International Journal of Psychosocial Rehabilitation, Vol. 23, Issue 04, 2019
ISSN: 1475-7192

Smart City Applications with Solutions – A Survey

Dr.M. Ashwin, Bhavani Vasantha, A. Roshini and
Dr. Dinesh Kumar Anguraj

Abstract--- A smart city utilizes Information and Communications Technology (ICT) to improve its Livability, Workability and Sustainability. The problems with smart cities are lack of financing, ICT, Integrated Services, Citizen Management and Smart City Visionary. To overcome the smart city problem it utilizes the ICT technology to Enhanced Livability, Workability and Sustainability. The Smart city applications are Smart Building, Smart Energy, Smart Utilities, Smart Administration, Smart Enterprise, Smart Transportation, Smart Security, Smart Retail and Smart Agriculture etc. This study investigates the smart city applications with solutions.

Keywords--- ICT, Smart Devices, Smart City Applications.

I. INTRODUCTION

In most clear terms, there are three zones to smart action: Collecting, Communicating and "Crunching." First, a smart city aggregates information about itself through sensors, varying contraptions and existing structures. Next, it passes on that data using wired or remote structures. Third, it "crunches" (disengages) that data to esteem what's happening now and what's in all probability going to happen straightaway.

Collect - Information about up-to-date conditions over all responsibility zones (control, water, activity, climate, structures, and so forth.).

Communicate- Information, once in a while to different gadgets, now and again to a control focus and some of the time to servers running great programming.

Crunch - Data, breaking down it to exhibit data, to culminate (upgrade) activities and to anticipate what may occur straightaway.

Gathering information: Smart contraptions are constantly engineered all through the city to gauge and screen conditions. For instance, smart meters can assess power, gas and water use with impossible exactness. Smart traffic sensors can cover road conditions and blockage. Smart GPS mechanical get together can pinpoint the right zones of the city's vehicles or the whereabouts of crisis social occasions. Computerized atmosphere stations can report conditions.

Moreover, the mobile phones passed on by various city occupants are additionally sensors that can – when especially upheld by their customers to do everything considered – gather their position, speed, where they collect at different conditions of the day and the trademark conditions around them.

Dr.M. Ashwin, Senior Assistant Professor, School of Computing Science and Engineering, VIT Bhopal, Kothrikalan, Madhya Pradesh, India. E-mail: mailmeashwin@gmail.com
Bhavani Vasantha, Assistant Professor, Department of CSE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, A.P., India. E-mail: vasanthabhavani@gmail.com
A. Roshini, Assistant Professor, Department of CSE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, A.P., India. E-mail: roshinicse22@kluniversity.in
Dr. Dinesh Kumar Anguraj, Assistant Professor, Department of CSE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, A.P., India. E-mail: adinesh@kluniversity.in

Received: 09 Sept 2019 | Revised: 08 Oct 2019 | Accepted: 07 Nov 2019

Imparting information: Once you've gathered the information, you have to send it along. Sharp Smart urban areas ordinarily mix and match a grouping of wired and remote correspondences pathways, from fiber-optic to cell to connect. An indisputable objective is to have compose all over the place, to each individual and each gadget.

Crunching data: After social event and passing on the data, you isolate it for one of three purposes: 1) showing, 2) consummating or 3) foreseeing. In the event that you've perused about " analytics " or " Big Data," at that point you may definitely think about the amazing things that end up conceivable by crunching a lot of information. Vitally, crunching information transforms data into knowledge that encourages individuals and machines to act and settle on better choices.

This starts a prudent cycle wherein information is influenced helpful, to individuals make utilization of that information to enhance choices and conduct, which thusly implies progressively and better information is gathered, in this way additionally enhancing choices and conduct.

The benefits of smart cities are enhanced livability, workability and sustainability. Enhanced livability implies a superior personal satisfaction for city occupants. In the brilliant city, individuals approach an agreeable, perfect, drew in, solid and safe way of life.

Probably the most profoundly esteemed perspectives incorporate reasonable vitality, advantageous mass travel, great schools, quicker crisis reactions, clean water and air, low wrongdoing and access to differing stimulation and social choices.

Enhanced workability deduces enlivened cash related movement. Put another way, it recommends more occupations and better organizations and expanded neighboring GDP.

In the unbelievable city, individuals approach the establishments of accomplishment – the principal structure benefits that let them battle on the planet economy. Those organizations join broadband system; flawless, trustworthy, humble essentialness; enlightening shots; sensible cabin and business space; and powerful transportation.

Upgraded maintainability prescribes giving people access to the advantages they require without trading off the point of confinement of future generations to meet their own specific issues. Smart urban networks connect with the skilled utilization of ordinary, human and cash related assets and push cost sparing in the midst of gravity, and they are cautious stewards of resident dollars.

