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A Survey of Human Computer Interaction with an Automated Teller Machine

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Abstract: In excess of beyond few years using financial transaction through choice routes are generally expanding swiftly. ATM is among the most critical routes. In these competing years maintaining ATM individual fulfills using its usage and also companies are incredibly crucial. Static interface design, sophisticated and easy navigation menus, distinct ATM interfaces calls for immediate image resolution. A side from the ATM design and style and also user inter face client satisfaction is usually identified with sort of some other ATM support in which in frequent network breakout, inferior ATM meting out terminal's place and also out of cash concerns. This specific makes an important need involving effective Human Computer Interaction (HCI) systems to be able to rectify the actual stated difficulty. This paper present a comprehensive research survey on techniques used in HCI with ATM.

Keywords: HCI (Human Computer Interaction), ATM (Automated Teller Machine), Prom Tool (Process mining tool), Dynamic Screen Selection.

1. INTRODUCTION

Using an ATM has become essential part for the users because it dispenses cash not even in the same city or country but also throughout the world. ATM comes with very advanced options and services; this brings complexity to ATM inter face and design. Static ATM interface design is a very common problem which shows options which are irrelevant. In this survey, we have 300 target audiences in which 242 respondents provide the valuable response. The targeted audiences are classified based on their education level, sex, age group, profession and frequent types of transactions are very important to shape ATM design. Every bank has their own unique ATM design interface which creates problem to customer interacting with different navigation menus. Navigation menus are complex in nature and allow customer to perform transaction after playing through it. The ATM terminal points are inadequate places, most of the time ATM is out of order due to cash run out in peak hours or network break down. These issued is satisfies the ATM customer with lose of interaction. Designing an effective interface reduces customer dissatisfaction towards ATM usage like waiting on a queue while old age man is trying understanding the advancement and exceeded complexion of an ATM. So understand the need of who is actually using the ATM is necessary.

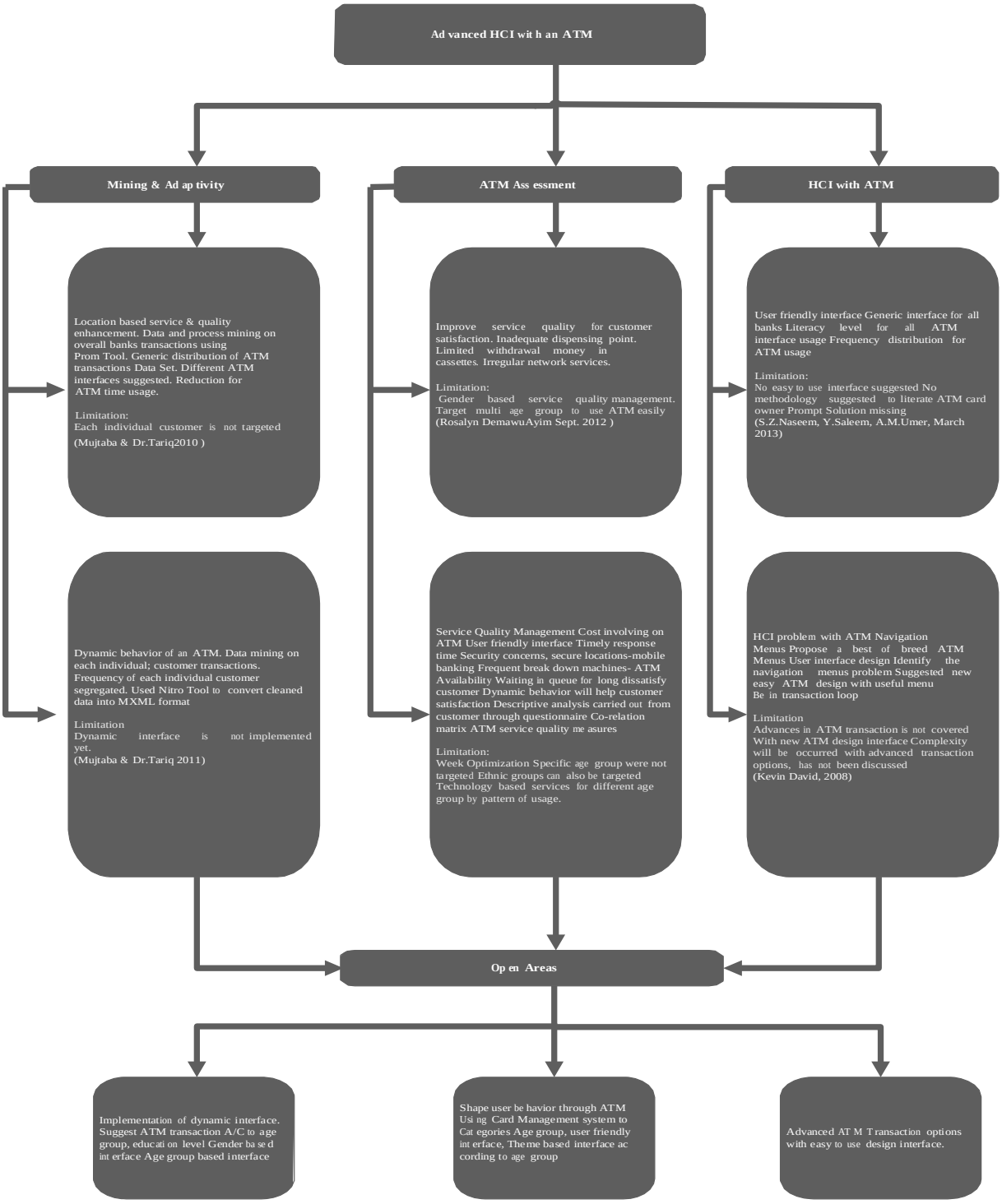
This allows designers to produce different interface to overcome the problem and provide easy to use interface. Section II describes the statement of the problem, Section III describes the various study and techniques used to resolve problem of interacting with an ATM. Section IV graphically displays the literature map and shows the open areas. Section V displays the Bar Chart of trend in which it is clearly identified that how individual respond on the survey questions. Section VI describes the open areas. Section VII describes the conclusion.

