Design of Public Transportation Model using Moment Based Approach

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Abstract - *Trips are generally generated for the purpose of work in urban areas. Moment based approach means understanding the moment of Traveler at a particular location with respect to time and then this data is used for developing a public transportation model. This paper is based on developing a Public Transportation model for Traffic analysis Zone (Gajanan Township and kathora village in Amravati), where there is a shortcoming of city buses trips which results in the inconvenience caused to the residents. The moment patterns were determined on the basis of data collected by the survey, Home interview method and roadside Interview methods of Origin & Destination Survey were adopted to collect data, the patterns were predicted and the individual travel pattern was studied and a Transportation model was developed according to the demand.*

Key Words: Moment based approach, Public Transportation Model, Trips, Home Interview Method, Travel pattern

1. INTRODUCTION

Humans have been using various modes of transportation since ages, today buses have emerged as one of the most important modes of transit in urban areas. The trips are generated due to the moment of passengers for various kinds of purposes on the network of roads by different modes of transport. A trip is generated when a passenger travels from an origin to destination on a certain route. The pattern and frequency of traveler depend upon the purpose of the trip i.e. (Home-based / Non-Home based). The classification of trips as home-based and non-home based, state the nature of the trip. In-Home Based trip one of the ends (origin or destination) is home of traveler, whereas in non-home based neither origin or destination is the home of traveler, the end from which a trip starts is known as production and the end where the trip ends is known as attractions. The total of productions and attractions should be equal in numbers.

Amravati is the second major city in the Vidarbha region and here lies the Gajanan Township and kathora village, a place which is undergoing rapid development and home to about 3000 to 5000 people and a huge education institute known as P.R. Pote Patil education institute. Here the most of the residence regularly travel to mainland City for work and still a proper and regular city transport (buses) are not provided. To understand the need of residents a survey was conducted and the collected data was analyzed and used to design the trip.

2. LITERATURE REVIEW

Abhishek L Hedau, S.S. Sanghai. (2014) Development Of Trip Generation Model Using Activity-Based Approach studied the trip generation by using activity-based model, In which activity patterns determined on the basis of dependent and in dependent variables and trips were generated for Trimurti Nagar, Nagpur.

Jones et. al. (1990) developed an overarching definition of activity analysis as it is a "framework in which travel is analyzed as daily or multi-day patterns of behavior, related to and derived from differences in lifestyles and activity participation among the population." The "emerging features" of activity analysis are identified (Jones et. al., 1990).

Sheppard (1986) studied cross-classification models which have been widely used more for long-range residential trip generation analysis to overcome the inherent problems along with the regression analysis. Cross-classification models were discovered in the late 60s. Similar to regression-based approaches, cross-classification models of relating characteristics of households to demand travel.

3. STUDY AREA & METHODOLOGY

Study Area

''According to the Census 2011 information the location code or village code for Kathora village is 532675. Kathora Bk village is located in Amravati Tehsil of the Amravati district in Maharashtra, India. It is situated 10km away from sub-district headquarter Amravati and 10km away from district headquarter Amravati. As per 2009 stats, Kathora Bk village is also a gram panchayat. The total geographical area of the village is 785.57 hectares. There are about 824 houses in Kathora Bk village. As per 2019 stats, Kathora Bk villages come under the Teosa assembly & Amravati parliamentary constituency. Amravati is nearest town to Kathora Bk which is approximately 10km away'', (villageinfo.in)

''Kathora Bk. is a large village with total of 824 families residing. The Kathora Bk. village has a population of 3468 of which 1775 are males while 1693 are females as per Population Census 2011.'' (census2011.co.in)

Fig-1: Satellite view of the study site

Methodology

Transport planning is the process of defining future policies, aims, investments and design to meet the demand of moving people and goods in future and hence the transport planning was broken down in three stages.
1) Inspection of the existing condition
2) analysis of present condition and to plan and synthesize a particular task
3) Evaluation

3.1. Inspection of the existing condition

In view of understanding the existing condition and also to determine various factors to prepare design, Home interview method and roadside interview methods of origin and destination survey were adopted and data from the residents was collected by a standard questionnaire form the data was collected digitally with the help of Google forms, a survey of about 600 houses was carried out.

2) Analysis of present condition and to plan and synthesize a particular task

The data collected from the survey was segregated on the basis of moment on particular route, time of travel, frequency of travel, time and fuel required for the journey, etc. And this segregated data was for the bifurcated as to know peak and non-peak hours and to obtain most preferred routes, time and destinations then later the following data was categorized according to the head as most preferred, second preferred, third preferred and least preferred routes, this data was synthesized and number of combinations of possible trip on particular route at the specified time were determined and the whole data was taken for evaluation.

