



Design and Implementation of Integrated Approach for Smart Rural Development

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ABSTRACT: Human culture is creating with fast energy and accomplished different triumphs for improving its occupation. Human progress is an observer for different changes identified with its development through various impetuses like mechanical development, science, and so forth. Today's technology has demonstrated its potential in different divisions of development in urban and rural landscapes. Urban territories appear to increasingly slant to acknowledge and embrace Information and communication technology because of points of interest of proficiency and better framework when contrasted with rural regions. Because of such appropriate circumstances of urban landscapes great measure of accomplishment of this technology is noticeable as shrewd urban areas and better vocations of living people. Be that as it may, the issues, outcomes, and openings in urban zones are diverse for powerful usage of Information and Communication Technology for practical development of rural masses. The current research article talks about rural development in the creating scene for the Upliftment of work of the rural masses and to take a 'Look-ahead' at logical developments and advances that may be powerful throughout the following 10 - 20 years. The driving inspiration driving the idea on "Brilliant Village" is that the technology should go about as an impetus for development, empowering instruction, and neighborhood business openings, improving wellbeing and government assistance, upgrading law-based commitment and by and large improvement of rural town occupants. The "Smart Village" idea intends to understand its objective through giving policymakers shrewd, base up examinations of the difficulties of town development.

KEYWORDS: Information Technology, Rural, Smart Village, Sustainable Development

I. INTRODUCTION

At a point while "India lives in its cities" stated Mahatma Gandhi, an exceptional political dissident and visionary pioneer of India. A rural territory is a geographic region this is in outdoor urban areas, while rural zones are in any other case known as 'town' in India. In these cities, farming is the crucial wellspring of business along with angling, cabin organizations, ceramics, and so on. As in keeping with the East while planning commission of India, an agreement with a maximum extreme populace of 15,000 is considered as a "town". several India's rural populace lives in nucleated cities, which maximum regularly & have a settlement structure portrayed as an ill-described agglomerate. [1] At present, rural human beings appear up to the authorities for each and the whole lot. People's participation in the improvement sphere is important.

People must be fully aware of the features and uses available. The Indian government is providing the Pradhan Mantri Awaas Yojana Garmin (PMAYG) system, housing, Pradhan Mantri Gram Sadak Yojana (PMGSY), Road Construction, Mgnrega Mahatma Gandhi national rural employment guarantee act (MGNREGA) has been come into existence. The National Mission of Rural Life is not only a variety of health conditions, but also promotes qualified wage employment capabilities to reduce poverty, and rural revenue has increased significantly on sustainable standards. This plan plays an important role in Indian rural development.

Being a rural overwhelmed nation, the smart idea isn't pondered the rural territories. All zones which are not arranged as urban territory are considered as rural zone. Number of rural units or towns in India have expanded from 6,38,588 [9] to 6,40,867 [10]. As indicated by 2011 statistics, rural territory has populace of 68.84%, while urban zone has populace of 31.16% as it were.

It is developing reality that the rural populace is languishing more results over employment when contrasted with urban zones. The troubles of job might be driving rural populace to relocate to cities. The administration has just perceived this issue and has invested genuine amounts of energy through different plans for upgrading work of rural masses. Rural development basically centers on neediness lightening, better business openings, arrangement of Fundamental luxuries and foundation offices through inventive software engineers of independent work.



The populace dwelling in the rural territory additionally needs a similar personal satisfaction as delighted in by individuals living in sub urban and urban zones. Better business in rural region may lessen upsetting impacts of neediness, joblessness and insufficient framework on urban focuses causing ghettos and considerable social and financial strains. Thus, rural development is worried about financial development and social equity, improvement in the expectation for everyday comforts of the rural individuals by giving sufficient and quality social administrations and least fundamental needs gets basic.

Such rural development improve job in rural region, yet additionally may diminish the movement of rural populace in urban territories for business and decrease pressure on urban framework.

Such changes are not exceptionally extraordinary for people as human progress has gone through different periods of development. A portion of the achievements, which are observer to this development, are Prehistoric age, Stone Age and so forth.; the present time of human development is stopped ahead and prominently known as "Brilliant age". People are utilizing advanced mobile phones, shrewd TVs and live in brilliant homes. The idea of astuteness is mainstream in regard of human development independent of rural or urban zone, proficient or ignorant in all the nations and India isn't exemption to it. In the same way as other creating nations, India also is a rural overwhelmed nation. However, the attention to the brilliance idea is very much perceived by the organizers and approach creators, yet not viably executed for the rural zones.

