

CPSC 444 User Interface Design Heuristic Evaluation Report

i) Evaluation team Info:

Team number: 10

Team members: Annie Chan, Takako Ohata and Phoebe To

ii) Evaluated project Info:

Team number: 9

The project title: Hapticon Editor

iii) List of heuristics employed

- | | | |
|----|---|---|
| 1 | Visibility of system status | Because the system is interactive and the user needs to decide what to do next, the system status must be evident to the user so that the user can see what he can do. |
| 2 | Clarity of action consequences | The system should give the user appropriate feedbacks so that the user can take a subsequent action by examining the current state. |
| 3 | Availability of reasonable choices | The system should allow the user choose from different options so that the user can perform an appropriate operation based on his goal. |
| 4 | User control and freedom | Because the system supports the user with different levels of familiarity, some inexperienced user may get an unexpected result by performing an unfamiliar operation. Thus, the system should allow the users to recover from the mistakes they have made. |
| 5 | Consistency | The system would have various operations and graphical user interface such as icons. The operations and the interface should be presented in a consistent way. |
| 6 | Error prevention | Casual users would likely make mistakes. The system should anticipate and correct user mistakes. |
| 7 | Recognition rather than recall | There would be various operations the user can perform and it would be hard for the casual users to remember those operations. The user should be able to easily figure out how to perform desirable operations. |
| 8 | Help users recognize, diagnose, and recover from errors | The system should support users who are familiar with computers but have not used Hapticon Editor. Help menus and error messages would be necessary for those casual users. To prevent researchers from losing their valuable research data the system must protect data against unexpected loss or manipulation. |
| 9 | Flexibility and efficiency of use | The system should be flexible so that the expertise users can perform different kinds of operations. It should be efficient to use because the users would have a certain time constraint to conduct the research using the system and also they would need to conduct a large test set. |
| 10 | Aesthetic and minimum design (optional) | The system should look nice for the user to have pleasant time using it. Also it should have necessary but minimum functionalities so that it is easy to learn and use. |
| 11 | Help and documentation | Help would be needed for the casual users in case the user gets stuck. The operation manual should be supplied to the user because the system is for not a generic use but for particular research use and would have special operations. |

Evaluations

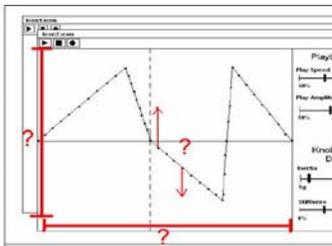
Scenario:	Severity scale:	Extent scale:
#1 : Novice User	3 = Major usability problem	3 = Widespread
#2: Intermediate User	2 = Minor usability problem	2 = Several places
#3: Expert	1 = Cosmetic problem or nuisance issue	1 = Single case

iv) Team's Evaluation

After we went through individual evaluations, we came up with a list of problems categorized into 3 groups based on the levels of seriousness. For each we will give a detailed explanation as well as the possible solutions.

Level 3 (Most significant):

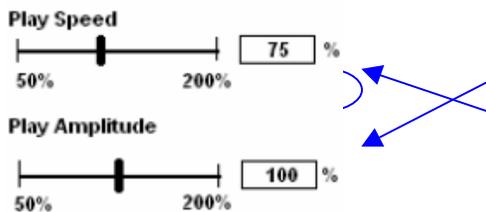
- a. Absent of the units for X-axis, which is likely to be the time duration in second, and Y-axis. In fact, the user will not be able to tell how high or low she should drag the point upward or downward.



- *Clarity of action consequences* (the user would not know how much time is elapsed or which direction she should drag the point to make the knob turn right/left.)
- *Visibility of system status* (no clear indication of time and no clue of where in the time interval the play-line is)

- All of us found the above problem and we rated it in the similar manner. (All of us have either 1 or 2 for Severity and 1 for Extent.) We think that it would not affect the functionality of the application but it would be inconvenient because the user cannot see the actual values. The application should display the values explicitly.

- b. Ambiguous limits on the play speed, amplitude, inertia and stiffness. Also it is unclear if the user can type in the value in the text boxes.



