IJSEAT International Journal of Science Engineering and Advance Technology

Secured and Smart Electronic voting system

B.Ravi Kumar ,T.V Janardhana Rao ,Dr.N.S. Murthy Sharma , P. Harika
Department of Electronics and Communication Engineering , B.V.C. Engineering College, Odalarevu , (A.P).
229ravi@gmail.com , dean.admissions@bvcgroup.in, msmm141 @gmail.com , harikapangam@gmail.com

Abstract

Now a days various displays are becoming available for implementing a new kind of human computer interaction (HCI) method. Among them, touch panel displays have been used in wide variety of applications and are proven to be a useful interface infrastructure. We exemplify our approach through the design and development of secured & smart ectronic voting system. As the Supreme Court recently ordered to include the "Reject" option, so that the voter can reject if he is not interested in any party. This touch screen based electronic voting system provides confirmation after selecting a party from the list. A beep sound will be generated when the voter presses the confirmation so that the vote will be casted successfully to a right party. This type of electronic voting systems allow easy confirmation and casting of vote without any assistance. This system also provides security by entering the voter ID whether it is correct or not. We also conducted a preliminary evaluation to verify the effectiveness of the system.

Keywords- touch panel interface; electronic voting system; assistive information technology.

1. Introduction.

Touch panel interface is becoming a popular technology in many fields. It has been used in specific application systems such as ATMs (automated teller machines), museum displays, and ticketing counters in airports and stations for a while. Now it consolidates its position as a general-purpose interface used in notebook PCs, PDAs (personal digital assistants), and cell-phones [1].

The touch panel interface eliminates keyboards and mouse for interaction in small devices. It also enables a single device to provide a variety of appic action interfaces by customizing display layouts. Large-scale touch screen devices such as Microsoft Surface tabletop display efficiently support multi-user collaboration environment [2].Whereas the above mentioned benefits in using touch panel interface, there are some weak points. For example, users ordinary need to watch a screen all the time until they finish operations in using the touch panel interface. Even if they watch the screen carefully, they may sometimes lack confidence in accurately pushing a button displayed in the screen. They also have difficulty in using the device in too bright or ray less environment. If they use the device with glances (ex. operating an in-vehicle monitor while driving) is difficult and sometimes very useless for blind users.

Information "haptization" for making various objects like GUI components displayed on the screen tangible entities attracts increasing attentions from many researchers. The touch-based interaction methods strengthen the intuitiveness and d rectness for presenting information through the Web, providing visually-impaired persons with an effective alternative for recognizing and

Figure 1. Immersion's Touch Screen™ device for typing a keyboard on an LCD display.

realizing a universal ICT service platform covering mice for interaction in small devices. It also enables a different generations and skill levels. single device to provide a variety of application interfaces by customizing display layouts. Large-scale touch screen There are commercially available touch screen devices with embedded haptic interaction capability. Figure 1 shows the Touch Screen™ haptic display developed and marketed by Immersion Corporation [3]. When a user touches GUI components (array of keys on a keyboard in Figure 2) drawn on an LCD display, he/she feels a realistic tactile sensation as if he/she really pushes the keys. The device presents such tactile sensation by vibrating the whole screen. It generates different kinds of tactile effects by changing the pattern, duration, and relative magnitude of vibration. There are predefined set of tactile effects callable from software. Because the user can allocate different effects to different GUI components, he/she can design a sophisticated interface with multiple tactile effects. For example, the effects for alphabet keys, numeric keypad, and a space bar can be differentiated in the case of keyboard application as shown in Figure 1. Then, the user easily identifies the difference between these keys by not only visual image but also touch sensation he/she feels when typing.

Although the haptic technology is becoming an important building block for implementing effective and easy-to-use interface, acquiring the state of principal modality along with audio-visual interface seems distant. A reason preventing the popularization of the haptic technology is that practical haptic applications are not clearly defined. Human touch sensation (somatic sensation) has a wider dynamic range and fewer findings in psychology and cognitive science than other sensations. so this reasons we design voting system with ordinary touch screen.

