E-Booking of Railway Tatkal Ticket in India : A Framework for Troubleshooting IP Based Booking & Reduction of Multiple User IDs

Pawan Kumar Maurya[1],Rewacharan Chourasiya[2] ,Dr. Anurika Vaish[3]

Division of MBA & Master of Science in Cyber Laws & Information Security

Indian Institute of Information Technology Allahabad

Allahabad, U.P. India-211012

pawankr.maurya@gmail.com[1],revacharan@gmail.com[2],anurika@iiita.ac.in[3]

Abstract: Indian railway is the second largest transportation system. Serving approximately 2.5 crores passenger on a daily basis. Therefore, to handle such a huge crowd efficiently modern advancement of technology has been adopted particularly the reservation system to bring ease, effectiveness, efficiency and transparency. Gradually, it was observed that the outcome of such adoption has brought about various challenges such as the new online tatkal booking policy i.e. only two tickets can be booked per IP address between 10 a.m. to 12 a.m. and multiple user IDs problem. Though, various remedial measures have been taken on the above highlighted issues yet it calls for further improvements. Thus, this paper was an attempt to provide a solution using UID registration numbers for reducing multiple IDs along with facilitating increased limit to the number of e-ticket (tatkal) booking for employees or personnel of large organizations. The solution proposed is an outcome of the survey where questionnaire was administered to approximately 250 respondents; the proposed model solves the problem up to an acceptable level.

I. INTRODUCTION

Indian Railway is the fourth largest railroad network after Russia [1]. Approximately 2.5 crores passenger's [2], [6] travel per day by train. According to the Ministry of Indian railway per day 15 lakh tickets are being sold by 8838 passenger ticket counters and 3.74 lakh tickets through IRCTC website, out of which around 1.70 Lakh tatkal tickets are booked per day [2]. The main purpose of the tatkal e-ticket booking system is to cater to emergency travelling needs. But the current system is plagued with numerous problems such as unavailability of tickets in a very short time etc. In order to overcome these problems Indian railways has made major changes. After these changes by Indian railway, still some problems are persisting. We are focusing on those problems and suggesting solutions. Our suggestion is based on Unique Identification Number (Aadhaar), and increment on number of tickets.

A. *Unique Identification Number (Aadhaar number):*

On behalf of the Government of India, Unique Identification Authority of India (UIDAI) introduced Aadhaar, which is a twelve digit random individual identification number [3]. This random number is generated, irrespective of any classification based on caste, sect, religion and location. It will be a proof of identity and address, at any location in India. Any single person, of any age and any gender, who is a citizen of India and completed the verification process conducted by UIDAI, can enroll for Aadhaar. It is a free of cost service and any person can enroll. Each individual person will be having a unique Aadhaar number with lifetime validity. With the help of Aadhaar number any individual will be allowed to access to services like banking, cell phone connections and other Government and Non-Government services in due course.

II. TECHNOLOGICAL ADVANCEMENTS IN RAILWAY SYSTEM & CHALLENGES

These changes in tatkal e-ticket reservation were made with effect from 10.7.2012 [4].

a. Tatkal ticket can be booked only before two days of journey.
b. Now IRCTC website is maintaining high capacity data servers. They have increased their internet speed from previous bandwidth 344 Mbps to 450 Mbps.
c. Only one user against a verified unique email ID or mobile number can register with the IRCTC website.
d. Web service agents can book only one e-tatkal ticket per day per train after 12.00 a.m.
e. Now only two tickets can be booked between 10.00 a.m. to 12.00 a.m. by individual users and per IP address.
f. Only a single session per user ID check is allowed and multiple sessions with individual user with a single user ID is disallowed.
g. Indian Railway will introduce by the end of this year a "next generation" e-ticketing system that will improve the speed of online ticket booking [5] [7].
h. The new system will have the capacity to book 7200 tickets per minute. Currently it is 2000 tickets per minute [5], [7].

III. RESEARCH OBJECTIVE PROBLEM

According to IRCTC, The agents and others have created multiple user Ids for its website. IRCTC teams have also deactivated more than five lakh such IDs created by individuals, these individuals are basically unauthorised agents and sellers of black tickets. 23 July 2012, IRCTC deactivated 44,000 multiple user ID, in its efforts to general and tatkal train tickets through the e-ticketing system [2]. IRCTC has about 1.35 lakh registered agents on its rolls. [2]

Some of these agents had opened multiple user IDs using the same mobile numbers and e-mail IDs. Hassled by increasing complaints because genuine users started complaining against the unavailability of tickets, Railways have taken measures towards change of tatkal booking time and increased restriction on the agents. The revised e-ticket booking time for tatkal tickets was enforced on July 10 2012 and since then; the IRCTC has been closely monitoring the bookings and even cancelling suspicious IDs. Now agents are not permitted to reserve tatkal tickets between 10 a.m. and 12 a.m.

