

SMART RURAL HEALTHCARE AND TELEMEDICINE SYSTEM DEVELOPMENT PLATFORM

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Abstract: The utility of telemedicine is of prior importance in the survey of this particular domain. The backward place of our country needs to have proper developed healthcare units in order to decrease the illness rate. To achieve this, the Seva Kendras in the rural areas are made to tie a pact or deal with the well equipped city hospitals to provide adequate amount of medication, assistance and doctor's guidance. This Set-up is designed so as to provide a hassle-free and accurate medication and diagnosis for the people of the rural area who are unaware of their health conditions due to unavailability of adequate equipment in the health centers.

Health cards linked with Aadhaar cards are used to store medical details of the patients which can be monitored digitally through smart medical ATM and e-pharm facilities. A central server is built for the coordinated functionality of the devices. This will further help decreasing the death rates and illness of those areas.

Index Terms-Telemedicine, Smart automated machine, E-pharm

I. INTRODUCTION

Telemedicine uses telecommunication and information technology to provide remote diagnosis and treatment of patients. The benefits of telemedicine and its monitoring systems are the main scope of interest discussed in this paper. It is used to improve access to medical services that is not available in distant rural communities so that hospitals in the rural areas can provide emergency medical services. Patients who are diagnosed have improved outcomes and less costly treatments. Medical conditions which cannot be diagnosed without the physical presence of the patient can be done by monitoring medical histories to keep a check on medical dosage. It makes medicine intake and therapy more convenient to track. A ratio was calculated of the population of the area to the number of hospitals of the area and a comparative study of kolkata was done with Mahishadal, Nanadakumar. It was seen that the total population of Kolkata is 45 lakhs[1] and the number of hospitals is close to 100 including government and private hospitals, whereas in the rural areas of Mahishadal and Nandgram the population count is approximately 2.5 lakhs[2,3] and the number of hospitals is round about 4-5. The hospitals in Kolkata are multi-specialized and have an advanced infrastructure with all modern equipments and doctors, the scenario of mahishadal and nandakumar is far worse. Hence, We aim to develop a platform where those backward communities would be benefited

II. EXISTING TELEMEDICINE SETUP

Telemedicine uses telecommunication and information technology to provide remote diagnosis and treatment of patients. The benefits of telemedicine and its monitoring systems are the main scope of interest discussed in this paper. It is used to improve access to medical services that is not available in distant rural communities so that hospitals in the rural areas can provide emergency medical services. Patients who are diagnosed have improved outcomes and less costly treatments. Medical conditions which cannot be diagnosed without the physical presence of the patient can be done by monitoring medical histories to keep a check on medical dosage. It makes medicine intake and therapy more convenient to track. A ratio was calculated of the population of the area to the number of hospitals of the area and a comparative study of kolkata was done with Mahishadal, Nanadakumar. It was seen that the total population of Kolkata is 45 lakhs[1] and the number of hospitals is close to 100 including government and private hospitals, whereas in the rural areas of Mahishadal and Nandgram the population count is approximately 2.5 lakhs[2,3] and the number of hospitals is round about 4-5. The hospitals in Kolkata are multi-specialized and have an advanced infrastructure with all modern equipments and doctors, the scenario of mahishadal and nandakumar is far worse. Hence, We aim to develop a platform where those backward communities would be benefited prepare their reception, hitherto impossible to achieve. In 64% of the cases the communication system enabled the use of vehicles from other establishments, reducing the mean time employed for evacuation from 8.61 hours to 5.17 hours (60% reduction)[1]. 93% of the health staff covered by the project consider it fast and easy to make consultations and as a result the employment rate of the area increased as the pilot project trained and involved some of the people of those areas too[4]. Hence the programme experienced demonstrates considerable improvement of the isolated rural systems by means of systems and services of the developed bodies as well as appropriate methodologies to support the technological transfer.

Henceforth we intend to build a central server in the form of a website using cloud computing which would connect the Seva Kendras with the government hospitals of the city, as well as e-pharmacy and a smart ATM would work as a temporary health monitoring platform in absence of a medical personnel.