Finally an electronic voting system is designed using two types of touch screens one is haptic touch screen and second one is ordinary touch screen.

In this paper, we propose an approach for effectively designing user-friendly touch screen applications. We describe a technical framework for effectively sharing various touch screen devices and device dependent software from application systems. Then, we exemplify how the touch screen function helps the weak users through the design and development of an electronic voting system. The system uses a touch panel display for allowing the weak to easily confirm, select, and vote their supporting candidate without any assisters

In this paper we also propose to provide confirmation for our vote. This project also provides audio confirmation for our vote.

2. Related Work

Haptic touch screen is becoming a popular interface technology in mobile information terminals such as PDAs and cell-phones [4]. The operational interface used in the mobile terminals is mainly inherited from GUI interface originally designed for personal computers. Such interface ordinarily is difficult to use in a small mobile screen. There are some trials for investigating how tactile feedback improves the terminal interactions. Kyung et al. showed that the tactile feedback improves the performance and accuracy of some GUI operations on a mobile terminal such as clicking, drag and drop, scrolling, and others [5]. Hoggan et al. focus their attention on text typing operations on a mobile touch screen device [6]. They reported that adding the tactile feedback improved the text entering operations in both static and dynamic environments.

Touch screen terminals with the tactile feedback have efficacy as assistive information devices. Guerreiro et al. designed a method enabling blind users to input text via the keypad of a mobile phone [7]. They evaluated the method by using the physical keypad of the mobile phone rather than the tactile feedback. Rantala et al. designed and implemented a Braille character display by using a touch screen mobile phone with the tactile feedback [8]. They designed three methods for presenting the Braille characters and conducted experiments to verify the methods. They pointed out that using rhythmic patterns is an efficient and preferable approach in the presentation of the tactile feedback. Ternes et al. showed that the rhythm- based tactile feedback is a valuable method to implement a large number of tactile vocabularies [9]. They developed a method for organizing more than eighty haptic icons, GUI parts with brief tactile effects, perceptually identified as different icons by users. They conducted a thorough experiment for validating the proposed method. Users' comfort is another important factor for implementing a good interface for information terminals. Koskinen et al. explored a way for presenting a pleasant tactile feedback for operating GUI widgets [10].

3. Applications Scenario

Although the haptic technology is becoming an important building block for implementing effective and easy-to-use interface, acquiring the state of principal modality along with audio-visual interface seems distant. A reason preventing the popularization of the haptic technology is that practical haptic applications are not clearly defined. Human touch sensation (somatic sensation) has a wider dynamic range and fewer findings in psychology and cognitive science than other sensations. Most ongoing research projects focus on implementing new devices, control methodologies, and basic software toolkits. The promotion of the haptic technology utilization, however, needs a scenario for defining application level research issues and their potential applications. Accordingly, we are conducting our research project with the application development scenario as shown in Figure 3. The following prototype systems are planned or currently under development.

(a) One of the most encouraging applications is an assistive computer technology field. The haptic modality usefully complements and improves the visual and auditory senses of the elderly and physically-disabled persons. We conducted a questionnaire survey on how the haptic technology resolves digital divide in the use of the Internet [11]. The results show that it has a potential ability for effectively assisting such weak persons.

(b) In heritage applications, touching real exhibits and traditional arts is strictly prohibited. The haptic interface allows the users to touch and elaborate cultural assets and the techniques of mastery. We are developing a virtual calligraphy system for learning professional writer's skills.

(c) In disaster prevention applications, when users are observing constantly changing disaster information, the haptic sensation enables the users to instantaneously detecting indistinctive but significant changes over the vision-only presentation approach. We are developing a prototype system as shown on the left side of Figure 3.

(d) In electronic map systems, the haptic sensation helps the users for grasping 2D information in three dimensions.

We are developing an electronic voting system with the tactile feedback as an assistive technology demonstrator. In the next section, we present our approach for implementing the above mentioned scenario by exemplifying the development of the electronic voting system.