According to IRCTC e-tatkal booking policy only two e-tickets per IP address are allowed. This policy creates a problem for corporations and organizations, i.e. people are unable to book tatkal e tickets in an emergency.

We are proposing a model based on Aadhar card number to overcome multiple user ids and a solution based on a survey to reduce the problem of unavailability of tatkal e-tickets in organizations, companies and institutions.

IV. METHODOLOGY

Initially our research explores the major drawbacks of the current system. For this purpose we designed and took a survey. The research then moves on to a descriptive phase where we analyze the underlying causes and propose a model based solution.

A. A proposal based on Unique Identification Number (Aadhaar):

IRCTC website is facing a problem of use of multiple user IDs by an individual user. Any individual user can create multiple IDs with the help of multiple email IDs. There is a solution for this problem, using the UID number to register when a new user is registering for IRCTC login id. It should be a compulsory process for existing users as well to register their UID numbers to continue availing the facilities of the website. The registered UID numbers and its owner's name will be verified through the UIDAI database.

Only two tatkal e-tickets can be booked between 10.00 a.m. to 12.00 a.m. by individual users and per IP address. This policy is being used at present. So we proposed a model that only one tatkal e-ticket can be booked per UID number instead of per IP address.

B. A proposal for increasing the number of Tatkal tickets:

Based on the outcome of our survey the following changes are suggested to the current system maintained by IRCTC. IRCTC should enable registration of educational institutes, companies, and organizations where accomodation facilities are provided for the students, residential facilities are provided for the staff members and company where employees from different geographical locations, are working. Such type of companies, organization, institutes, universities, and their estimated number of internet users, should be registered with the IRCTC website to avail the facility of increased number of tatkal E-tickets. Changes could be made by IRCTC to increase or decrease the number of tatkal e-tickets during festive season and normal days.

a) In normal days:

At least 4 tickets to be booked per user ID between 10-12 AM for the personnel of the organizations there, where a large number of personnel resides.

b) On vacation and festival time:

(When the number of passengers and reservations of railway tickets increases)

On the basis of the undertaken survey it was concluded that at least 6 or more Tatkal e-ticket reservations should be allowed per user ID between 10 a.m. to 12 p.m. for the personnel of organizations there, where a large number of personnel and workers reside.

C. Mechanism for implementing a model:

To implement the proposed model following mechanism can be considered should be-

a. To reduce multiple Ids:

a) The user will sign up to the IRCTC website and he will provide all necessary information along with the UID number as a mandate.

b) UID number will be registered only once and can't be used again for any other new login ID requests.

c) After being successfully registered user can avail the facilities of IRCTC website.

d) Existing users also need to update their UID Number with IRCTC so that they can continue availing the services.

e) If existing users do not register their UID number they will not be able to login to the website. (see fig: 1):
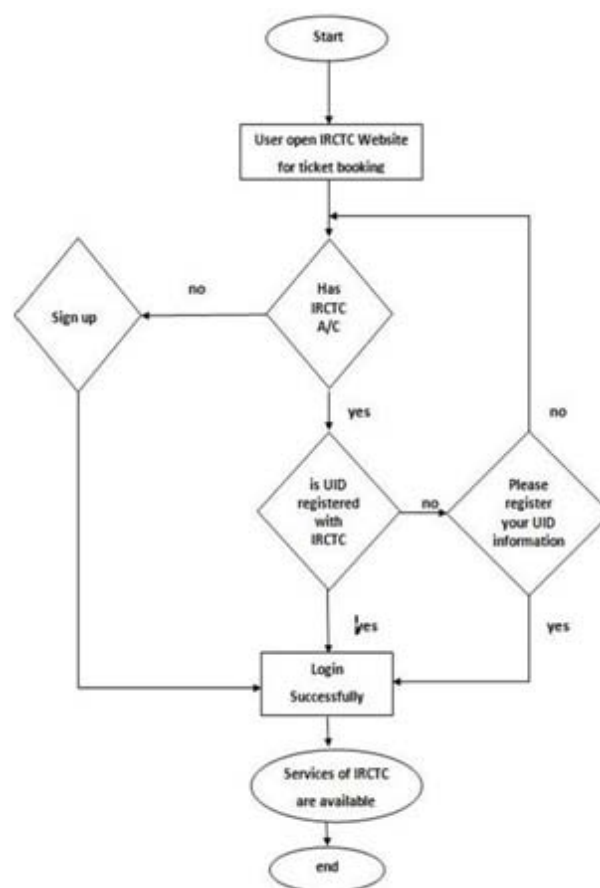

Figure: 1 Flow chart of UID number registration

b. *Ticketing Provisions for educational institutions, organizations and corporations:*

a) Each organization will have to register themselves along with their public IP addresses.
b) When users of those organizations will want to book Tatkal e-ticket IRCTC will check whether they are registered or not along with their IP addresses, and if not, it will ask them to register.
c) Now users can book their Tatkal e-tickets.

