A New Landscape of Energy Efficiency: A Comprehensive Study on Various Electricity Consumption Related Smartphone Applications

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Abstract

With the recent emergence of mobile platforms capable of executing various complex software, there exists a variety of applications those provide services in the diverse field of interests. A public utility is one of the most interesting and demanding fields of interest in mobile platforms. In this article, we present a comprehensive study of various mobile applications that provide nudging for public utility, their acceptance, their pros and cons and other research aspects of those applications. In this article, we primarily focused on electricity consumption related to various public utility mobile applications. We present our findings based on mobile application?s user ratings, number of installations and most importantly user feedbacks in terms of comments on those applications.

Index terms—

1 I. Introduction

obile applications are increasing tremendously especially during the last few years. As a result, there exists a large number of applications in roughly all fields of application. But all those applications did not provide great services to the people. There are various ways to know the acceptance of application via user ratings, user comments and number of times it is downloaded and installed. All those information provide us a great feedback about the acceptance of the application as well as its advantages and disadvantages from its real users. A public utility is an interesting and highly demandable field where mobile applications are being used increasingly. In our study, we presented a comprehensive study on the existing mobile applications for energy-related public utility, their acceptance analysis and finding and indicating their pros and cons. We finally present a comprehensive summary of various aspects of the findings of our study.

2 II. Related Work

There is various research works that provides a comprehensive study in various fields of application. But our study focuses on only mobile applications.

Dan Wang and Zheng Xiang present a comprehensive study on smartphone apps. In their study, they used data mining approach to classify types Author ? ?: Lecturer, Department of Computer Science & Engineering Bangladesh University of Business and Technology Dhaka, Bangladesh. e-mails: md.nahidnewaz@gmail.com, sohel.ruet10@bubt.edu.bd of information services and design features of travelrelated i-phone apps as well as users reviews and evaluation for those apps. This study serves as an important foundation for understanding emerging mobile technology and will cause substantial changes in travel and tourism [1].

Mark Terry presents a study on medical apps for smartphones. In his study, he provides the features analysis, user acceptance and price analysis of those smartphone applications. He also provides a study on the companies that marketed those apps [2].

Martin F Mendiola, Miriam Kalnicki, and Sarah Lindenauer present a study on mobile health apps for patients and consumers. In their study, they analyze the content of the apps and their user ratings to identify the most valuable contents of those apps [3].

In our study, we will provide a comprehensive study on smartphone apps especially in energy efficiency and nudging related applications.

3 III. Categorization of Analysis Methods

Analyzing all types of smartphone apps related to energy efficiency and nudging we first categorize our analysis study into three categories based on three different dimensions of the dataset we have. Those three categories are an analysis of user's star ratings, analysis of a number of installations and of user comments on those applications.

Word of mouth marketing is one of the most effective ways to sell a product or service. User star Ratings and Reviews provide this type of marketing online. Apptentive Consumer Survey 2015 provides the reason why star ratings and reviews are important [4]. Our study involved 25 electricity related mobile applications from various countries having various functional features and services. We analyzed 11,208 different users' star ratings, 3,400 different users' comments, and 697,760 application installations.

4 a) Analysis of User's Star Ratings

From small online businesses to e-commerce giants star rating systems are used in order to measure customer satisfaction and preferences. Now star rating systems are the cornerstone of recommendation systems in pretty much every web industry. Mobile applications industry is one of the large industry that uses star ratings for customer satisfaction and preferences. Apptentive Consumer Survey 2015 shows how star ratings affect application downloads [4]. Our study shows that the average star ratings of electricity-related applications are 4.17-star which is pretty good as 96% users consider downloading an app with a 4-star rating.

Our study also finds that 56.09% users give 5star ratings whereas only 14.20% users give 1-star rating to those electricity related applications.

5 b) Analysis of Number of Application Installations

A number of downloads, download growth and update rates plays a great role in applications rank and promotions in app stores. Whenever a user installs an app in their device for the first time it is counted as a download and further updates do not contribute to the total downloads. So a number of installation roughly gives us the estimates about how many users are using and have used those mobile applications.

In our study, we found that the average number of installation of various electricity-related applications is 29,073. This means every electricity related application has on an average 30 thousand users. In our study, we found that 20.83% of electricityrelated applications are installed in less than 1 thousands times. 33% of electricity-related applications are installed in less.