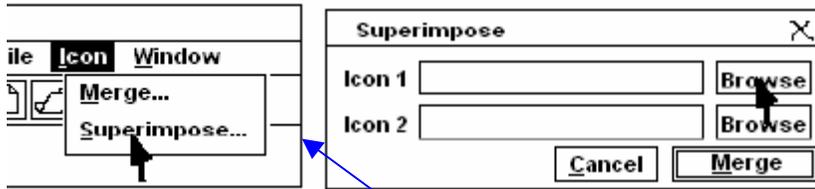
- Error prevention
- Availability of reasonable choices (It is unclear whether the user can modify the speed in the text box. It seems that the user has to rely on the scroll bar to adjust the speed.)
- User control and freedom (What if the user wants

less than 50% or more than 200% for the slider bar values? Is there a function with which they can alter the value? Why it is not 0% and 100% but 50% and 200% anyway?)

- All of us found this problem and we rated it the same. (2 for Severity and 2 for Extent).
- c. Unknown whether the user can undo when she made a mistake.
- Error Prevention & help users recognize, diagnose, and recover from errors
 - All of us found this problem. There is no indication of whether the user can perform an 'Undo' operation. It is highly likely that the user makes mistake. Thus, 'Undo'

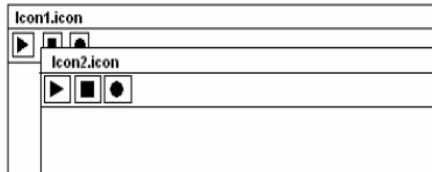
command is definitely needed.

- d. What is the difference between “Merge” and “Superimpose?” The pull-down menu has “Merge” and “Superimpose” options but the “Superimpose” window has the “Merge” button.



- Consistency and standards
 - 2 of our members see this as a problem and they consider this as one of the major problems. It is very confusing because 'Merge' and 'Superimpose' look the same but they are presented as two different functionalities. The user would wonder what these functions actually do.

- e. Invisible current mode and state.

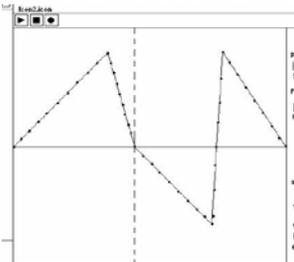


- Visibility of system status

- 2 of our members found this problem. It is hard for the user to find if she is currently in the recording mode, playing mode, or editing mode. It would be informative for the user if a Playback mode or Record mode is shown on the top of the window.

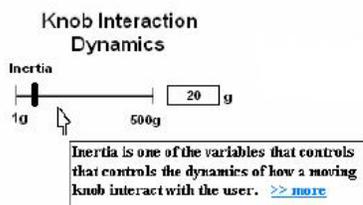
Level 2 (Less significant):

- a. No indication of whether the user can drag the data point when the mouse is over the data point.



- Clarity of path to reasonable goal
 - 2 of our members found this problem. It would be a problem for the novice user. It will be better if the pointer changes to a hand or an up/down arrow when it is on the top of a data point.

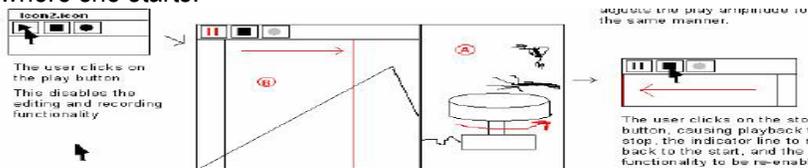
- b. Pop-up help is not necessary for the expert. It would be rather annoying for them. Also, positioning a mouse on an icon for 5 seconds to see the pop-up help is also a bit too long. 1 or 2 second should be enough.



- Help and documentation
 - 2 of our members found this problem.

Although the new user would find a pop-up help useful, the expert user would never want a pop-up help. Therefore our proposed solution to this problem to enable the user to turn on/off the pop-up help.

- c. The user must always start playing from the beginning. It is not clear if she can select the point where she starts.



- flexibility and efficiency of use

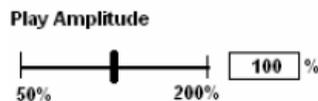
- Only 1 of the members found this problem, however, we think that it is a significant problem for the intermediate and expert user. Since the user would be always editing and previewing the haptic icons, it is very inconvenient for the user to preview from the very beginning every single time.

Level 1 (Least Significant):

- a. Unfamiliar Mapping of buttons and labels.