2. STATEMENT OF THE PROBLEM

It is observed that single ATM financial transaction took around 45-60 seconds, while multiple flavors of the transaction are offered by the banks (depends upon banking services), so time to single customer with multi transaction will increase up to 3-4 minutes, and eventually a large queue will make outside the ATM booth and affect the customer satisfaction. This time also varies depending on the transaction nature like On-Us transaction or Off-Us transaction, Online-Utility Bill Payment or Off-Line Utility Bill Payment, Online-Fund Transfer or Off-line Fund Transfer transaction. The nature of transaction add-on the security features and the time delay on each part of the transaction (julie A. Jacko, Human-Computer Interaction - Interacting in Various Application Domains - 2009).

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Features	Approaches	Researchers
Problems with using different ATM interfaces	Questionnaire, descriptive analysis	S. Z. Naseem *et al*.[1] 2013
Dynamic behavior of ATM according to Bank	Frequency distribution table, process mining on transactional data	Mujtaba, G. *et al*.[2]2011
Dynamic behavior of ATM according to individual customer, different interfaces Offered	Frequency distribution table, process mining on transactional data	Mujtaba, G. *et al*.[3]2011
Customer satisfaction and service quality management, Convenience, Efficient, Operation, Security and Privacy, Reliability Responsiveness	Descriptive statistical analysis, mean and standard deviation figures against questionnaire,	M. A. Khan[4]2010
Navigation menus, alignment, complexity of an ATM	Questionnaire, self-observation of various banks	k. Curranetal. [5] 2008
Location based ATM services, Inadequate ATM dispensing points	Questionnaire, observations, analysis, static analysis	R.DEMAWU, A.[6] 2012
Customer perception towards ATM, security, services.	Questionnaire, analysis	Khawaja. *et al*.[7] 2009
Customer satisfaction through online banking and ATM services.	Questionnaire, SERVQUAL model, E-SQ, WEBQUAL	H. A. Kadir *et al*. [8]2011
User interface, efficiency of use	Surveys, questionnaire, analysis	De Angeli *et al*.[9] 2002
Adoption of ATM with adaptively features	Deep survey, HCI techniques for adaptations	De Angeli *et al*.[10]2003
ATM services and users satisfaction	Regression analysis, correlation and factor analysis	V. Kumbhar. *et al* [11] 2011
Customer satisfaction in E-banking	SERVQUAL,ES-Qualand E-Res-Qual scale to examine service quality.	Mobarek *et al*.[13]2007
service quality approach for ATM	User friendly system, secure ATM location, cost effectiveness	Dilijonas *et al*.[14]2009
Assessing Electronic service quality for an ATM	ES-Qual	Parasuraman *et al*. [15]2005
E-service quality management and assessing	SERVQUAL Tool	Zeithaml *et al*.[16]2000
Efficiency and User friendly ATM	Analysis	Aldlaigan *et al*[17] 2002
Interaction with ATM	Operation performance	Yavas *et al*[18] 2004
User friendly ATM system, location adequacy	Performance analysis,	Lovelock *et al*[19] 2000
ATM frequent failure, customer dissatisfactions	Use of multi-channel, accessibilities, speedy Operations	Patricio *et al* [20] 2003
ATM for disable people	Interfaces that help disable people ATM usage	Gill *et al*[21] 2009
Reliability and efficiency of ATM	Analysis	Davies *et al* [22] 1996



Naseem *et al*. (2002) A study was carried out for investigating ATM interfaces and their interaction with customers, various question naira were build i.e. use of different ATM interfaces, differences in ATM interfaces, people who are facing difficulties using different interfaces , literacy level of ATM users and number of people who use only one single ATM interface on order to survive from different ATM interfaces. The results showed the static analysis for each ATM user; this brings Bank attention towards having a same and simple ATM interface in order to keep their user satisfied.