4. DEVELOPMENT OF ELECTRONIC VOTING SYSTEM WITH HAPTIC TOUCHSCREEN

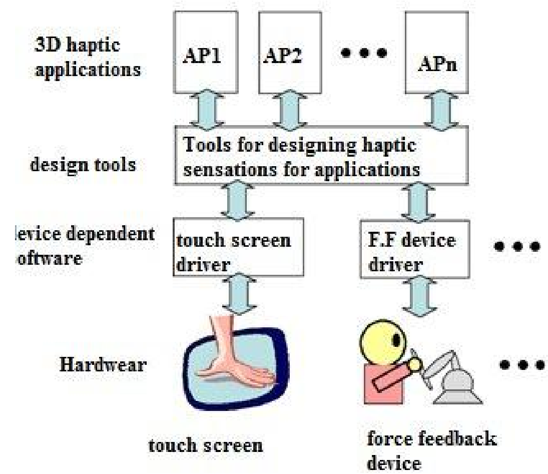

Figure 2. Architectural framework for sharing and reusing different types of haptic devices from application

4.1 Framework Architecture

A characteristic of the haptic technology differentiating itself from other modalities is the diverseness of the display devices and their control software. Human tactile sensation has no particular receptor and is responsible for various senses across an entire body. Therefore, developing a single device covering all senses is impossible. Accordingly, so many research and commercial devices targeted at stimulating a specific tactile sense have been developed. Because these devices have their own mechanisms for presenting various tactile effects, the users need to incorporate the devices into their application systems by using proprietary control methods. Although the haptic devices should easily be customizable as interface devices, effectively using the devices is an extremely difficult issue for the users with no programming skill.

We devised a technological framework as shown in Figure2 enabling the application developers to share and reuse the different types of the haptic devices. As shown in the figure, the design tools layer makes the device-dependent software and hardware layers invisible from the applications. The tools layer also provides multiple design support tools and interfaces depending on the knowledge, experiences, and technical skills of the users [13]. Accordingly, the framework supports a broad range of users from novices to skilled experts.

4.2 Outline of Electronic Voting System

Electronic voting systems with touch panel interface are actively pursued in these days. Computerized balloting system has some advantages over the traditional paper ballot such as prevention of wrong description, simplification and automation of vote counting, and substantial cost reduction. In contrast, high reliability, security, and usability are important factors for implementing the practical system. The elderly and blind users have difficulty balloting by using the normal touch panels without the tactile feedback. The blind users especially need multiple assisters like surrogate scribes and beholders when they throw their votes using the touch panels. Our goal is to implement the electronic voting system enabling the weak persons (the blind users and the elderly) to have a ballot all by themselves without anxiety. We leverage the haptic feedback to achieve the goal.

The system assigns candidates' names and their belonging parties with different tactile effects. It allows even the blind users to independently vote their supporting candidates by using the effects as clues. We utilize the Immersion's Touch Screen haptic display as a target device for implementing the system. Figure 3 shows the functional design outline of the system. The balloting procedure consists of the six processes as indicated in the figure. The former discriminating the candidates and assign an effect with each candidate. Then, in Process 3, the administrators make the assigned tactile effects by pushing the buttons one -by-one. Because the candidate name is read out by the system simultaneously, they can relate and memorize each effect with the corresponding candidate. After that, in Process 5, the voters select their supporting candidates by pushing the selection button They should select the candidate only with the tactile effect in this process for confidentiality. .process 6 provides nobody voting option Finally, they complete the vote by pushing the "Vote" button. The "click" sound notifies the voters of the completion.

4.3 Tactile Effect Design Support Tool

It is important that the system provides a tool allowing the users to intuitively substantiate their desired sensations as well as hiding mechanical features and operational parameters of the haptic devices. We developed a tactile effect design tool. It enables the users to manually set the following Touch Screen device parameters for designing "touchable" GUI components: Base effect among three alternatives, "pulse", "crisp", and "smooth," Relative magnitude, duration, and repeat length of vibration, and Cadence effect of vibration.