It isn't connected to placing gigantic sums of money into new establishment, it's connected to impacting system to achieve dynamically and last longer for less.

Received: 09 Sept 2019 | Revised: 08 Oct 2019 | Accepted: 07 Nov 2019

II. LITERATURE REVIEW

Table 1: Comparison between Traditional Cities Vs Smart Cities

S.No	Resources	Traditional City problem	The Smart City Resolution
1	Design	● Specially appointed and scattered ● Cost reserves aren't comprehended ● Limited potential for versatility of theory	• Facilitated and all-encompassing • Resources are shared • Cost reserve funds are completely figured it out ● Speculations are flexible ● Improved city arranging and determining
2	Organization	• Runs wastefully • Costs more cash and resources for run	• Streamlined with forefront progression • Saves cash and resources • Improved association level understandings
3	Framework Operators	• Guess at framework conditions • React to issues • Can't send assets beneficially to address issues	• Enjoy progressing giving a record of establishment conditions • Predict and stay away from issues • Deploy resources essentially more effectively • Automate upkeep • Save cash
4	ICT Investments	• Piecemeal and siloed • Deliver defective favored outlook • Don't grasp economies of scale	• Centrally orchestrated • Deployed across over city divisions and exercises • Deliver perfect bit of leeway • Provide most extraordinary regard and funds
5	Resident commitment	• Limited, scattered online association with subjects • Citizens can't make ideal utilization of city administrations (or then again effortlessly discover them)	• Complete and specific online closeness • Citizens can without a considerable amount of a stretch discover and use associations • Citizens can take an interest in smart city works out • Two-course exchanges among government and individuals • Specialized associations concentrated on the individual occupant • Citizens can both add to and get to predictable shrewd city information
6	Sharing information	• Departments and capacities are siloed • Departments once in a while share information and work together on activities	• Departments and capacities are incorporated as well as shared • Data is shared amongst divisions and better corresponded with other information administrations • Results are moved forward • Costs are cut

Table 2: Smart City Application components with benefits

S .No	Smart City Application Category	Application	Components	Benefits
1	Smart Living [2]	Connected signage	Smart Digital signage	• Easy to plan and alter content • Manage screens remotely • Multi-outline content • Mobile commitment • Data and Analytics • Revenue creating
		City Application to support Tourism and Culture	Smart Tourism app (iBeacon)	This new innovation enables organizations to get significant data from (potential) clients and convey important notices to them dependent on their definite area.
		Event Notification	OpenBack's Mobile App Notification	● Personalization ● Automation ● Easy to use Platform ● Targeting ● Drive Analytics KPI's with actionable Messaging ● Cost Savings
		Public Wi-Fi	Wi-Fi	● Provide a comfort for occupants, understudies, guests, and visitors ● To connect the advanced partition ● Enable IoT-based city administrations
		Associated road furniture	Seats, Tables, Bus stops, Signs, Lightposts, Taxi stands and Even waste repositories	● Solar-controlled charging seat empowers individuals to remain carefully associated, through USB charging for tablets and telephones, and in addition physically associated, by offering them an agreeable place to sit and chat. ● Smart bus shelters — To energize electric vehicles, free Wi-Fi, USB charging ports, vitality proficient LED lights and incorporated constant transport landing data.
2	Smart Safety[3]	Smart care and assisted living	Care@Home Improved Telecare Facilities	**Individual and Proactive** - Predictions and alarming to give prompt care if there should arise an occurrence of exacerbating wellbeing conditions. **Living at home independently** -Confidence in immediate care if needed. **Peace of mind** - Prevention of health deterioration**.** Enhanced and Efficient Services - Smart investigation motor empowering the correct treatment at the opportune time. Consistent consideration encounter - A