Mujtaba, *et al.* (20023) Researches were made on the ATM usage, number of frequent transactions like Balance Inquiry, Cash Withdrawal, fast cash and mini-statement. A frequency distribution table was generated to show the importance of frequent transactions. This was achieved through applying Process Mining Technique by using Pro M Tool and Nitro tool on Bank's transactional data, which really cleans the data first then mine to produce semantics and generate task matrix. The task matrix displays frequency of each type of transaction on bank bases. Through these analysis bank scan easily analyze the importance and re-design their ATM interface accordingly which doesn't involve any complexity but a straight forward, easy to understand ATM look and feel which creates user bonding with ATM services rather than going/playing through complicated Menus for only Balance inquiry transaction.

Khawaja, and Manarvi, (2009). While considering customer satisfaction and ATM service quality management an empirical study were carried out through questionnaire on the basis ATM user's age, gender, education level and for how long they have been an ATM for. A descriptive statistical analysis was carried out to present the mean and standard deviation figures against questionnaire. After the analysis a correlation matrix were generated which defines the Convenience, Efficient, Operation, Security & Privacy, Reliability Responsiveness, ATM Service Quality in terms of numbers to help improving the Service quality management and customer satisfaction.

Khan. (2010). an investigation was carried out on HCI problems with ATM navigation menus. In this investigation most of the United Kingdom's Banks were targeted and analyzed that navigation menus are not properly aligned, complex in nature, after one transaction card is ejected so for performing two consecutive transaction customer has to re-insert the card now think about the person who is waiting to use an ATM in peak hours and for simple transaction customer has to face complex menu options. Different banks menus are also shown and their complexity levels are also discussed. Different diagrams are also drawn to propose the simple ATM menus so human computer interaction becomes so easy and with customer satisfaction.

Survey Results

Mujtaba, *et al.* (2003) in the second part instead of banks, individual customer who uses ATM services was targeted. Their frequent transactions were again mined through process mining technique and frequency distribution table were generated. Rather than bank changes their interface on the bases of number of frequent transaction but all bank scan propose the Dynamic behavior of an ATM according to customer needs and wants I.e. if customer uses ATM only for cash withdrawal and in the cash withdrawal mostly she/he withdraws500then directly display 500cash amount on the front screen and other service will be covered in the Other Menu List. This dynamic 4ehavior of an ATM will save not only customer time that is using ATM but also for the person who is in the queue to use an ATM.

Description:	Yes	No	Don't know
Did you ever experience a delay in the financial transaction on ATM	181	35	26
Did you every experience a queue on the ATM booth.	207	27	8
Do you think that ATM screens is the main reason of the transaction delay	32	8	202
Do you believe that Network is the main reason of the transaction delay	97	86	59
Do you think that ATM screens should be dynamic	136	21	85
Do you think that dynamic screen-flow helps you to come the transaction more fast and easier	125	35	82
Do you think that dynamic screens are more attractive	128	34	0
Do you think that ATM screens should be based on last 5 five transactions	133	29	0
Do you think that ATM screens should be based on gender	137	25	0
Do you think that ATM screens should be based on education level	146	16	0

Open Areas

Several researches have been performed on Human Computer Interaction with an ATM, after thorough study of these researches followings are the open areas where more work can be done to improve ATM design interface and customer experience. Implementation of dynamic inter face.

i. Implementation of dynamic interface.
ii. Suggest ATM transaction A/C to age group, education level
iii. Gender based interface
iv. Age group based inter face Shape user behavior through ATM Using Card Management system to categorize Age group, user friendly interface.
v. The me based interface according to age group
vi. Advanced ATM Transaction options with easy to use design interface.

3. CONCLUSION

In this survey we have described the various study and approaches taken to reduced problems of customers interacting with ATM and improve their satisfaction through service quality management. But there are some more work can be done to improve customer experiences of using an ATM and to retain their satisfaction. A theme based interface according to age and sex wise would be more appraisable by customers. Introduce dynamic behavior of an ATM according to customer literacy, age, profession level. Loyalty point should be introduced to generate more customers' attraction. Provide dynamic interface which provides ease of use and some basic guides for usage. Advanced transactions options for bank's professional customer with easy and attraction design interface. Banks should also consider securing customers and their data along with providing peaceful environment to use an ATM service, this will help bank to retain and satisfy their customer.

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