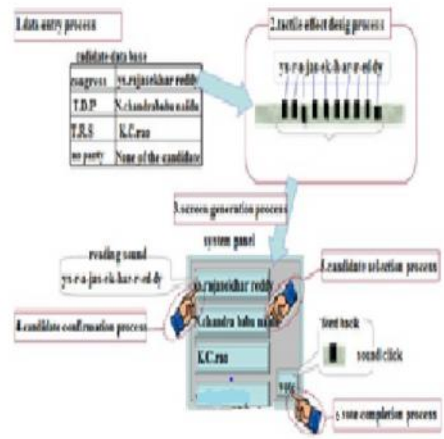

Figure 3.functional design of electronic voting system based on tactile feed back

A set of buttons placed in the central area of the main window are used to precisely set the above mentioned vibration parameters. The users can check and adjust the defined effect with the replay function activated by pushing the top left "replay" button. An effect consists of two vibrations activated before and after a specific GUI operation. The user can assign different ones for these before/after vibrations for generating sophisticated tactile sensations. For example, in a "press button" operation, a realistic "bumpy" feeling of the button can be expressed by giving different effects on push down and push up separately. The defined effects set can be saved and restored for sharing and reusing among different applications. The tool also provides a function for comparing multiple effects and checking the degree of difference the users can perceptually identified.

4.4. Prototype of Electronic Voting System

In the screen, each candidate’s name, confirmation button, and selection button are regularly arranged in a row. A ballot operation consists of the three processes that are confirmation, selection, and vote as described in circled numbers.

***4.4.1. Confirmation process*:**

A voter (the elderly or the blind) experiences the tactile effect assigned for each candidate one by one by pushing the “confirmation candidate” button. Because the candidate name is read out by the system in concurrence with the tactile effect presentation, the voter can memorize each effect with its corresponding candidate. He/she performs the confirmation operation for all candidates. He/she efficiently carries out this process by shifting his/her finger horizontally. If the number of candidate is rather large, the voter performs this process on multiple pages.

***4.2. Selection process*:**

After the confirmation process, the voter selects his/her supporting candidate by pushing the “select candidate” on. Each candidate’s button is collocated just beneath confirm button. The tactile effect only is presented this process for hiding about who is selected by the voter.

4.3. *Vote process*:

Finally, the voter completes the ballot by pushing the te” button. For simplicity of use, comparing the tactile cts among candidates can be done by shifting theer’s finger horizontally, and the confirmation and ction can be performed by vertical shift. In the real usage, the voter needs to wear a head receiver to preserve the secrecy for the voice output of candidate name in the confirmation process.

5. DEVELOPMENT OF ELECTRONIC VOTING SYSTEM WITH TOUCHSCREEN

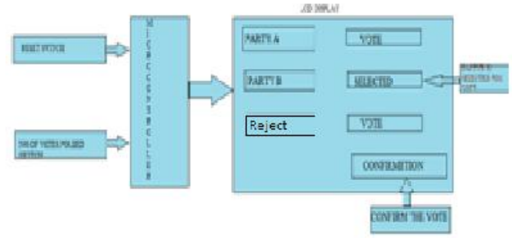

Figure 4.functional design of electronic voting system based on touch screen.

The above figure 4 shows the functional diagram of touch screen based electronic voting system[16] .This system consists the touch screen display and micro controller. The functional diagram consists the reset switch, this switch is used to reset the previously polled votes. The functional diagram also consist the no. of votes polled switch. This switch is used to display the no. of votes polled . The no. of votes polled is displayed on touch screen LCD display. The touch screen display displays the party list and confirmation for vote. The vote confirmation process also provides audio beep sound for vote confirmation.