V. FINDINGS , ANALYSIS & OUTCOMES

A. *Questionnaire Analysis :*

We initiated the analysis of our research through the questionnaire analysis using the MedCalc tool. The Cronbach's alpha test was applied to the questionnaire and the outcomes are as follows: -

a. *Cronbach's alpha values:*

We prepared a questionnaire consisting of 13 items and presented it to an approx of 250 respondents on the basis of the data gathered from this survey we applied Cronbach's alpha test to find an estimate to find the reliability of a psychometric test for the sample. The findings are as follows.

Cronbach's alpha   - 0.8500

95% lower confidence limit   - 0.7082

Cronbach's alpha with standardized variables

Cronbach's alpha	0.8500
95% lower confidence limit	0.7082

Effect of dropping variables

Variable dropped	Alpha	Change
q1	0.8379	-0.01217
q2	0.8379	-0.01217
q3	0.8579	0.007926
q4	0.8379	-0.01217
q5	0.8492	-0.0007915
q6_a	0.8379	-0.01217
q6_b	0.8503	0.0002825
q7	0.8215	-0.02853
q8	0.8517	0.001692
q9_a	0.8256	-0.02443
q9_b	0.8841	0.03411
q10_a	0.8256	-0.02443
q10_b	0.8445	-0.005548
q10_c	0.8501	0.0001075
q11	0.8298	-0.02019
q12	0.8277	-0.02229
q13	0.8277	-0.02229

Figure: 2 Cronbach's alpha Analysis

B. *Graphical representation of questionnaire:*

Our Main objective of this research is to reduce the prevalent practice of exercising multiple IDs to book tickets by integrating the UID card number with the IRCTC ID .And To analyze this problem more clearly we have prepared a questionnaire and conducted a survey in organizations, companies, and institutes. Our survey was taken by approximately 250 respondents out of which 230 showed positive an outlook. The outcome of this survey indicated that 87% are facing IP based tatkal e-ticket problem. We have observed that the main problem is related to IP based

tatkal E-ticket reservation. Questionnaire and survey results are as follows:

a. *97% travel by train (see fig: 3). Out of them 97% (see fig: 4) use internet for the following purpose:*

a) 96% use the internet for the purpose of e-ticket booking.
b) 91% of social networking.
c) 81% of online shopping.
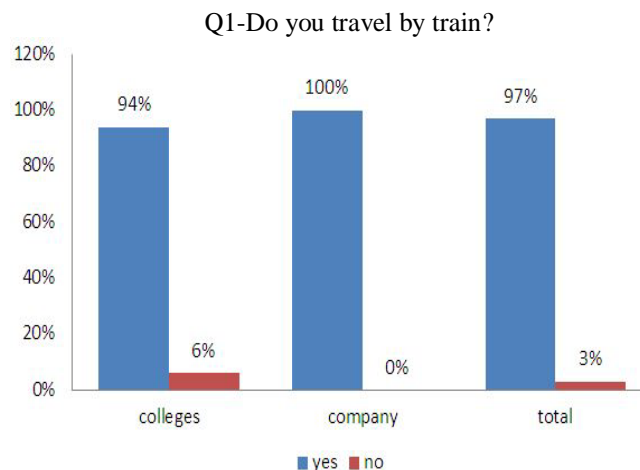d) 74% for surfing.
e) 96% for email. Check (see fig: 5)

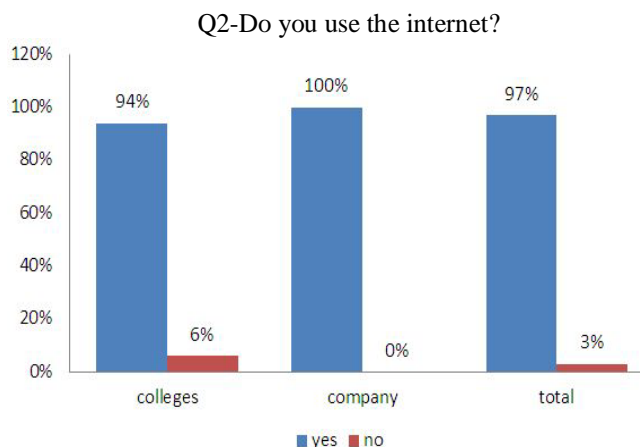
Figure: 3-Survey of, People travel by train

