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COMPUTING FOR RURAL PUBLIC BUS TRANSPORTATION

Dr. P P Patil

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Authors Correspondence

First Author
Associate Professor
Bharati Vidyapeeth University Pune
Campus :YMIM Karad

Abstract (12pt)

Information System plays a vital role during the daily communication in the life of human being. Due to lack of in time information, the certain societal problems arise to the users in the society who performs public bus traveling daily up and down to the villages a part of rural community in the society. Today due to the advancement most of the rural community is trying to become urban based community for their needs. Paper identified how computations support for bus State Transport (ST) facility in the rural and remote areas for sharing of the information. We studied various needs of the rural community for the future development of the rural community. Study suggests that there is need of information assistance in the form of Information Systems to the remote villagers on the daily basis. How does the knowledge based experts in the field of Medicines, Educations, Pharmacy, Postal Services, Agricultural, Tourism may help the development of the rural area. This paper selected case study as State Transport facility for the rural villages in Satara district of Maharashtra. Paper also mention, how does the Self-Help- Groups, Physically Handicapped public and such others may be helped in all the ways without shifting them towards urban area. There may be the low cost-coverage of regular bus services in rural areas. This may not be seen as a barrier but it is stated as an incentive to promote innovative transport system for rural areas a part of rural development. Improved co-ordination and more effective use of existing resources may improve public bus transportation services and it is helpful to the society by ignoring the economic constraints.

I. INTRODUCTION

Convenience is playing the important role in the every aspect of the human life. It is observed that adequate no. of experts in the varied areas viz. Medicine, Education, Banks, Postal Services and many more are wish to shift to the urban areas due to their needs, growth and expectations. Due to this, very few villages are acquainted with experienced and knowledgeable Teachers, Good Doctors, Good Pharmacy facilities and other allied human resources [6] in the various fields. There are multiple reasons for this situation. It is the situation in most of the villages in the studied area i.e. in Satara District the Patan Tahsil. We know that two third of the population is in rural area. We observed that no. of villages are not well connected with at least good road facilities. Sometimes road may be constructed but due to the natural impact of heavy rains, we found that surveyed rural roads are not in good conditions, sometimes at some places they are no more in the existence due to major rain water. It is seen that certain places in the Patan Tahsil, which are popular for different reasons and they becomes tourist's places. This creates an opportunity to develop tourism industry. It is seen that maximum no. of families are having farming as their profession. And the economic condition is not so good to get adequate services.

II. PROBLEMS IN PRESENT PUBLIC BUS TRANSPORT SERVICES.

We know that poor transport system is a major hurdle in economic growth and development of the nation which is a societal concern. It is seen that maximum no. of knowledge based service providers and employees in the field of Education; Banks, Electricity, Postal Services, Healthcare [9] (both for humans and animals) and other experts are commonly reluctant to work in the rural areas. There are several reasons for the same. But one of the reason if they get good services and information e.g. Public bus Transportation in the form of at what time public bus may reach to the place of his service or job site in village. Availability of timely information helps the human who are delivering various services in the villages viz. Teachers (Both Primary, Secondary and Higher education), Postman, Wireman, Bank Employees, Doctors and other Govt. Employees and private sector service providers. In case of a good service provider or Expert who stay at close by urban place in any field of Education, Medicine, Govt., and private business sectors is transferred or appointed in any rural or remote village then, we found that, some of the following may be true:

* Staff cancels the job appointment or did not accept the appointment (not ready to work in the villages)
* Attendance in the office is poor and maximum days, he/she is on leave or absent.
* Does not be available when his/her services are mandatorily/emergency needed
* Late arrival to office or Early departure from office
* Lack of in time services and the availability
* Always thinking, planning and worrying about transport facility from service place to his residence in urban area.

Associate Professor ,Bharati Vidyapeeth University Pune ,Campus :YMIM Karad *

These delays in services directly/indirectly impacts on the overall development of rural community and economy. Sometimes in case of healthcare, patients becomes dead due to lack of in time services from doctors or their absenteeism in the villages.

It is also seen that coverage of affected area is large and becoming larger. We found that existing systems are having lack of support of computing based resources. Note that due to lack of in time availability of resources and information and its management [1], we found that the situations of the service seekers viz. teachers, villagers becoming inconvenient which may result in to the adverse impact in getting the good services from the intelligent resources and knowledgeable staff in the society. These are some of the limitations in present scenario in the studied area.