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Than 10 thousand times whereas 67% of electricity-related applications are installed in more than 10 thousands times. This clearly indicates that the uses of electricity-related utility software are very high and the number of highly ranked electricity related applications is also huge.

8 Analysis of User Comments

Online reviews are crucial to any mobile application that wants to keep control of its online reputation. Online reviews have created a new form of marketing and communication. Though customer reviews range in thoroughness and comprehensibility, they do hold a powerful effect on the behavior of other audience and therefore, the performance of the application. According to the survey by Bright Local 85% of consumers trust online reviews as much as personal recommendations [5]. Reviews can also help us to find out what works and what does not work and where to focus in our development efforts.

Apptentive shows in their survey done in 2015 that why users leave reviews. According to their survey 73% of users review an app after a negative customer experience, 60% users review an app after positive customer experience, 39% review an app to file a bug report, 24% review an app to suggest a feature and 16% review an app to comment on a version update [4].

In our study, we categorized our customer reviews into three categories. The distribution of comments on those three categories are given below In our study we found that 62.26% of user comments on electricity-related mobile applications are positive, 31.88% are negative and only 5.85% are neutral. This clearly indicates that people found those applications helpful and trusty.

Among those 62.26% positive comments we found that most of the comments appreciated and praise the applications such as an excellent app, Nice work, helpful app etc.

And among those 31.88% negative comments we found that most of the problems are update related problems such as updates does not work, electricity price rates are not updated ones, update version crashes etc. Another most frequent negative comment is an interface and features related problems such as bad design, features need to be added, some features do not work etc.

9 IV. Discussions and Findings

After analyzing those electricity related smartphone apps we found some interesting findings that can help future application development in this field and update the existing related applications so that they can satisfy the app users. Our findings are given below: a) Users are interested in electricity Related Mobile Applications We found that current users are very much interested in reducing their electricity consumption and make use of mobile applications to help them for this reduction. The average number of installation of electricity-related applications is 30 thousand which clearly prove our statement.

10 b) The quality of existing electricity related mobile applications are very good

We found that the quality of existing electricity related mobile application is very good. The average ratings of all electricity-related mobile applications are 4.17. AS according to Apptentive survey 96% users want to download an app if its rating is 4, the rating of electricity-related applications is praiseworthy.

11 c) Users Participate Positively in Reviewing Electricity Related Mobile Applications

We found that number of comments on electricity-related applications that gives positive responses is significantly greater than those which gives negative responses. We found that approximately 62.26% of user comments were positive. So this clearly supports our findings

12 d) Most of the problems of current electricity related applications are caused by lack of updates and poor user interfaces

When we analyzed the applications negative reviews we found that approximately 40-45% negative reviews were somehow related to application update problems and poor interface design issues. So this clearly suggests that our future applications should solve those issues seriously. Year 2018