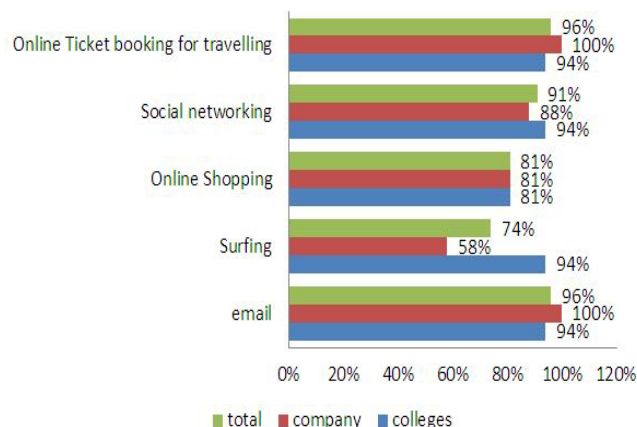Figure: 4-Survey of, Percentage of internet users

Figure: 5-Survey of, Purpose of internet use

b.   Out of 97% internet users, 97 % are having IRCTC login account (see fig: 6) and their usage statistics are as follows:

a) 79 % use for booking e-ticket for relatives and friends.
b) 97% of family members.
c) 84% for them self (see fig: 7)
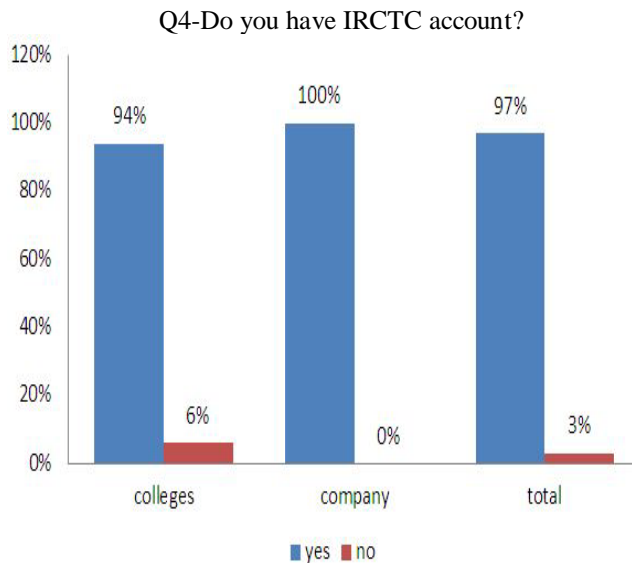
Q4-Do you have IRCTC account?

Figure: 6- Survey of, Percentage IRCTC account holders

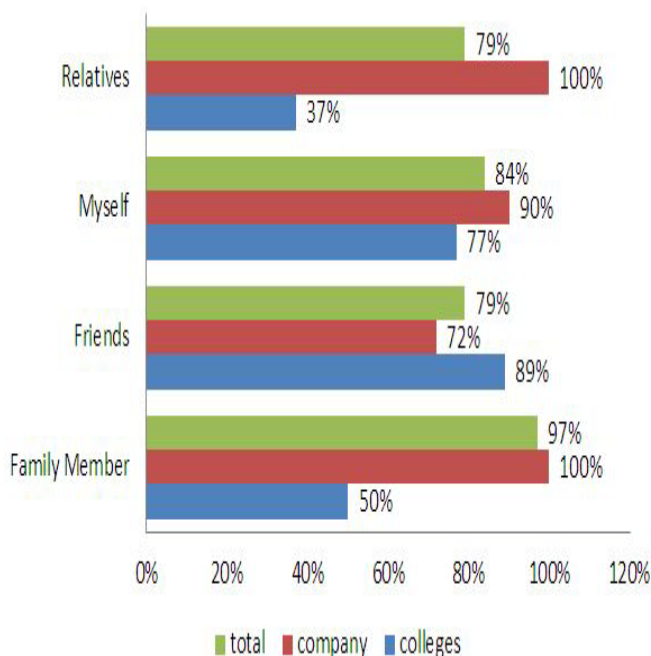**Q5-For whom do you book an e-ticket via the IRCTC website?**

Figure: 7-Survey of, People, for whom IRCTC account is used

c.   Out of the 97% IRCTC website account holders, 97% book tatkal e-tickets (see fig: 8a) and their statistics is as follows:

a) 65.5% book tatkal e-ticket less than five times.
b) 18.8% more than ten times.
c) 15.7% more than five times. (See fig: 8b)