III. PROPOSED MODEL : WEB BASED PUBLIC BUS TRANSPORTATION MODEL FOR RURAL ASSISTANCE (WBPTRA)

In the view of above said limitations, we feel that, there is need of application of Distributed Computing based model in the form of Web Based Computational System for the rural development. Hence we propose one of the solution as to design and develop the **Web Based Public bus Transportation Model for Rural Assistance** for provision of adequate informational services in rural area. As we know that the presently web based systems is one of the fastest mode for the information services in rural areas also[2, 4].

Fig. 1 shows the important component of the computational model. Fig. 1 also shows the relationship between Service Provider, Service Seeker in the real world and the computational world.
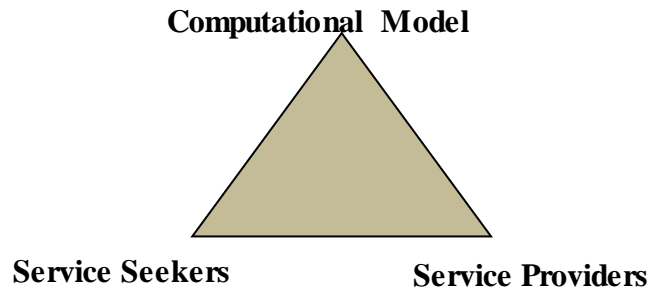
Figure- 1: Computing for serving the rural community

a) Service Providers

Service Providers are e.g. bus depot staff the human resources, users who provide the public bus transport facility on regular basis without fail especially in rural places. The important categories of SP's and their responsibilities are listed in Table 1

Table 1: Service Providers and the responsibilities

Sr. No.	Service Provider	Role
1	District Bus Depot	Provision and assistance of information, Assisting and monitoring of route wise public bus services as per request in time and follow up of the bus routes on daily basis
2	Tahsil Bus Depot	
3	Regional Bus Depot	
4	Intermediate Bus stations	Follow up and communicating daily bus details to further stations and to the service seekers about the status of the route and in emergency make the necessary arrangements during the failure if required.

b) **Service Seekers**

They are the human resources who may be villagers, employees, staff of Govt., private organizations who stay at non rural areas [8] part from their working places or offices and it is mandate to visit the rural office or place as a responsibility – a part of service/job for the various services in the field of Education, Primary Health Centers, Banking, Postal Services, Govt., departments, private business organizations in the area. The important service seekers and their major responsibilities are listed in Table 2.

Table 2: Service Seekers and the responsibilities

Sr. No.	Service Seekers	Responsibilities
1	Grampanchayat Staff	Display of Arrival of Bus Timings and related communication in the villages
2	Primary School staff	Registration to the bus depots for the services, making payments and registration of the mobile number and e-mail for SMS services (messaging) and alternative mobile numbers
3	High school staff	
4	Doctors : Both private and Govt., including veterinary and their staff	
5	College Staff	
6	Bank staff	
7	Postal services	
8	News paper agency and other allied visitors	

c) Computational Model

In the view of above said limitations we propose to design and develop the computational model which is a Web based Distributed Computing [5] based software tool which will assist the public bus transportation related services by means of Information services[12] to the SS and from service providers in terms of

- Registration for requisite services
- Planning for the transportation
- Billing of services
- Monitoring of conduct of services
- Compliance of stand by bus service/s during the failure of buses
- Information processing and assistance

This information is useful to manage [7] the users themselves in the view of the transportation services in the rural areas [11].

IV.   WORKING OF WBPTRA MODEL

It is mandatory that the adequate no. of bus passengers as travelers should be there on the average basis for each route with adequate support of information technology and distributed computing [3] by means of Web Services, then we felt the proposed model may be useful. In other circumstances the economic constraint [10] of profit and loss may be an unavoidable limitation. Sometimes this type of bus services may be treated as one of the Service-To-The-Society (S-T-T-S) which cannot be measured in terms of money. Otherwise service to the rural community means of making available knowledge resources viz. good teachers, doctors, and other service providers from the urban area.

The WBPTRA comprises with two sub systems

a)   Service Providers System (SpS)

b)   Service Seekers System (SSS)

SpS supports for the important activities. First we have to prepare the bus scheduling and allotment of the staff (Bus Drivers and Conductors) which will show the performance by reaching to the specific destination (Bus Stop) in the required time period. The human resources i.e. SS who want to go for up-down journey on the daily basis e.g. Primary School staff (both men, women and supporting staff) from urban area to some remote village e.g. Mr. XYZ on his wireless telephones i.e. Mobile Phones. They should be provided with the Bus Time Table of the buses visiting and taking the Stop. The WBPTRA model must also be accessed by the intermediate major bus stops/stations viz. 1, 2, 3. When a particular Bus Route is registered by the group of users from Start-Place 1 to Destination-Place 2 for the certain period. The route has different intermediate stations (e.g. between bus stops viz. S1, S2, S3,...S6). The model must work in the manner 24x7x365 and able to provide the Web Based services to the registered mobile numbers or e-mails frequently.