- Consistency and standards

(2/3 of our members found errors regarding this topic, with 1 for Severity and 1 for Extent)

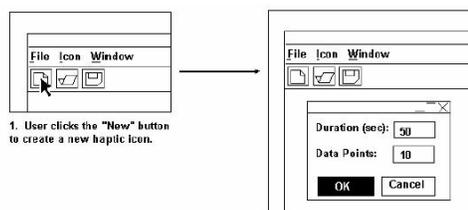


- “Play Amplitude” label is awkward. We assume that the designer meant “Adjust” amplitude.
- + and – sign can be used to increase or decrease the Inertia and Stiffness instead of the scroll bar because it has a negative transfer of the scroll bar used in Play speed (increase stiffness, not making the stiffness go faster)
- Speed, amplitude, inertia and stiffness all have different scales, but a same scroll bar is used for all the attributes. The user may confuse the “%” with the “gram”.
- If the user is used to the first version, then he may find some ‘mapping’ confusing. The new version uses “%” and the scroll bars are horizontal whereas the scroll bars are vertical in the old version such as 1/4X and 5X. Also, the old version uses milliseconds but the new version uses seconds.

- b. No indication of whether the user can change the duration.

- User control and freedom

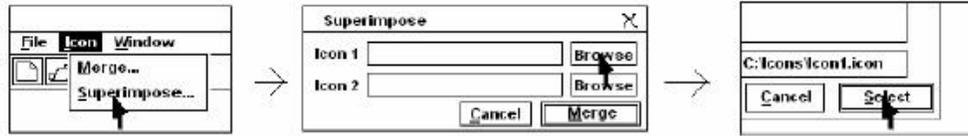
- One member found this error with Severity 1 and Extent 1.



- The user can set the duration when she creates a file. However, what if she wants to change the

duration later on?

- c. The proposed system does not specify whether a user can merge more than 2 icons. It seems that the window does not provide a menu which allows more than 2 icons to be merged at the same time.



➤ flexibility and efficiency of use

One of our members found this problem with 2 for Severity and 1 for Extent.

Member Name: Annie Chan

Scenario #1

H	S	E	Comment
1	2	1	<ul style="list-style-type: none"> ● Generally, the system's visibility is good. Positive transfer of the Play, Stop and Record Icon. ● Although the play button is disabled while the system is recording, it would be informative for the user if a Playback mode or Record mode is provided on the top of the window so that the user will know which state the system is in. ● Play, record and Stop button should be placed at the bottom of the screen rather than the top right hand corner of the page, because most of the case the user will want to play or record after they have adjusted the amplitude or speed.
2	2	1	<ul style="list-style-type: none"> ● The current system does not have a button to store the setting of the speed, amplitude, inertia or the stiffness. The user might want to compare the "before and after" of the graph, and most likely a novice user will not remember the setting that he/she has made. It would be useful if there is a previous and current setting button so that the user can go back to the previous stage.
3	2	2	<ul style="list-style-type: none"> ● It is unclear whether the user can modify the speed in the text box, it seems that the user has to rely on the scroll bar to adjust the speed; however, it will be better to provide a middle value of the bar so that the user can choose 75%, 100% or 150%.
4	1	1	<ul style="list-style-type: none"> ● It is not evident to the user that they can only drag the arrows up and down. The user might have tried different directions before they figure it out. It also does not specify how long the user can extend the line and the meaning of the Up arrow and Down arrow. (Up = Turn Right, down = Turn left)
5	3	1	<ul style="list-style-type: none"> ● Superimpose and Merge. Superimpose means that to place or lay over or above something. Merge means to combine two things. But in the Superimpose screen there is a merge button, the user will not understand what the system will do until it has merge 2 files together. ● No scaling is provided on the graph, a novice user might not know what the graph is according to. To time or to amplitude? ● "Play" Amplitude: I presumed the designer is intended to say "Adjust" amplitude, because it does not make much sense to the user to "play" amplitude ● + and - sign can be used to increase or decrease the Inertia and Stiffness instead of a scroll bar, because it has a negative transfer of the scroll bar used in Play speed (increase stiffness, not making the stiffness go faster) ● Speed, amplitude, inertia and stiffness all have different scales, but a same scroll