As of late, there is a gigantic enthusiasm for the development of Smart Cities [08]. Making a city "brilliant" is developing as a methodology to relieve the issues created by the urban populace development and fast urbanization [11]. All around, the idea of 'Shrewd City' is a critical activity that looks to improve the personal satisfaction of urban residents.

Shrewd Cities the nation over can possibly be a distinct advantage in the nation's urban scene and the lives of standard residents. The shrewd city activity is having acceptable potential for urban development and India has additionally perceived this potential and is at the edge to begin actualizing this idea. This will encourage better living for about 30% of the populace, who live in urban territory. In any case, the greater part populace won't be profited by keen city development. Conditions in the rural zone are altogether different when contrasted with urban, so a similar model of the brilliant city can't be actualized for the towns. The endeavors of rural development may not take a shot at a similar guideline as of the keen city.

But rural areas play a crucial role in overall economy of the country. To meet the basic needs of people, The economic development should touch the life of people and integrates the people, process, and technology, taking advantage of the revolutionary impact of the internet. The government is facing massive challenges in today's highly competitive market and trying to acquire the maximum possible development. But due to political interference it is taking time. The economic development can be successful if the design and implementation of the government's processes are according to the changes happening in the rural areas. The economic development of the rural areas can be by the government through the establishment, development, maintenance of long term mutually valuable relationships between the business and macroeconomic environmental variables for smart rural development.

Henceforth, usage of Information Technology, which has demonstrated its potential for the development, might be utilized for rural development through an idea of "Brilliant Village". The Smart Village idea will be founded on the nearby conditions, foundation, accessible assets in the rural zone and neighborhood request just as capability of fare of good to urban zones.

Despite several public infrastructure development initiatives in rural India, progress is largely inadequate as facilities remain poor and performance varies from state to state. Estimates of regression coefficients for compound indicators and individual rural infrastructure indicators show that improved physical and social infrastructure and livelihood opportunities increase agricultural productivity and productivity, improve literacy and life expectancy, poverty, and infants. It has been shown to reduce mortality [3]. The results show the relative importance of various infrastructures such as health, education, transportation, and self-employment, with additional investment by the government in electricity, roads, irrigation, housing, and telecommunications to improve overall well-being.

In the Indian setting, towns are the core of the country. Thus, for the development to permeate to the grass-root level, the center must be committed to the advancement of towns and to tidy the rural populace utilizing ICT answers to accomplish self-maintainability.

Imbalanced development among rural and urban landscapes prompts the test of quick urbanization in effectively packed Indian urban masses. One of the primary results of uncontrolled urbanization is the absence of employments, a great way of life and civilities in the towns of India. Shrewd town idea may assume a vital job in keeping up the harmony between the development of rural and urban zones and help to diminish relocation of rural populace in urban regions. Urban populace thickness is expanding in an uncontrolled way, while the quantities of urban areas are yet insufficient to oblige the moving populace from towns. This should be turned around and reasonably figured out how to improve personal satisfaction in Indian urban areas.

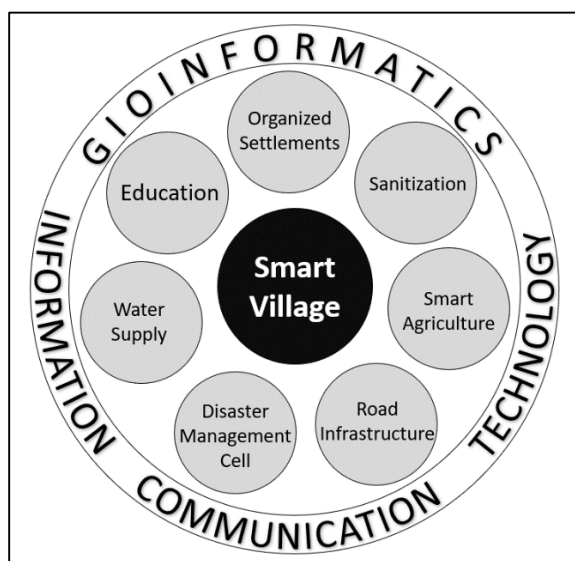


Fig. 1 Core Smart Village

The idea of a "smart village" also addresses a variety of challenges, including voluntary urbanization, urban development, relocation for financial reasons, and a better life.