III. IMPLEMENTATIONAL SCOPE

Following the survey as discussed in Section 1.3, a similar survey was conducted in few of the noteworthy hospitals of Kolkata and simultaneously in some of the rural wards of Mahishadal and Nandakumar and implementational scope was spotted.

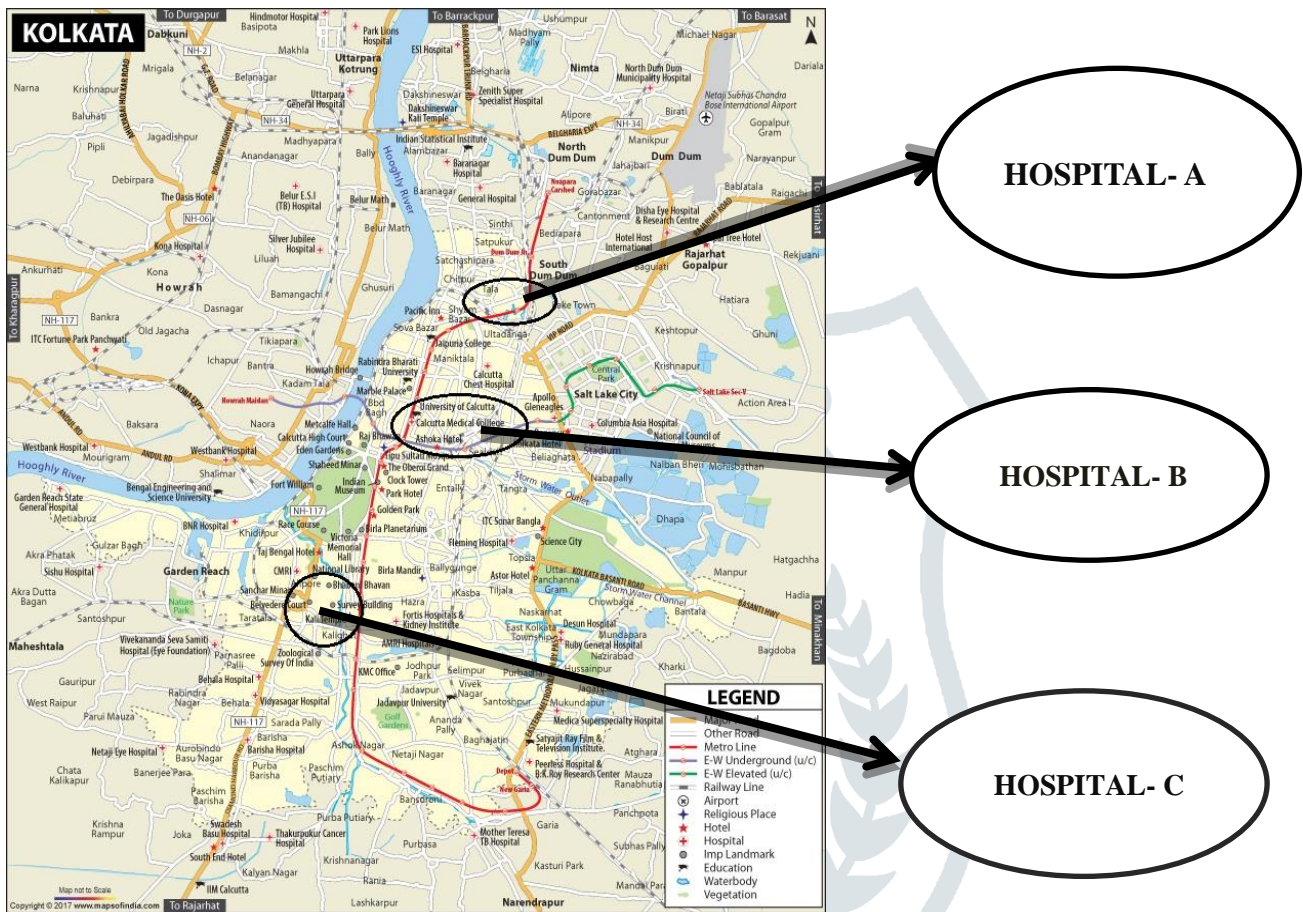


Figure1:Major considerable Hospitals in KOLKATA

Kolkata being a city has some of the noteworthy hospitals among which Calcutta Medical College & Hospital, Chittaranjan National College and Radha Gobinda Kar College & Hospital can be selected for the pilot project. These hospitals are considered as the reference point for the Seva Kendras of the rural area. In this setup the Seva Kendras act as the medical centres for 3 wards of Mahishadal and Nandakumar. The Seva Kendras would be equipped with the following facilities:

- Basic infrastructural setup
- Basic medical technological setup (No OT services would be available
- One Doctor+ One Nurse+ Two Intern Doctors+ One B.Pharm + One Intern B.Pharm
- E-Pharmacy
- Smart Medical ATM
- CHC : Community Health Centre which is the third tier of the network of rural health care institutions.
- PHC : Part of the Health Care.

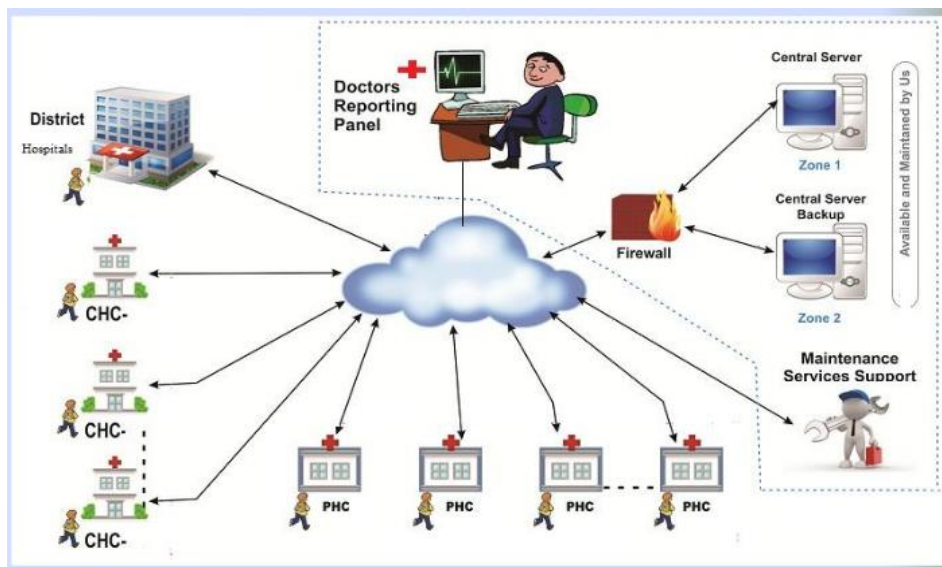


Figure 2: Proposed Telemedicinal setup (CHC: Community Health Centre which is the third tier of the network of rural health care institution, PHC :Part of the Health Care.)

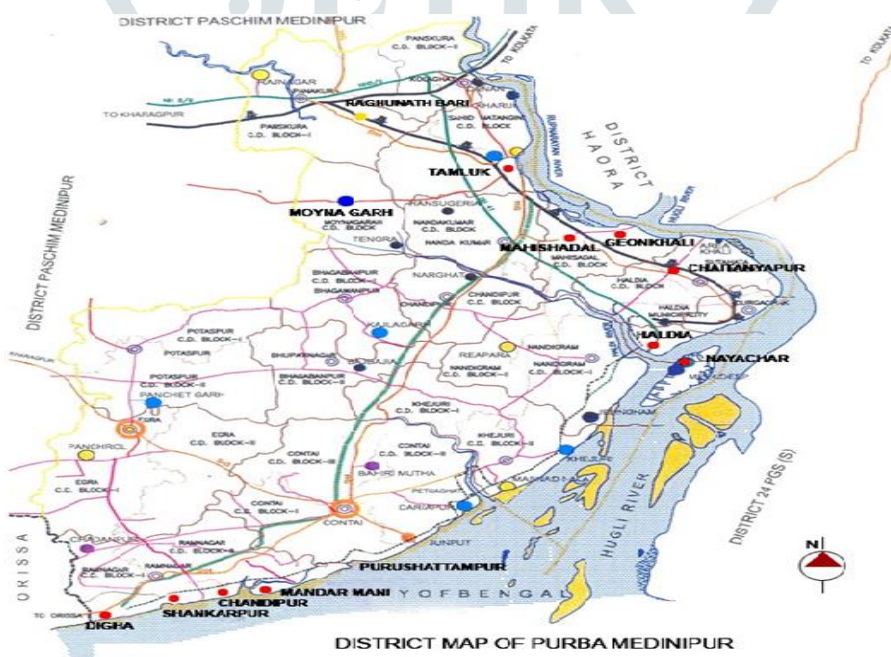


Figure 3:Implemented area(District map of Medinipur)

