Communication Technologies (ICT) to ease up the livelihood of its citizens. It is a corporation that uses ICT to augment operational efficiency, share information with the citizens and improve both the quality of government services and citizen welfare [7]. According to Technology Strategy Board – IoT Special Interest Group [8], “The Internet of Things (IoT) describes the revolution already under way that is seeing a growing number of internet enabled devices that can network and communicate with each other and with other web-enabled gadgets. IoT refers to a state where Things (e.g. objects, environments,

vehicles and clothing) will have more and more information associated with them and may have the ability to sense, communicate, network and produce new information, becoming an integral part of the Internet."

Another good example that uses this concept is a smart and automated parking application [9] that helps the driver to discover available parking lot spaces quickly without circling of crowded city area around the parking lot. The smart parking application encompasses digital payment which is fast and hassle free.

There are so many places where this evolving concept is being used to gain advantage in. Another good example would be an Internet based AI application which keeps track and manages the Inventory control. Similarly, smoke detector application can help to warn the individual if any smoke is detected.

2. Use Cases For Smart Sustainable Cities :- Let's start with the simplest of question, what makes us declare that a city is "smart"? Going into details further, following are few ways in which AI along with IoT is helping to see and realize the smart city concept [10].

A. Smart Automated Parking :- If we talk of transport and infrastructure in Indian cities, getting a place to park the car is the most difficult task usually. AI and IOT can help in this scenario. There can be display boards displaying the information about parking spaces. Once this vital data is captured, it can be processed for providing actionable insights and real-time parking map [11].

B. Waste and Dump Management :- One of the goals of smart sustainable cities is an environment friendly and a clean city. Most Indian cities are working on this goal under the name of Swach Bharat Abhiyan. With AI working in coordination with IoT, it has become easier for city's civic authorities to remotely monitor waste levels. [12].

C. Public Safety :- This is one of the basic necessities of a smart city. A lot has been done by the governments to make these cities secure and by applying real-time surveillance, data analytics and higher-level decision-making, artificial intelligence (AI) and IoT can help public safety in our cities. [13].

D. Road Traffic :- A major objective of a smart sustainable city is to allow commuters to get from one corner of the city to another safely and as quickly as possible without traffic snarls. To get this goal fulfilled, cities are turning to the use and application of IoT and AI-enable traffic solutions [14].

E. Water and Power :- A developing nation needs regular and affordable water and power supply. By giving them more authority over utilities, AI helps smart cities to minimize costs and the consumption. With AI and IoT, it is possible to regularize the use of water and power in a city. Water and power conservation is possible which will help in sustainability [8].

Summary and Conclusion :- Smart sustainable cities are those urban areas which follow goals of sustainable development. These are the cities which minimize wastage of natural resources and are environment friendly in nature. It is a beautiful and a systematic connected city with wonderful infrastructure, quality education and advanced affordable healthcare facilities. We all would want to be a citizen of this environment friendly smart city having all the facilities and resources at our disposal. Technology has played a major part in making cities smart and sustainable. Smart homes is one of the component of this smart city planning and well known builders are selling smart homes fitted with all the IoT and AI devices that makes the citizens share the facilities even from remote locations and be connected to their families.

We have always been dreaming of smart cities with full interconnectivity of intelligent vehicles, driverless cars along with normal cars and smart hi-tech buses all connected with each other. They are in turn hooked with smart intelligent e-highways, smart traffic lights with sensors and automated vehicle parking lots. The smart sustainable city will work together to change life with a promise of betterment and safety. Smart city will be a fully connected intelligent system that will save human lives through prompt actions, save precious resources continuously and save fuel which is the need of the hour. It has been a dream which is getting fulfilled now. This will soon become a reality which will be possible as the government moves towards requiring technology built into new vehicles in the future which helps in fulfilling the sustainable development goals.

We would want India to progress fast and have unlimited smart sustainable cities. We have the capabilities and the expertise too. It is in the interest of Indian cities to adapt and welcome AI and IoT solutions with positivity and the intent.

References :-

1. Gartner Says a Thirty-Fold Increase in Internet-Connected Physical Devices by2020 Will SignificantlyAlterHow the Supply Chain Operates, http://www.gartner.com/newsroom/id/2688717

2. IBM Connects “Internet of Things” to the Enterprise, http://www-03.ibm.com/press/us/en/pressrelease/46453.wss
3. IDC: 30 Billion Autonomous Devices By 2020, https://securityledger.com/ 2013/10/idc- 30 billion-autonomous-devices-by-2020/
4. Seize New Product and Revenue Opportunities with the Internet of Things, http://www.cisco.com/web/solutions/trends/iot/portfolio.html
5. Forecast: The Internet of Things, Worldwide,2013, https: // www.gartner.com/doc/2625419/forecast-internet-things-worldwide-
6. Aawatif Hayar & Gilles Betis Frugal Social Sustainable Collaborative Smart City Casablanca paving the way towards building new concept for “Future Smart Cities By and for All”, IEEE SENSET 2017 Conference Lebanon
7. https://riberasolutions.com/smart-city-iot-and-ai/
8. https://iagre.org/internet-of-things-main
9. A.Khanna and R.Anand, "IoT based smart parking system", 2016 International Conference on Internet of Things and Applications (IOTA), 2016.Available: 10.1109/iota.2016.7562735.
10. https://achievion.com/blog/how-artificial-intelligence-ai-is-helping-to-make-the-smart- cities-concept-a-reality.html
11. T.Kilic and T.Tuncer, "Smart city application: Android based smart parking system", 2017 International Artificial Intelligence and Data Processing Symposium (IDAP), 2017.Available: 10.1109/idap.2017.8090284.
12. R.Elhassan, M.Ahmed and R.AbdAlhalem, "Smart Waste Management System for Crowded area : Makkah and Holy Sites as a Model", 2019 4th MEC International Conference on Big Data and Smart City (ICBDSC), 2019.Available: 10.1109/icbdsc.2019.8645576
13. M.Mendonca et al., "Improving public safety at fingertips: A smart city experience", 2016 IEEE International Smart Cities Conference (ISC2), 2016. Available: 10.1109/isc2.2016.7580772.
14. Z.Arbi, O.Belkahla Driss and M. Sbai, "A multi-agent system for monitoring and regulating road traffic in a smart city", 2017 International Conference on Smart, Monitored and Controlled Cities (SM2C), 2017.Available: 10.1109/sm2c.2017.8071843.