Q6 (a) -Do you use tatkal e-ticket reservation system?
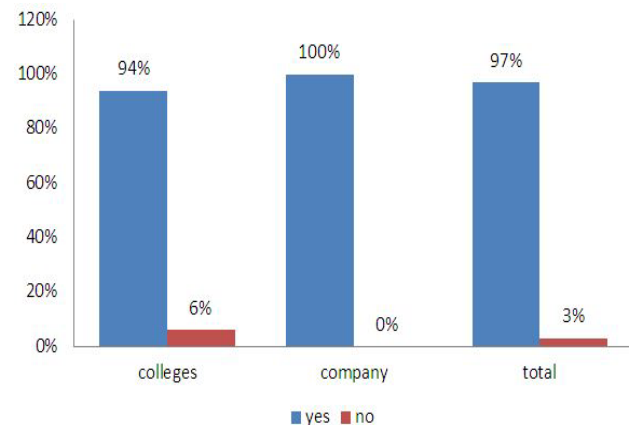
Figure: 8(a) - Surveys of, Users, who use tatkal E-ticket reservation system

Q6 (b) -If yes then how frequently do you book the tatkal ticket throughout the year?
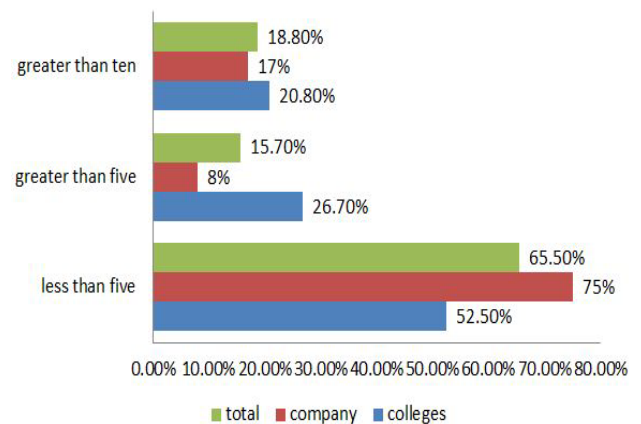

Figure: 8(b) - Survey of, Frequency of tatkal ticket booking with IRCTC website

d.   Out of 97% tatkal e-tickets reservation process, 68% users face problems (see fig: 9) and their usage statistics is as follows:

a) 87% problem of two tickets has already booked by this IP address.
b) 69% service unavailable.
c) 75% session expired.
d) 67% server down. (See fig: 10)

Q7-How many times have you faced the problem you lead or follow while booking a tatkal ticket?
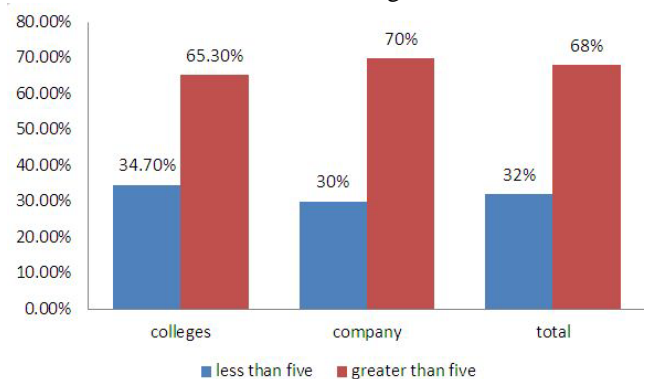

Figure: 9- Survey of, how frequently people face the problem, while booking tatkal ticket

Q8-Which problem, do you face while making online reservation through the irctc website during tatkal e-ticket booking?
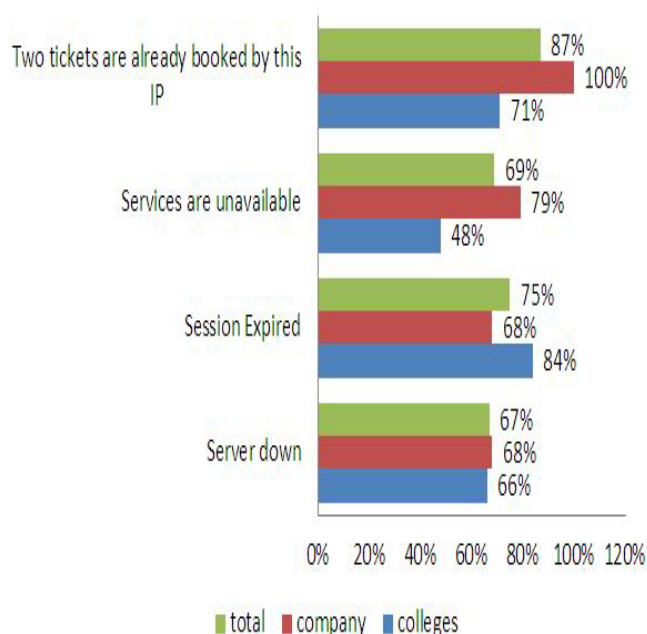