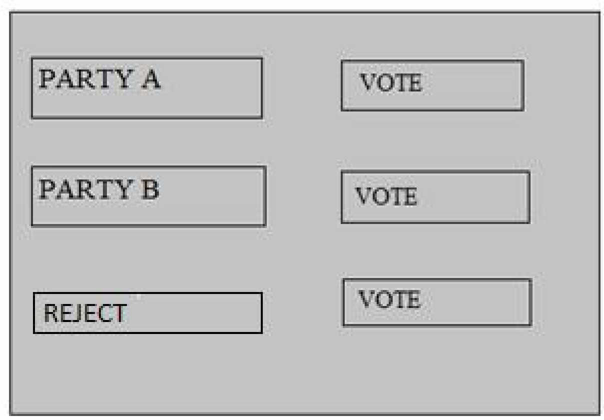

Figure 5. LCD display before party is not selected.

The above figure 5 shows the LCD display before party is not selected. The confirmation option is also not displayed on the LCD touch screen before selecting the party.

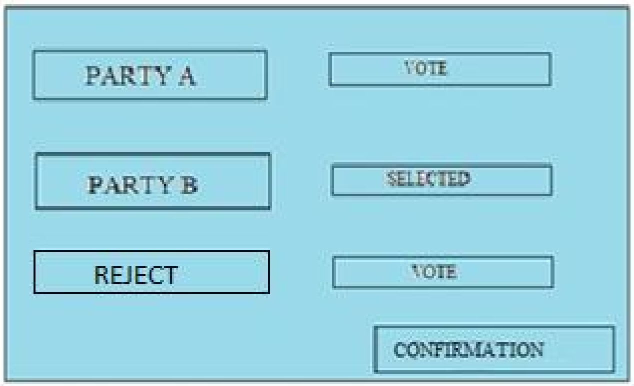

Figure 6. LCD display after party is selected

The above figure 6 is the LCD display after selecting the party from the party list on LCD. After we select the party touch screen displays "SELECTED". The LCD also display "confirmation". This confirmation is displayed after selecting the party . we press the confirmation the vote is casted successfully. This confirmation option is also provides beep sound..

The touch screen based electronic voting system consists the following steps for casting the vote.

- Enter security code process
- Selection process
- Confirmation process

***5.5.1. Enter security code process*:**

In this process the touch screen displays number keys, we enter the correct security code the LCD display displays the vote .If the security code is not correct the LCD not displays the vote. This process is used to provide the security for electronic voting system.

***5.5.2. Selection process*:**

The selection process is used to select the party from the party list. We select the party the LCD displays the "selected". In this selection process the LCD also displays the "confirmation".

5.5.2. confirmation process:

The vote is confirmed after press the "confirmation" button on touch screen. This confirmation is displayed on touch screen. The vote confirmation is also confirmed by hearing the beep sound .

6. Preliminary Experiment

The system assigns distinguishable tactile effect with each candidate for allowing the weak (the elderly and the blind) to independently discriminate, select, and vote their supporting candidate. To verify how the system can satisfy this requirement, we conducted a preliminary experiment for designing a set of tactile effects easily discriminated by the voters. Firstly, we investigated whether vibration magnitude (intensity) can be a factor for the candidate discrimination. We used the three basic effects ("pulse", "crisp", and "smooth") predefined for the Touch Screen haptic display and assigned the same effect with different magnitude to multiple candidates. Each basic effect has the four levels of its vibration magnitude from weakest to strongest; therefore, we measured the discrimination ratio by gradually enlarging the relative magnitude as single, double, and triple differences of intensity. We employed eight subjects for this experiment. As can be found in the figure, the "pulse" and "crisp" effects achieved 100% discrimination ratio with the triple intensity (maximum relative magnitude). The "smooth" effect, however, could not attain 100% ratio. This result suggests that the vibration magnitude can be used for constructing a set of easily distinguishable tactile effects when used with the "pulse" and "crisp" effects.

Only using the basic effects limits the number of candidate to discriminate. Consequently, we implemented the rhythm-based method proposed by Ternes et al. [9] for expanding the tactile effect vocabulary. Ternes et al. defined twenty one basic effect patterns with different rhythms and then expanded the number up to eighty four by combining different vibration frequency and amplitude with the basic effect patterns. We defined twenty two basic patterns by adding one pattern with their definition and conducted the discrimination test for twenty two different candidates. The result showed that these patterns can stably be discriminated when presented in conjunction with different rhythmic patterns; therefore, we found our system also can organize large tactile effect vocabulary by combining the "pulse" and "crisp" effects with these rhythmic patterns.