13 V. Conclusion

From the above discussions and findings, we can conclude that people are now very much interested to make use of different Smartphone applications to reduce and monitoring their energy uses. An outstanding mobile application in this field can not only help us in reducing electricity consumption but also can save our valuable money. Production of electricity often causes some negative environmental impacts. Reduction of electricity consumption using those mobile applications can help us in these environmental issues. But our existing electricity related mobile applications have some problems and we need to do some effective research to improve their services. So, in future we need great apps in this sector that can really help us to change our behavior or habits that can reduce energy, save money and make the world greener. [1]
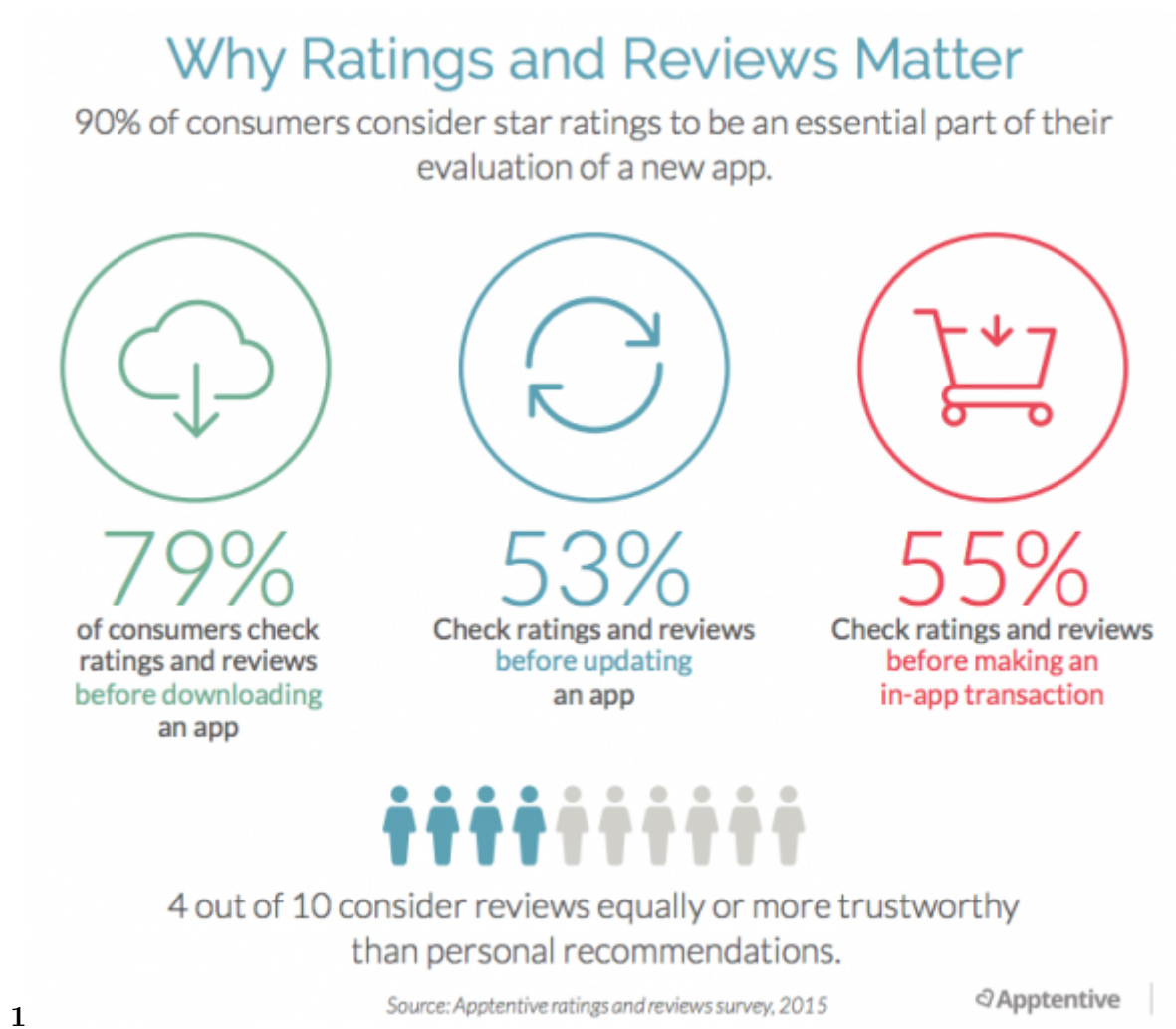
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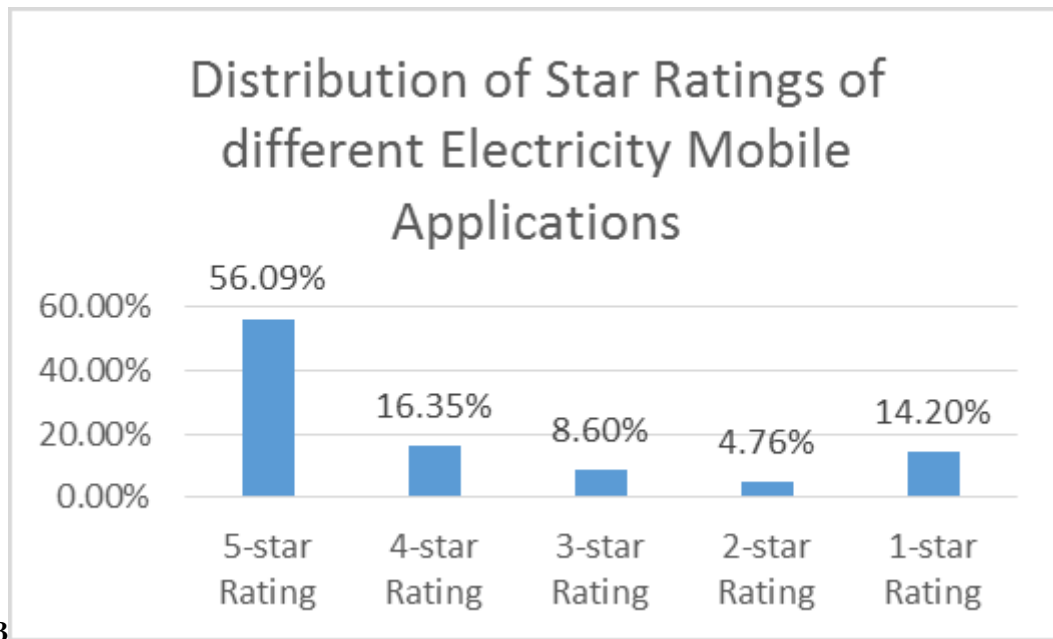Figure 1: Figure 1 :