3) Evaluation

The combination was then sorted according to the need and the potential of passengers available on the particular route at the particular timings. Then these sorted combination were studied in detail and intermediate halts on each route were identified on the basis of passengers requirement after then the respective halts were provided on particular routes and this was finally polished and then turn into a final plan stating the time and route of a bus trip which is required to be operated.
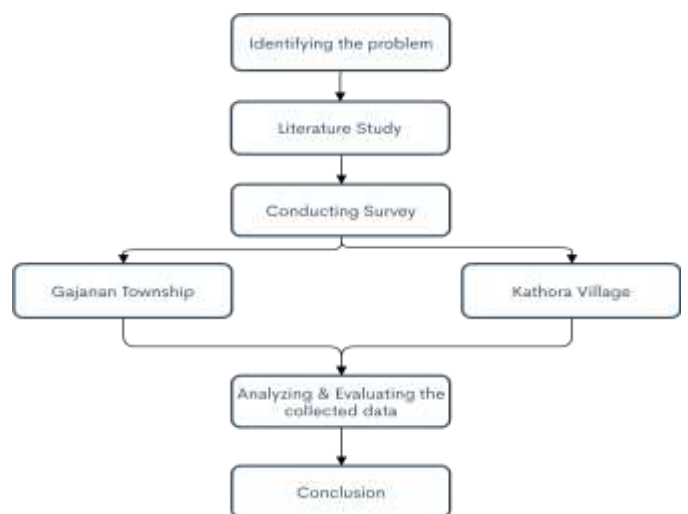

Fig-2: Flow chart of Methodology

4. RESULT

After the analysis of the survey data, major routes were identified on the basis of the movement of passengers. It is further segregated on the basis of preference and Intermediate halts were identified of each route along with the time required for the journey. The most and the least preferred routes found are Panchwati and University respectively. The peak hours identified were 9 am-11 am in morning and 5 pm-7 pm in the evening.
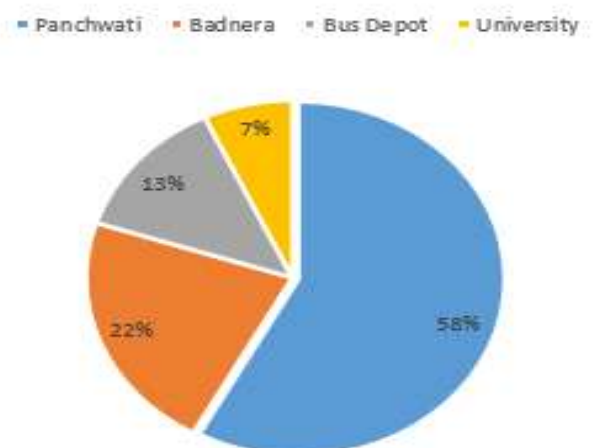

Fig-3: Percentage of passenger moment on routes

CONCLUSION

We have come to the conclusion that there's a need to operate the city buses between the morning and evening peak hours as there is a potential of passengers at the following timings. The buses can be run according to the routes and timings suggested, If the operations are started it will be like a boon to the residents and also it will indirectly help in boosting the rural economy resulting in a better life style of the resident and development of Gajanan Township and Kathora Village.

Sr. No	Time Span	Time Of Departure	Time Of Arrival	Trip Distribution	
				ORIGIN	DESTINATION
1	7:30 AM	7:30 AM	8:30AM	Kathora Village	Panchavati
2	8 -9 AM	8:30 AM	9:30 AM	Kathora Village	Badnera
3	9 – 10 AM	10:00 AM	11:00 AM	Kathora Village	Badnera
4	10 – 11 AM	11:00 AM	12:00 PM	Kathora Village	Badnera

Table-1: Suggested times and route for operating buses (Morning Hours)

Sr. No	Time Span	Time Of Departure	Time Of Arrival	Trip Distribution	
				ORIGIN	DESTINATION
1	4 - 5 PM	4:30 PM	5:30 PM	Badnera	Kathora Village
2	5 - 6 PM	5:30 PM	6:30 PM	Panchavati	Kathora Village
3	7 – 8 PM	6:30 PM	7:30 PM	Panchavati	Kathora Village
4	8 – 9 PM	8:00 PM	9:00 PM	Panchavati	Kathora Village

Table-2: Suggested times and route for operating buses (Evening Hours)

ACKNOWLEDGEMENT

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