Figure: 10- Survey of, Problems, people face during tatkal ticket booking with IRCTC website

e.   80% feel that the number of tatkal e-tickets should be increased for institutions and organizations. (See fig: 11a) and their statistics are as follows:

a)   7.8% want to increase tatkal e-tickets per user ID by six instead of two.
b)   16.6 want to increase by five.
c)   28% want to increase by four.
d)   27% want to increase by three.
e)   20.4% do not want any change. (See fig: 11c)

Q9 (a) -Do you feel that the number of tatkal tickets should be increased for institutions, large organizations and cyber cafes?
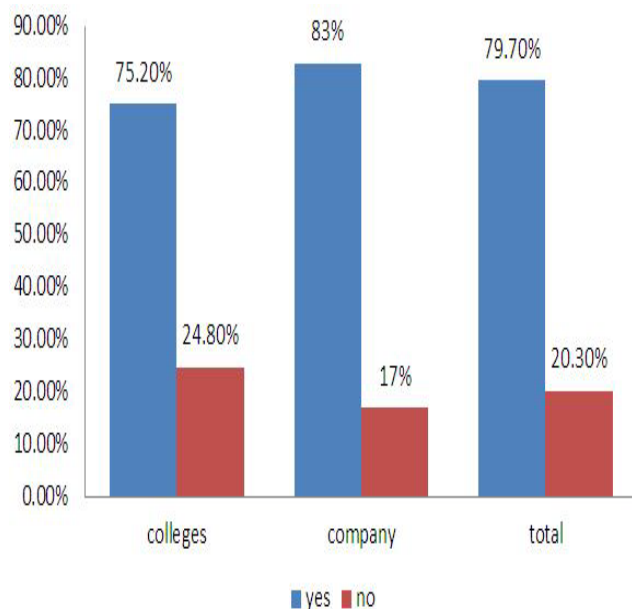

Figure 11 (a) - Surveys of, People who wants to increase the number of tatkal tickets

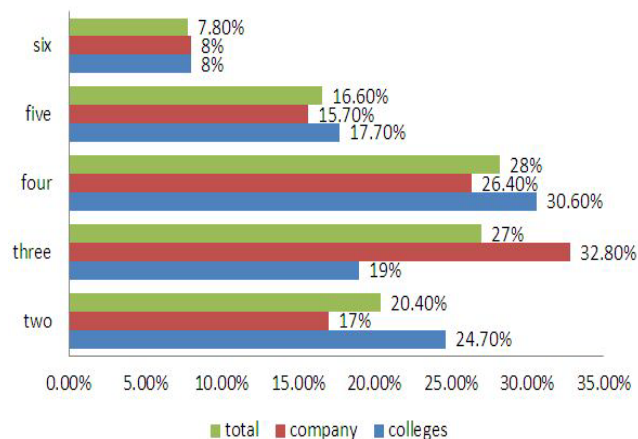Q9 (b) -If yes then how many tatkal tickets should be booked per user id?

Figure: 11 (b) - Survey of, Number of tatkal tickets should be allowed to book according to others.

f.   81% feel that during peak days there is a need to increase tatkal e-ticket. (See fig:12a) and their statistics are as follows :

a)   18.7% want to increase tatkal e-tickets by five during normal days .
b)   40.3% want to increase by four.
c)   26% want to increase by three.
d)   15% do not want any change. (See fig: 12b)

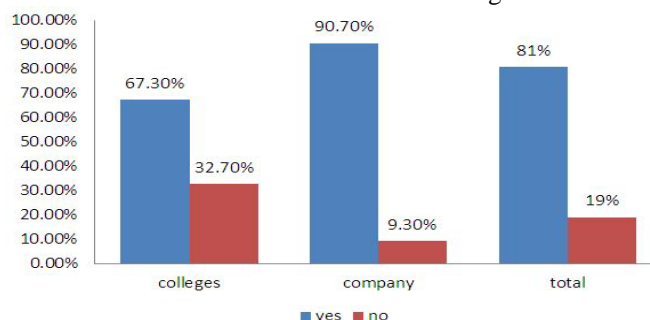Q10 (a) -Do you feel that during peak days there is a need to increase the tatkal ticket booking?