Received: 09 Sept 2019 | Revised: 08 Oct 2019 | Accepted: 07 Nov 2019

				self-learning framework without wearables. Anyplace whenever - Real time warning and cautions.
		CCTV and Smart CCTV	Indoor cameras and Outdoor cameras	Motion Detection, Movement, Field of View, Cost, Sound, Resolution, Wi-Fi capability, Night Vision
		Incident Detection	SmartTraffic-AID	● To Detect and episodes and mishaps on roadways ● Fast programmed constant occurrence location with a caution and on-screen show ● It works on Smart Cameras that are IP addressable and can straightforwardly associated with focal framework or roadside unit ● Mobility and Safety
		Crowd monitoring and control	IoT Sensor-led, Wearables-led, Device-led, Mobile network-led	● IoT sensor-led – Using versatile empowered IoT sensors, for example, Bluetooth reference points or IP cameras, to screen crowds. ● Device-led – Enabling a cell phone to give its area through GPS ● Wearables-led – Using wearable gadgets, for example, RFID wrist trinkets, to screen a high thickness swarm. ● Mobile organize drove – Using portable system information to plot the position and movement of a group
		Adaptive lighting	Luminaire Controller	● Up to 90% Energy savings ● Up to 50% Maintenance cost Reduction ● More safety
		Environmental Monitoring(air quality, noise, pollen, water quality, flood monitoring)	Aquaculture, Air quality & Pollution, Water level and flow, flood warning stations and systems	● Automated Water Quality Monitoring & control systems ● Measurement instrument for air quality monitoring ● Measuring water level, Measuring water flow, Sensors for water level and flow measurements ● Choose from standard ALERT, hybrid ALERT, or a customized flood warning system.
		Emergency alerts and notifications	AND IP devices play an integral role in Mass Notification Systems (MNS)	AND IP displays and speakers, organizations can protect its people and property.

		Disease Surveillance and epidemic monitoring	Agent-based models, Metapopulation models (GLEAM, FRED, gravity model)	Epidemic simulation Assessment of disease spread determinants, Design of containment interventions
		Building and infrastructure structural monitoring	OneSpace	Work area the board, Room booking, Visitor Management, Energy and inhabitance Monitoring, Analysis and Optimization.
		Access Control and Perimeter Surveillance	Access Control IoT Devices	The multiple benefits of video surveillance in manufacturing Preventing intruder access at the front door; halting hacker access at the back Opening new doors with IP access control Protecting your business with smart access control **A.** Using smartphones as keys for access control continues to grow
3	Smart Sustainability [4]	Energy Management	PMC/PMD, Smart Power Meter, Power Meter IoT pack and PC side programming	● ICP DAS PMMS (Power Monitoring and Management Solution) is an innovative total solution for energy saving Wireless meter interfaces for load control and data collection ● Reduce energy consumption
		Transport	IoT Devices	● Vehicle-to-vehicle(V2V) arrangements ● Real-time vehicle area data and information ● Predictive, Preventive upkeep ● Safety consistence ● Security breaks ● Extended organize framework ● Increase in investment
		Smart Parking	Parking administration and investigation programming, Smart Parking sensors, Wireless Communication System (LPWA), Driven Dynamic Message Signs(DMS), Standardized API, Mobile App	Advanced stopping, Reduced traffic, Reduced contamination, Enhanced User Experience, New Revenue Streams, Integrated Payments and POS, Increased Safety, Real-Time Data and Trend Insight, Decreased Management Costs, Increased Service and Brand Image
		Traffic Management	Bluetooth and Wi-Fi sensors, Management and investigation programming, Wireless Communication System, Electronic Variable Message Signs (VMS), Standardized API and	● Improve mobility technique ● Manage and streamline activity continuously ● Make quicker choices in light of every minute of every day data ● Save assets through quick usage and upkeep

			Mobile App	● Reduce the quantity of mischances ● Decrease blockage and spare time for crisis vehicles and open administrations ● Postpone the need to build extra street limit
		Bicycle Sharing	Bicycle	Diminishing contamination, Congestion, travel expenses and Oil reliance, while improving general wellbeing
		Smart Lighting	Smart LED lights	Dimming, Controlled by a mobile device, Colors, Music and sleep
		Public space water management	Water Management Device, Bulk Water Management Device and utiliMeter	Economic Savings, Improved services, Improved waste water management, Increasingly productive treatment, Environmental assurance and improvement, Reduced carbon discharges, flood control and tempest water the board and Greater flexibility
		Waste management	ISB Smart Bins – Bin Sensors	UK based ISB Global is utilizing IoT controlled applications to oversee squander. Utilizing propelled bin-level sensors, cloud-based information gathering and a shrewd application, ISB has made a system of associated gadgets for compelling waste administration

III. CONCLUSION

The crucial the Smart Cities application with arrangement direct is to shown you the way to turning into a city of things to come – a smart city with upgraded reasonableness, functionality and maintainability. It will take position to consolidate those features with a thorough smart city plan that has the assistance of individuals when all is said in done.

Yet, stunning favorable circumstances anticipate those urban communities that try. Their citizens will have a more advantageous, more joyful place to live alongside better, higher-paying occupations and the greater part of that in a maintainable manner that doesn't victimize from the people to come.

REFERENCES

1. Jesse Berst, Liz Enbysk and Christopher Williams, “Smart Cities Readiness Guide” by 2013 Smart Cities Council.
2. https://www.gpsintegrated.com/
3. https://www.wirelessintegrated.com/
4. https://www.bioenabletech.com/

Received: 09 Sept 2019 | Revised: 08 Oct 2019 | Accepted: 07 Nov 2019