The government has already taken the initiative to improve the condition of the village. This covers most of the critical aspects of development. The only task that remains is better implementation and monitoring. Along with the government, local people must also contribute to the success of the development program [2]. Therefore, the ideal approach could involve governments, Panchayati, village staff, researchers, industry, and NGOs and the Intelligent Rural Development Project is this platform, pooling all possible resources for development.

II. NEED FOR SMART VILLAGES

The town networks are little republics, having about everything that they need inside themselves, and practically autonomous of any remote relations [7]. In the development procedure, there will be numerous adjustments in the interest and supply of different needs, as rural populace will go through the procedure of progress. At present, one of the significant difficulties in India is developing populace and quick urbanization. This urban development to certain degree is unavoidable, as the financial interests and desires of the populace do change and advance. This should be switched and reasonably oversaw through a harmony among rural and urban personal satisfaction. The idea of "Smart Village" will address the various difficulties looked for economic development of rural India.

The "Smart Village" provides urban networks with long-term social, financial, and natural government support movements, fosters, and enables interest in neighborhood forms of governance, and promotes business ventures, Build a stronger network [12]. At the same time, the "Smart Village" guarantees legitimate sanitation offices, better education, a better environment, clean drinking water, health centers, state assurance, asset utilization productivity, controlled waste, sustainable energy sources and more. These all aspects and resources have been observed to be very essential to achieve the goal of "Smart Village"



There is a dire requirement for structuring and creating "Smart Village", which are free in offering the types of assistance and work but then very much associated with the remainder of the world. In view of different projects embraced taken by Central and state governments alongside further mechanical activities, the Smart Village can accomplish SMART foundation, SMART help conveyance, SMART technology and development, SMART establishments alongside ideal assembly and usage of accessible assets, prompting quicker and progressively comprehensive development. A 'Smart Village' will envelop a reasonable and comprehensive development of all segments of the town network, so as they appreciate an elevated expectation of living.

By reading magazines, Watching the news, research reports and news, we witnessed a huge nutritional crisis in Sri Lanka last year due to improper agricultural practices [5]. The situations for the development of sustainable agriculture are becoming more and more favorable for rural development, except in some areas of India. New opportunities open the eyes of farmers, development workers, researchers and policymakers from Agriculture, dairy, poultry farming, cattle management, and fishing business. Now is the time to understand the potential and importance of these practices not only for the economic benefit of them but also as the basis for further strengthening our villages and overall environmental sustainability.

III. DEVELOPMENT OF SMART VILLAGES

Unmistakably the circumstances and difficulties in creating urban and rural region are distinctive because of the requirements and openings. Numerous scientists accept that the current advances produced for the smart city might be helpful for the smart village idea. Scientists [12] revealed that the Smart village framework can be created on the lines of smart city model. The parts taken in to thought will fluctuate from area to district for villages, in view of the accessible assets and openings.

Each village we observe is a unique example. With various problems and situations due to a lack of resources and services, it can be difficult to implement the same rural development model in all underdeveloped areas. [14] To address this complex issue, public-private partnerships (PPPs) can play an important role in the development of smart villages. The benefits of the smart village efforts are foreseen to be tremendous because villages play an important part of the country, so the benefits of smart village efforts are expected to be enormous. The smart village concept is likely to be imitated in other developing countries. The concept of smart villages can be extended to the small towns and communities surrounding urban areas.

Following are some summed up rules for the development of Smart Villages:

1. Financial Component: This part will incorporate the nearby organization and monetary elements. It will cover administration models, transmission capacity, portability, distributed computing, business enterprise and so on. Some of the governmental investment that are helping in the financial development of rural areas are as follows:

- Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) continues to a department's budget decreased by 13% this year.
- Funds allocated for the rural roads scheme; Pradhan Mantri Gram Sadak Yojana (PMGSY) has seen an increase of 39% from the revised estimates of 2019-20.

2. Natural component: The environment that sustains human populations is utilized by people in many ways. Farms and forests supply international locations with a huge variety of critical uncooked materials: timber, wooden, pulp, minerals, leather-based, and foodstuffs, which are in addition processed into synthetic items along with lumber. paper, prescription drugs, shoes, and flour. these uncooked substances and completed products are crucial to the monetary security of the use of a and to the meals protection of its citizens. Water assets are crucial for the existence and are harnessed as a vital input for financial increase, along with agriculture and enterprise. herbal resources also offer rural human beings with food, medicines, sport, honey, gums and resins, condiments and other goods which can be exchanged or used for secondary processing and contribute greatly to rural subsistence economies.