Figure: 12 (a) - Surveys of, people who think that during peak days tatkal tickets should be increased

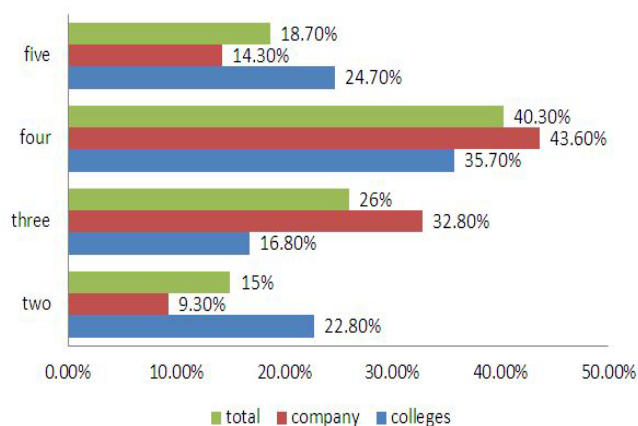Q10 (b) -What should be the limit of tatkal ticket booking during normal days?

Figure: 12 (b) - Survey of, number tatkal tickets people want to increase during normal days

g. *81% feel that during peak days there is a need to increase tatkal e-ticket. (See fig:12a) and their statistics are as follows:*

   a) 14.5% want to increase tatkal e-tickets by more than six during the festive season or vacation time.
   b) 40.3% want to increase by six.
   c) 30.7% want to increase by four.
   d) 15% do not want any change. (See fig: 12c)

Q10 (c) -What should be the limit of tatkal ticket booking during the festive season or vacation time?
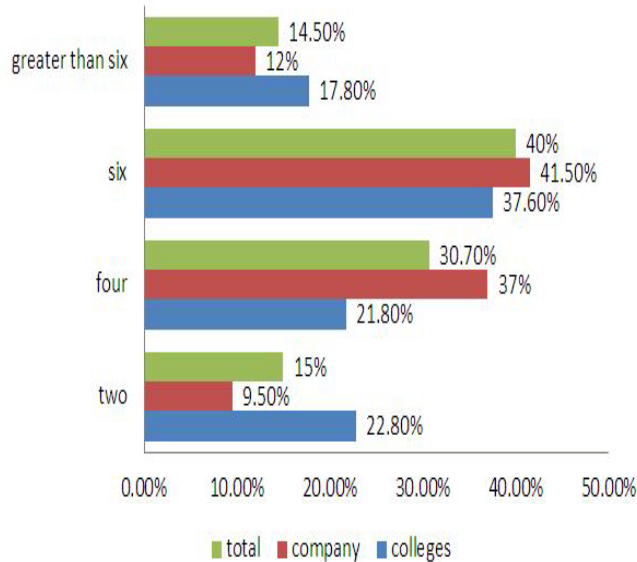

Figure: 12 (c) - Survey of, number tatkal tickets people want to increase during the festive season or vacation time

h. *90.5% want a policy should be made by the ministry of Indian Railway that tatkal E-ticket should be booked based on UID instead of IP address. (See fig: 13)*

Q11-Do you think that a policy should be made by the Ministry of Indian Railway that e-ticket should book by Aadhar card number instead of two tickets per IP address?
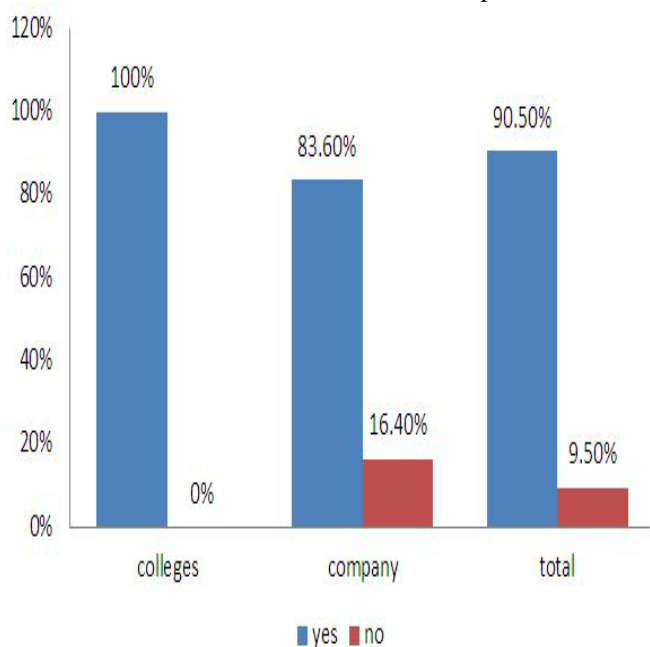

Figure: 13- Survey of, people who want to replace IP address based tatkal ticket booking to Aadhar card based booking

i. *77% want that IRCTC Signup be made by using UID number registration for user verification, to reduce multiple user IDs. (See fig: 14):*