7. Conclusion

We proposed an approach for effectively sharing different types of touch screen devices and designing various touch screen applications. We exemplified our approach through the design and development of an electronic voting system. The system uses an easy-to-use touch panel display with embedded function. It allows the easily confirm, select, and vote their supporting candidates without any assistance. We conducted a preliminary experiment for verifying touch screen. This project briefly explain the use of touch screen in electronic voting system. In this project the touch screen is used for many application i.e. vote confirmation display and display no. of. Votes polled. Although our project is at an early stage, the result is promising. Because we are also working on developing some other practical application systems and touch screen design tools, we would also like to conduct more thorough evaluations by using other applications and tools in the near future.

REFERENCES

[1] Koskinen, E., Kaaresoja, T., and Laitinen, P., "Feel-Good Touch: Finding the Most Pleasant Tactile Feedback for a Mobile Touch Screen Button," *Proc. ACM ICMI'08*, pp.297-304, 2008.

[2] Izadi, S., Hodges, S., Taylor, S., Rosenfeld, S., Villar, N., Butler, A., and Westhues, J., "Going Beyond the Display: A Surface Technology with an Electronically Switchable Diffuser," *Proc. of the 21st ACM symposium on User Interface Software and Technology (UIST 2008)*, pp.269-278,

[3] Hoggan, E., Brewster, S.A., and Johnson, J., "Investigating the Effectiveness of Tactile Feedback for Mobile Touchscreens," *ACM CHI2008 Proceedings*, pp.1573-1582, 2008.

[4] Guerreiro, T., Lagoa, P., Nicolau, H., Goncalves, D., and Jorge, J.A., "From Tapping to Touching: Making Touch Screens Accessible to Blind Users," *IEEE Multimedia*, pp.48-50, October 2008.

[5] Rantala, J., Raisamo, R., Lylykangas, J., Surakka, V., Raisamo, J., Salminen, K., Pakkanen, T., and Hippula, A., "Methods for Presenting Braille Characters on a Mobile Device with a Touchscreen and Tactile Feedback," *IEEE Trans. on Haptics*, Vol.2, No.1, pp.28-39, 2009

[6] Ternes, D. and MacLean, K.E., "Designing Large Sets of Haptic Icons with Rhythm," *Proc. EuroHaptic 2008*, Springer-Verlag, LNCS 5024, pp.199-208, 2008.

[7] Vaughan Nichols, S.J., "New Interfaces at the Touch of a Fingertip," *IEEE Computer*, Vol.40, No.8, pp.12-15, August 2007.

[8] Motoji, M., Nishino, H., Kagawa, T., and Utsumiya, K., "A Haptic Parameter Exploration Method for Force Feedback Devices," *Proc. of the 4th Int'l Conf. on Complex, Intelligent and Software Intensive Systems (VENOA 2010 Workshop)*, February 2010 (to appear)

[9] Shuto, K., Nishino, H., Kagawa, T., and Utsumiya, K., "A Handwritten Character Training System with Haptization of Instructor's Brush-Strokes," *Proc. of the 3rd Int'l Conf. on Complex, Intelligent and Software Intensive Systems (VENOA 2009 Workshop)*, pp.1030-1035, 2009.

[10] Nishino, H., Goto, R., Motoji, M., Fukakusa, Y., Kagawa, T., and Utsumiya, K., "Design Support Tools for Developing 3D Haptic Applications," *Proc. of the 2nd Int'l Conf. on Computer Science and its Applications (CSA-2009)*, December 2009.

[11] Aoki, E., Hirooka, J., Nagatomo, N., Osada, T., Nishino, H., and Utsumiya, K., "Effects of Haptization on Disabled People," *Proc. of the 4th Int'l Conf. on Complex, Intelligent and Software Intensive Systems (VENOA 2010 Workshop)*, February 2010 (to appear).