Suppose the bus route is :

START-PLACE1...S1....S2...S3...S4...S5...S6...DESTINATION-PLACE2.

Whenever bus starts from START-PLACE1 and has to reach in time to DESTINATION-PLACE2. The WBPTRA has to deliver the messages to the intermediate controllers or in charge of the S1. The intermediate stops may be villages or any other stops. If it is village then Grampanchayat should have facility to announce the tentative information about which bus will come at what time by means audio system at Grampanchayat office. This role must be allocated to possibly to the Physically Handicapped person or Self-Help-Groups by the bus depot and Grampanchayat together who can get financial support [14].

For every route daily, stop wise timings of expected time of arrival of bus and actual time of departure of the bus must be registered by the WBPTRA model and accordingly the messaging in form of SMS must be sent to the registered members. Whenever the intermediate stops are visited by the bus, the same information must be sent online to the Bus Scheduling Unit time to time.

Sometimes there is certain fault in the bus in between S3 and S4, it is the responsibility of the controller of the system who should take the corrective action as decision [12] and try to assist to the users by means of alternative arrangements of the bus or which should be another route to be followed by the regular passengers of the bus. Or sometimes bus must not come to that specific place and ent the message and be in touch with these service seekers in a route.

The local governing authority – Grampanchayat mat be involved by means of their support through the Self Help Groups. Fig. 2 shows the relationship between WBPTRA system, villagers, self help groups, other service seekers and local authority.
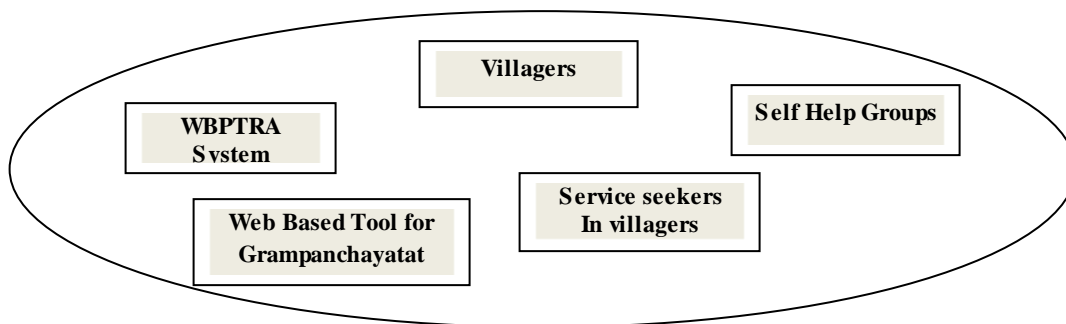

Figure-2: Grampanchayat and web based computation WBPTRA

The Web Based Computing model must be made available in relation of the Bus administration model WBPTRA which will perform the following.

- Information about time table of expected bus arrival and departure timings.
- Communicating through the audio system of Grampanchayat when the bus reaches to stop previous to your place.
- When the bus becomes late, communicating to the travelers about such information
- Play a role of mediator between travelers and the Bus services for the good services of timings

V.   ADVANTAGES

Some of the advantages of the WBPTRA model can be:

- A Platform for sharing the information to the administration and service providers and seekers
- Bus data will be exposed as and when required
- Instant availability of the information to the decision making authority
- Opens new door to help the rural community and serve the society
- Self-Help-Groups (Bachat Guts) may be involved at Grampanchayat offices
- Serving the needy poor peoples of which the cost is uncountable
- Bus administration will get in data about travelers for the planning

VI.   LIMITATIONS

Following are some of the limitations of the WBPTRA model.
- Need of strong computational network[2] amongst the users and the bus authority
- Network and data communication amongst villages, Tahsil and District[3] administration in 24*7*365 pattern with high speed internet connectivity[13]
- Support of mobile based facilities to the users
- Need to update the timings of arrival and departure from important places one stop previous to the affected service seeker village.
- Due to unavailability of the requirements to the district administration, the model may limit in the timely redressing of the affected villages by means of information sharing[1].

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BIOGRAPHY:

Dr. P. P. Patil, Ph. D, MCA (Engg.,), Associate Professor at Bharati Vidyapeeth University Pune (INDIA) Campus: YMIM Karad. He is Research Guide and BOS member. His research interests-**Distributed Computing**, Computing for the Rural development, Information Systems and Data Analytics. Published papers in National and International Conferences, Seminars and awarded with 2 Best Research Papers awards.