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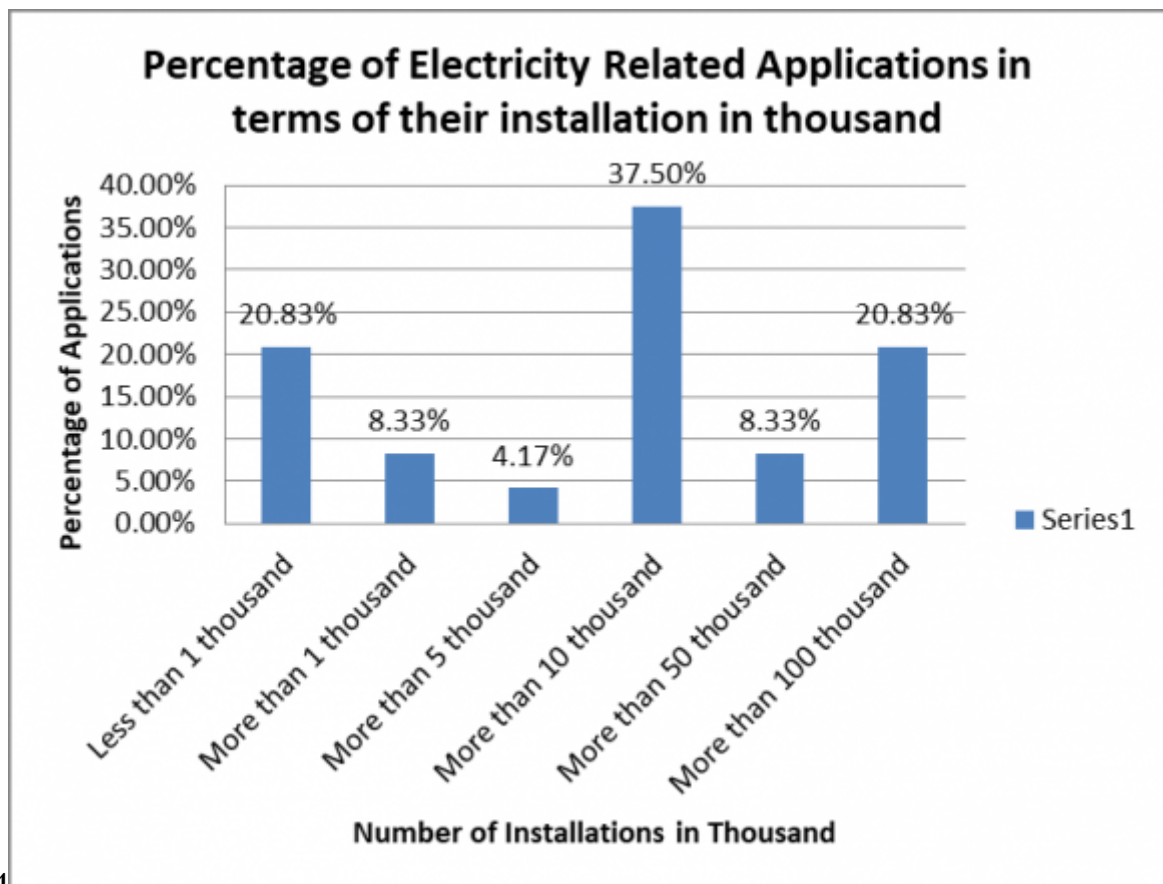
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