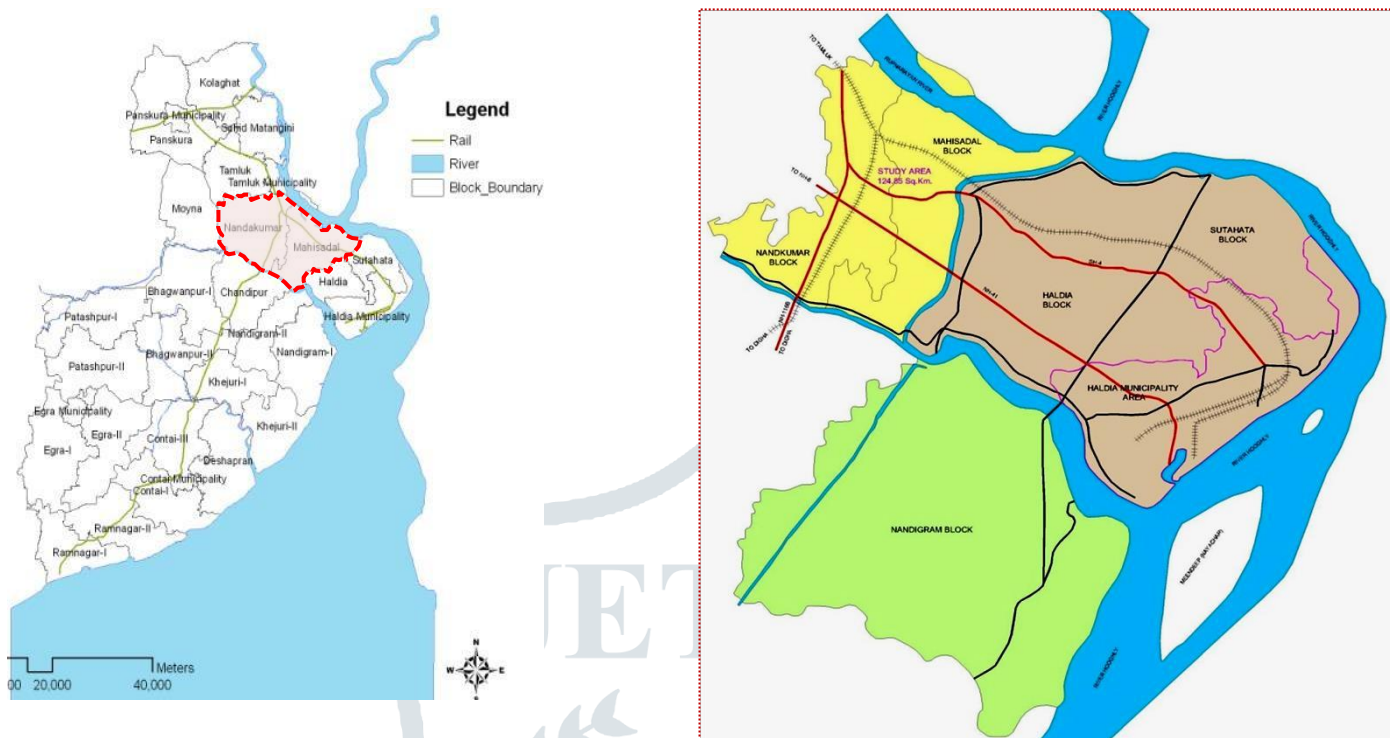


Figure 4: Detail implemented area Map (Haldia)