Q12-Should IRCTC SignUp be made by using Aadhar card number registration for user verification to reduce multiple user ids?
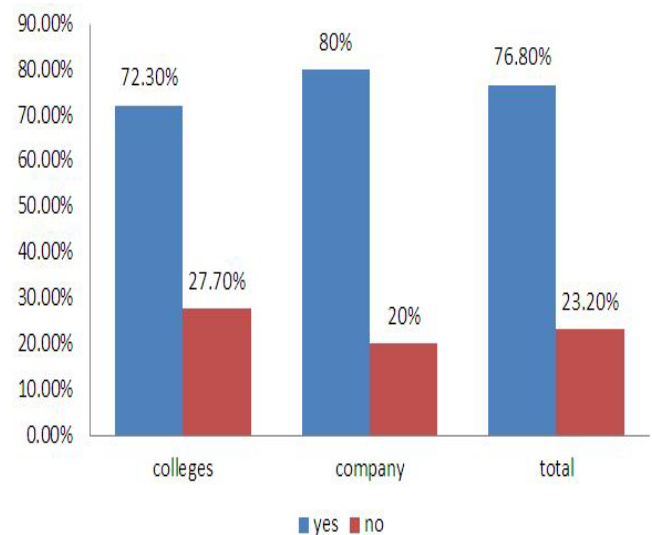

Figure: 14- Survey of, people who think that, UID number should be registered with IRCTC website

j. *76% want that only one tatkal e-ticket should be booked per UID number (see fig: 15):*

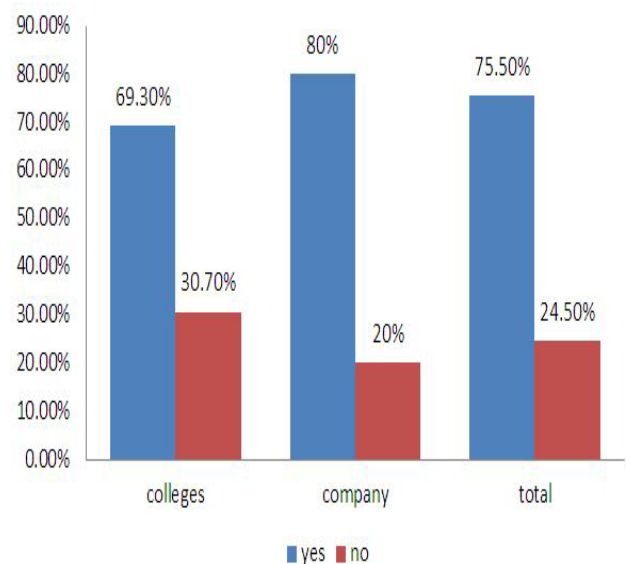Q13-Only one tatkal ticket should be booked per Aadhar card number?

Figure: 15- Survey of, one tatkal ticket should be allowed to book per Aadhar card number

VI. CONCLUSION

Although, Indian railway reservation system, is very well planned ticket booking system. It does not have such big problems and disadvantages in it, but still some changes are needed to make in the Policy of E-ticket reservation according to this paper. It will make the reservation and travelling easier, comfortable and convenient. However still there may be some untouched area related to it. But this scheme can reduce the problem till an acceptable level.

a) This will add a new advancement to the national security, i.e. people who are not having UID number; they will not be able to book railway ticket by IRCTC website.

b) Other than Indian citizen can't create their login id because of mandatory registration.

c) People will be aware to make UID card.

d) It will reduce the number of multiple user ids automatically because of the use of UID card number registration, one user will be having only one user id. Then there is no need for monitoring the booking and cancelling of e-tickets.

e) Even genuine passengers and users are able to book only one tatkal e-ticket for a journey.

f) It will also reduce database overloading in Indian railway's database server.

g) Management of the database will become easier.

h) Monitoring cost will be reduced.

i) Black ticketing will be reduced.

VII. LIMITATION

a) Misuse of UID- If UID information is compromised to an unauthorized person then genuine user will not be able to use his own ID for this purpose.

b) If a database of UID is compromised to an unauthorized person then he can create multiple user IDs and again genuine users will not be able to use their UID for this purpose. .

VIII. REFERENCES

[1] http://archive.techtree.com/techtree/jsp/article.jsp?article_id=79733&cat_id=547

[2] Press Information Bureau Government of India Ministry of Railways (10-7-2012,23-7-2012,23-11-2012) http://pib.nic.in/newsite/erelease.aspx?relid=91718

[3] http://uidai.gov.in/index.php?option=com_content&view=article&id=57&Itemid=105

[4] http://www.indianrail.gov.in/tatkal_Scheme.html

[5] http://in.news.yahoo.com/railways-next-generation-e-ticketing-system-073803735--finance.html(told by Indian railway Minister Mr. Pawan Kumar Bansal)

[6] http://en.wikipedia.org/wiki/Indian_Railways

[7] Indian railway budget 2012-13,2013-14

http://www.indianrailways.gov.in/railwayboard/