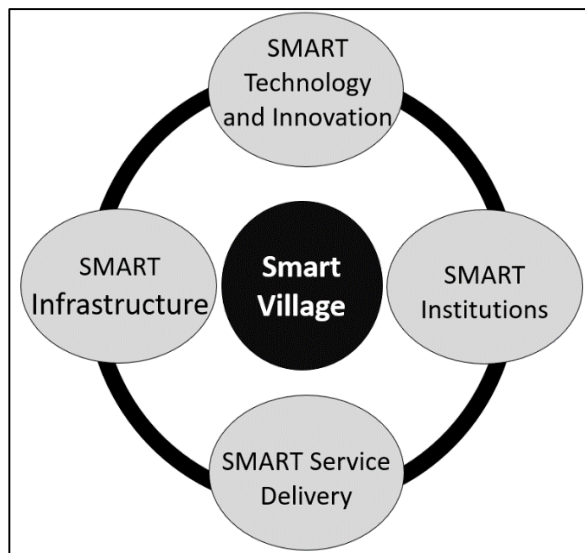


Figure 2. Components of Smart village

3. Social factors: Due to the large differences inside and outside the villages, it is very difficult to generalize the characteristics of rural areas, even if limited to so-called developing regions. It is also particularly difficult to generalize, financial, geographical, and social characteristics, as regional changes tend to be very high. Such changes are due to differences in social status, behavior, and attitudes of individuals and small groups. For example, it should come as no surprise to find significant social differences between neighboring villages in the same agricultural economic environment. This has a significant impact on social analysis. This means that decisions that affect the lives of people in the area should not be made based on inadequate or overly general information about the social characteristics of the area and rather should be done on independent surveys and information. This means that obtaining basic information about the social characteristics of the region is an important part of social analysis.

Human society is developing at a rapid pace and has made various achievements to improve our lives. Civilizations are witnessing various changes related to their development through various catalysts such as industrial development, green upgrades, and science and technology. Today's era is expanding with information and technology. This technology proves its potential in various areas of development, both urban and rural.

Urban areas are seeming to more inclined to accept and adopt Information and Technology due to advantages of literacy and better infrastructure as compared to rural areas [15]. Due to such suitable situations of urban areas have good amount of success of this technology is visible in the form of smart cities and better livelihood of residing people. But the problems, consequences and opportunities in urban areas are different for effective utilization of Information and Technology for sustainable development of rural areas. The research article discusses about rural development in developing world for the growth of livelihood of the rural areas and to look ahead at scientific developments and technologies that might be influential over the future one to two decades.

The driving motivation behind the concept on "Smart Village " is that the technology should acts as a catalyst for development, enabling education and local business opportunities, improving health and welfare, enhancing democratic engagement and overall enhancement of rural village dwellers. The "Smart Village" concept aims to realize its goal through providing policymakers with insightful, bottom-up analyses of the challenges of village development.

IV. IMPLEMENTATION OF THE SMART VILLAGE SYSTEM

The issue with the already created system is the clearing procedure starts when a few cases are registered for assistance. The setbacks with the most elevated need are moved to a triage classification particular gathering point for facilitate nearby treatment or potentially transportation and the strolling injured (green) are promptly isolated from all the more genuinely harmed losses through great group correspondence and control; the greater part of these setbacks could be dealt with in a dire care focus, center, or private doctor



workplace. Dead casualties are proposed to be exchanged to a secluded location and our commitments incorporate outlining two easy to understand emergency safeguard applications with upgraded instrument for finding region.

The point of the undertaking is that it contains two fundamental parts: Android cell phone running the applications, the server. It gives constant following of casualties and responders utilizing a mobile following system conveyed by every responder. It presents coordinated effort instruments between the responders and episode leader. It gives novel perception instruments to responders, for example, Augmented Reality. It additionally screens and records all data amid the occurrence, equipped for creating legal documents and reports.