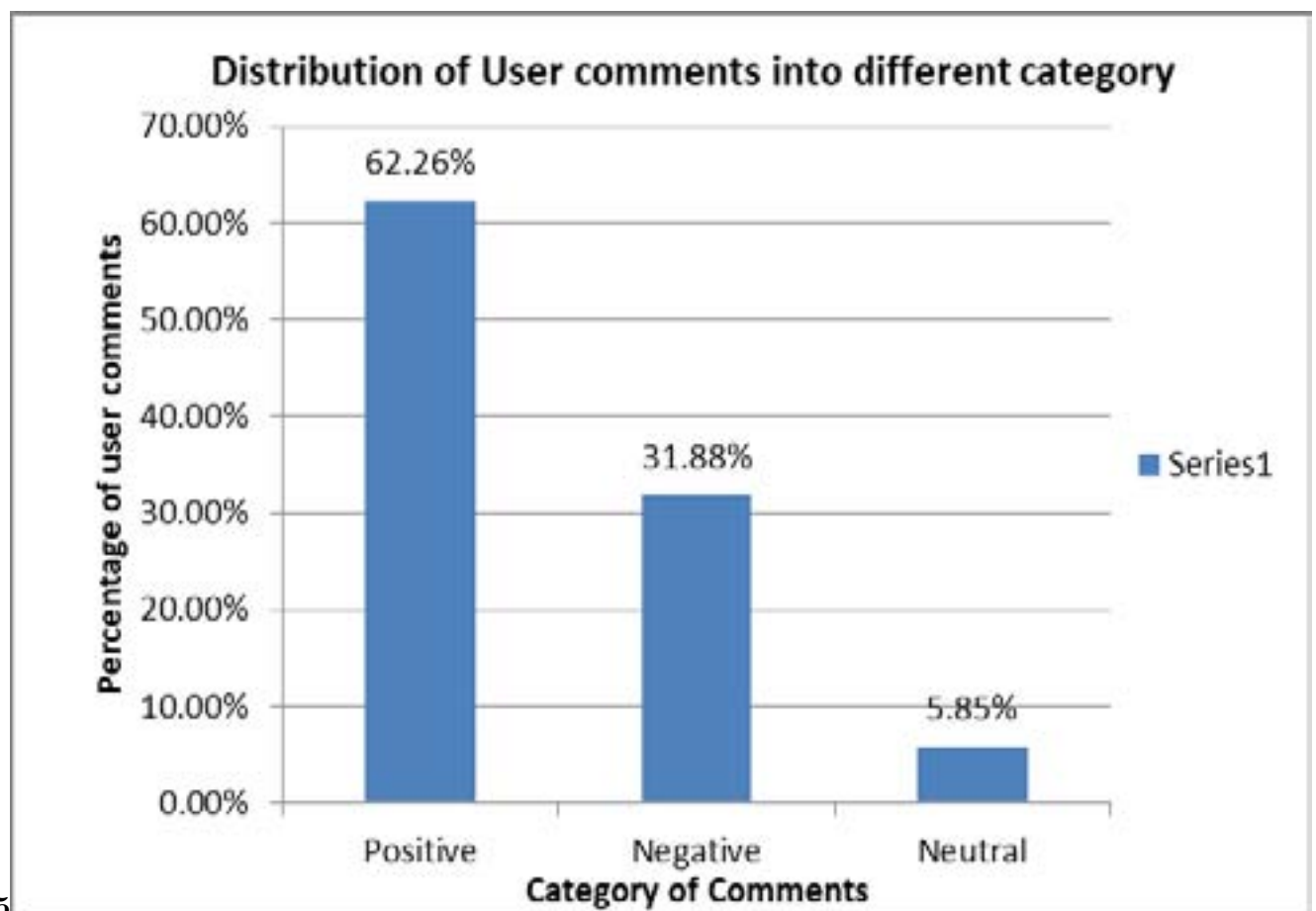

Figure 4: Figure 4 :

Figure 5: Figure 5 :

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