			<p>bar is used for all the attributes. The user may confuse the % with “gram” used for Inertia.</p> <ul style="list-style-type: none"> ● The range of the data points is not shown
6	2	2	<ul style="list-style-type: none"> ● There is no undo button if the user made an error.
7	2	1	<ul style="list-style-type: none"> ● Superimpose and Merge: since superimpose means to something lay over or above something, it is not apparent to the user which file is lay above the other, or they are just merging together?
9	2	1	<ul style="list-style-type: none"> ● The proposed system does not specify whether a user can merge more than 1 icon file. It seems that the window does not provide a scroll bar such that it will allow more than 1 file.
8	--	--	<ul style="list-style-type: none"> ● Help menu and Tool tip are good for user of different levels.
11	--	--	<ul style="list-style-type: none"> ● Providing a help menu for the novice user is good. Animation clip of Inertia and Stiffness are good, because the user might not know what it is.

Scenario #2

<i>H</i>	<i>S</i>	<i>E</i>	●
1	--	--	● Good system's visibility.
2	1	1	● The proposed design does not specify whether an error message will be displayed if it occurred.
3	2	2	● User might want to modify the speed or the amplitude in the text box.
4	1	1	● The user might know the representation of the arrows and know how to use it, however, a help menu or tool tip is helpful for reference
5	2	1	<ul style="list-style-type: none"> ● An intermediate user might still be confused by the superimpose and merge option. ● No scaling is provided on the graph, an intermediate user might not know what the graph represents.
6	2	2	● No undo button if the user made an error.
7	2	1	● Superimpose and Merge: An intermediate user might be able to differentiate the two, but a tool tip is required.
9	--	--	● Fairly easy for an intermediate user to use
8	--	--	● Intermediate user might find the Shortcut Key useful.
11	--	--	● Providing a help menu for the users of different levels is good.

Scenario #3

<i>H</i>	<i>S</i>	<i>E</i>	●
1	--	--	● Good system's visibility.
2	2	1	● Will an error message displayed if an error occurred?
3	2	2	● The user might want to modify the speed or the amplitude in the text box.
4	--	--	● The user know the representation of the arrows and know how to use it, thus, the system provide an expert user a lot of freedom.
5	--	--	● The system design is consistent.
6	1	1	● “To err is human” An expert may make mistake too; no undo button if the user made an error.

7	--	--	● Does not apply to the expert user, since they are the "Expert"
9	--	--	● The system provides a lot of flexibility for the expert user since the user knows how it works.
8	--	--	● Expert user might find the Shortcut Key very useful.
11	--	--	● Providing a help menu for the user of different levels is good.

Member name: Takako Ohata

Scenario #1

H	S	E	Comment
1			The system status is visible. For example, play button is disabled while it is recording.
2	1	1	Generally, the system gives the user sufficient feedback. The button look depressed when it is clicked. The menu is highlighted when it is selected. However, the user would not know how much time elapsed or which direction he should drag the point to make the knob turn right/left.
3			The system provides reasonable choices. The user can get a help menu any time. He can either chose from the contents, type the search keyword or position the mouse and right-click to bring the help icon.
4	1	1	It is not evident how long the duration can be and how many data points the user can enter.
5			The system design is consistent. All windows have consistent icons, menus and wording.
6			The horizontal scroll bars seem to limit the input value. Not sure if the user can type into the boxes that show the values.
7			The system has simple and meaningful icons. The user would easily recall what those menu icons are for.
8	?	?	Cannot tell from the sketches if the system supports an undo operation or it shows an error messages.
9			Not relevant heuristic for the casual user.
10			The interface design is simple and readable. Each window displays only the relevant information.
11	1	3	Help and documentation are well provided for the casual user. However, positioning a mouse on an icon for 5 seconds is a bit too long.

Scenario #2

H	S	E	Comment
1			The system status is visible.
2	1	1	The buttons are a bit confusing. Why does the user need to click on "Select?" Can't the user select the second file until he hits "Select?"
3			Supposedly, the user can browse and also type the file locations.
4	1	1	The file location could have a default value such as a previously chosen folder. The user would store the icons in the same place.
5	1	1	What is the difference between "Merge" and "Superimpose?" The pull-down menu has "Merge" and "Superimpose" options but the "Superimpose" window has the "Merge" button.
6	?	?	The file location could be auto-completed as the user types in.