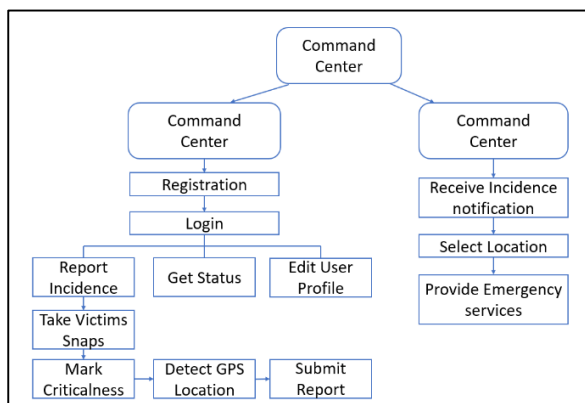


Figure 3: Flowchart of the System

Our Project depends on the location gave by the GPS Module i.e. The Latitude and Longitude of the situation to be found. The above outline speaks to the Architecture of the system. Any User can report an incidence happed. To report user just needs to take few snaps of the accident spot & Victims, the Geolocation of the spot of incidence will be detected by the GPS automatically.

To report user just needs to take few snaps of the accident spot & Victims, the Geolocation of the spot of incidence will be detected by the GPS automatically. After retrieving the geographic location, the user must mark the severity of the event that occurred and submit a report. The report is forwarded to the nearest hospital using Command Server. When the notification arrives at the hospital (we call it a "responder"), it must be confirmed and approved by the hospital. Using GPS, any available ambulance is diverted to the given.

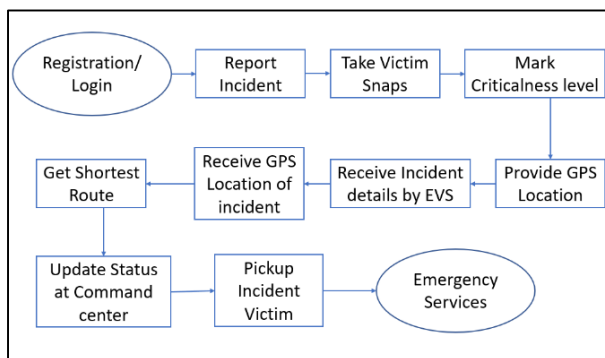


Figure 4: Block Diagram

Coordinates as this assures the patient would reach the nearest doctor's facility as soon as possible. This could help save those precious seconds which would be a differentiating factor between the life and death of the patient.

Algorithm to finding the shortest route is as follows:

1. $G(V, E)$: weighted directed graph, with set of vertices V and set of directed edges E ,
2. $w(u, v)$: cost of directed edge from node u to node v



3. v (costs are non-negative).
4. Links that do not satisfy constraints on the shortest path are removed from the graph
 - s : the source node
 - t : the destination node
 - k : the number of shortest paths to find
 - P_u : a path from s to u
 - B is a heap data structure containing paths
 - P : set of shortest paths from s to t
 - $count_u$: number of shortest paths found to node u

Algorithm:

```
P=empty,
count_u = 0, for all u in V
insert path  $P_s = \{s\}$  into B with cost 0 while B is not empty and  $count_u < K$ :
let  $P_u$  be the shortest cost path in B with cost C
 $B = B - \{P_u\}$ ,  $count_u = count_u + 1$ 
if  $u = t$  then  $P = P \cup P_u$ 
if  $count_u \leq K$  then for each vertex  $v$  adjacent to  $u$ :
if  $v$  is not in  $P_u$ , then
let  $P_v$  be a new path with cost  $C + w(u, v)$  formed by concatenating edge  $(u, v)$  to path  $P_u$ 
insert  $P_v$  into B
Return
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V. CONCLUSION

Smart Villages are the need of great importance as development is required for both rural and urban territories for better vocation and Information technology will offer compelling arrangements. There are effective advances accessible, which have been actualized in urban territories. There is a huge weight on urban landscapes because of the movement of rural individuals for occupation. Smart Villages won't just decrease this relocation yet additionally inundate the populace stream from urban to the rural territory. ICT/IT and GIS are the unbreakable columns to help the entire procedure of village development. Smart village idea will possibly inspire the grass-root level of the nation, thus including plume in the general development of India.

Our framework is an IT-upheld understanding administration framework for normal crisis administrations. For the plan and usage of the framework and incorporated working methodology has been performed at all development stages. Our area-based smart help framework is an android versatile application utilizing Google Map, database as a focal server involving information of the mishap between User and authority. The proposed framework is utilized to inform the emergency clinics, or legal authority about the accidents occurred or any necessary assistance through the single entry of interface.

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