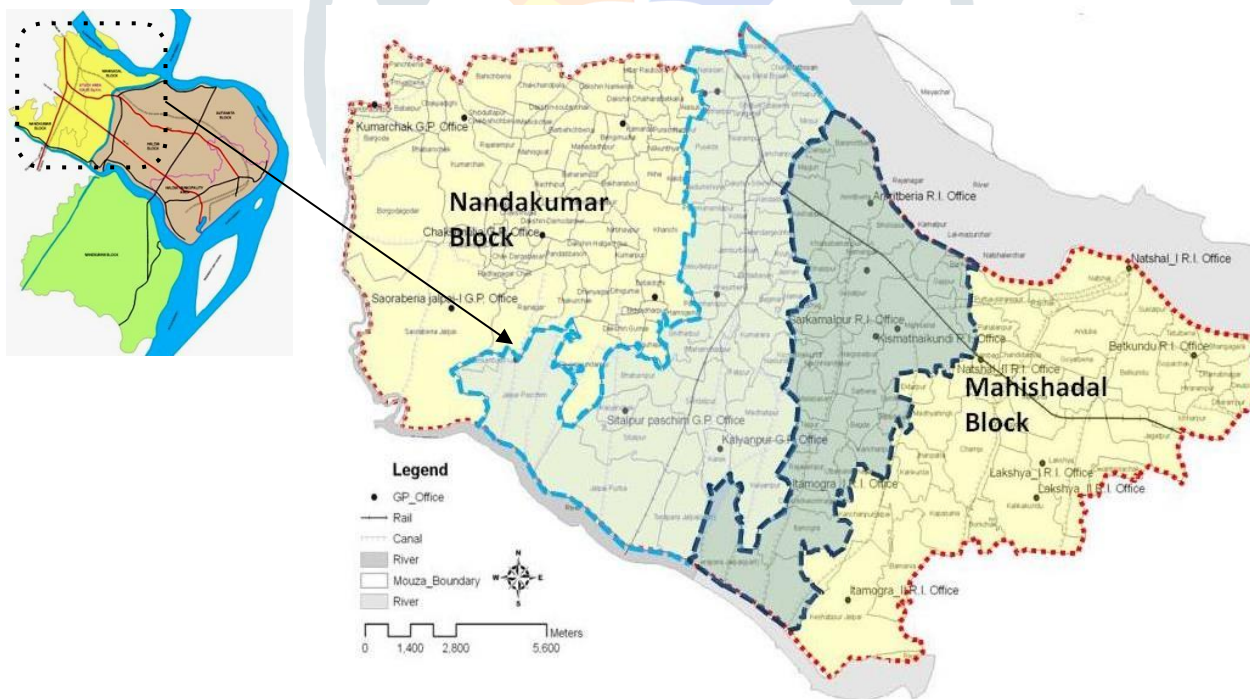


Figure 5:Detail Implemented Area(Mahishadal And Nandakumar)

The E-Pharm and the smart medical ATM as discussed before would be operated through a smart card which would remain connected to the Aadhar card or Aadhar card itself can provide the dual service and access to those accounts would be biometric in nature for the patients as well as for the doctors and other medical personnel. If Aadhar card be used for dual purpose then no

unique ID number for smart card would be required. Henceforth, Adhar card would provide a banking as well as healthcare facilities accordingly. The smart medical ATM would consist of the following sensors:

- Temperature
- Blood Pressure
- Sugar level
- Pulse
- Oxygen Saturation Level

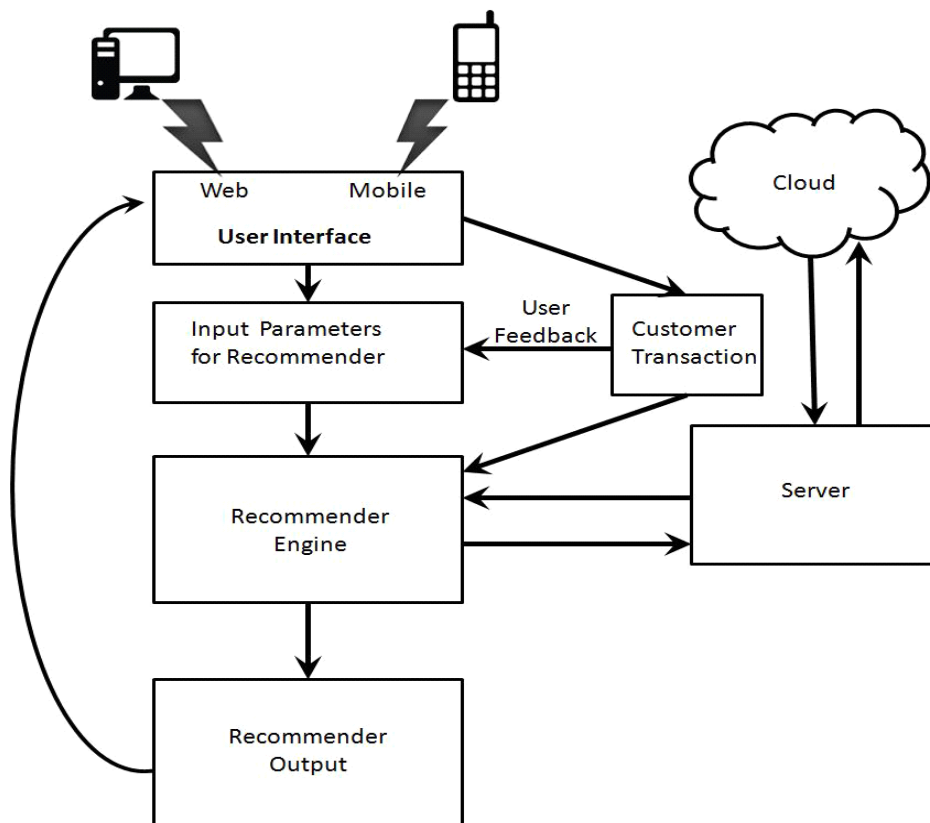


Figure 6: Smart Medical ATM Block Diagram

The ATM after taking the above measurements would generate a general medical report of the respective patient. The entire system is automatic thus reducing the need of human resources. Every patient under the Seva Kendra would have to have a monthly checkup in this ATM so that their respective doctors can monitor their health. Since the datas would be represented in graphical form hence deteriorating conditions could be easily monitored.

IV.RESULT

This graph below depicts the result of temperature and pulse sensor. The sensors are used to measure the body temperature and pulse rate of the patient.

And the graph below is an example of a patient’s temperature and pulse.

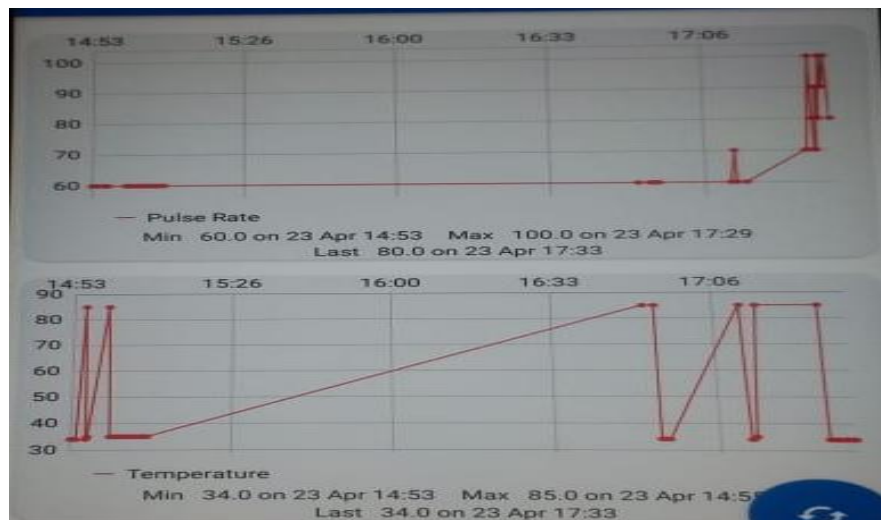


Figure 7: Sample Temperature and Pulse Rate for patient

V. APPLICATION

The model hence proposed has various implementational scopes. Like for the upper middle class of the society a smartphone with the sensors incorporated can serve the purpose of daily health monitoring and the unique username and password with Adhaar linked can be generated the same way as the Seva Kendras. The entire setup would be portable in this case as it remains incorporated in smartphones.

It has implementational scopes in corporate sectors as well as hotels for e-health monitoring of their employees and customers and these having an easy access facility with the hospitals would be beneficial in emergency cases

VI. REFERENCES

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