7			The user can always reference the help menu to perform any operation he likes.
8	?	?	Cannot tell from the sketches if the system supports an undo operation or if it shows an error messages.
9			The system does not need to be more efficient. The operation is fairly simple and quick.
10			The interface design is simple and readable.
11	1	3	Help and documentation are well provided for the intermediate user but 5 seconds to see the help icon would be frustrating for him.

Scenario #3

H	S	E	Comment
1			The system status is visible. The user would be in the play mode.
2			Supposedly, the user sees and feels how the knob acts after she enters the input and presses the play button.
3			The system provides reasonable choices. The user can stop, pause and replay the haptic icon.
4			The user does not seem to have much freedom because the operations are limited and quite simple.
5			The system design is consistent. The windows have consistent icons, menus and wording.
6			Not necessary for the expert.
7			Not necessary for the expert.
8	?	?	Cannot tell from the sketches if the system supports an undo operation or it shows an error messages.
9			The system does not need to have accelerators or some other special functions for the power user because the operations are simple and limited.
10			The interface design is simple but elegant.
11			Detailed documentation is provided for the power user.

Member Name: Phoebe To

Summary of Problems found. (For explanation see details on following pages)

Heuristic Topic	Scenario & User Type	S	E	Comments
Visibility of system status	#1A) Novice	2	1	Not clear definition of current mode.
	General	2	1	No display on current duration
Clarity of path to reasonable goal	#1A) Novice	2	1	When editing, if user put pointer over data point, there doesn't seem to have any indication they can drag the point upward or downward.
Clarity of action consequences	#2) Intermediate	1	1	What happened when pressing record after superimposed a new icon?
Availability of reasonable choices				
User control and freedom	#3) Expert	1	1	Should allow users to change file name, duration. Also what about Velocity, Acceleration and Friction

				Resistance mentioned in the proposal?
	General	2	2	What if user wants less than 50% or more than 200% for the slider bar values for example? (Maybe touch on Availability of reasonable choices)
Consistency and standards	#2) Intermediate	1	2	Mapping of 'Ok' and 'Cancel' button.
	#3) Expert	1	2	Mapping difference from Version 1.
Help users recognize, diagnose and recover from errors	General	3	3	Is it possible to do Undo in the application?
Error prevention	#1B) Novice	1	1	Record button too small.
recognition rather than recall				
flexibility and efficiency of use	#2) Intermediate	2	1	Always have to play from the beginning.
help and documentation	#3) Expert	2	1	Pop up help not necessary for experts and it is very annoying for them.

DETAIL EXPLANATION

Usability Heuristics:

- | | |
|--|---|
| 1. Visibility of system status | 8. Help users recognize, diagnose and recover from errors |
| 2. Clarity of path to reasonable goal | 9. Error prevention |
| 3. Clarity of action consequences | 10. recognition rather than recall |
| 4. Availability of reasonable choices | 11. flexibility and efficiency of use |
| 5. Match between system and the real world | 12. Aesthetic and minimalist design |
| 6. User control and freedom | 13. help and documentation |
| 7. Consistency and standards | |

NOTE: '+' means good improvement from version 1.

'—' means problems and this is what we are focusing on.

(Number) means which heuristic topic its related.

Scenario #1

A)

- **+(10)** With the new interface, it is very simple to understand that to create a new file; (unlike version 1 where there's no drop down menu and functions are all on buttons; making it very difficult to understand how to use the application). Here we just need to click the 'New' icon button. With the pop up window asking for the duration which I understand, but data points is not that clear. Its good there's the Help section with information on how to create a new icon, and so on.
- **+(11)** It's good that the help section is broken into different category and it is easy to find what I want to know about.
- **+(3)** Good mappings of buttons too. (new, open, save)
- **+(13)** It is good that there are those pop up help definition so I can know exactly what each function means.
- **+(3)** It is also very good that I can look at the current play speed, play amplitude (%), inertia, and stiffness directly.

- **+(13)** 'what's this' and 'anime' is really good for a new user.
- **--(1) (S2,E1)** But without the help document, there's not a clear definition of what's stage or mode I am in; like am I in recording mode? Or editing or playing mode.
 - **S2:** because it does not really affects a lot on the usability of the application; but for new user, it is still important that everything is well defined. **E1:** basically related to titles.
- **? Unknown factors:**
 - **a) (2) (S2,E1)** any addition mapping such as when user put the pointer over the data point, will there be any indication that user can drag the points up and down?
 - **S2:** won't affect how the application should function, but again for new user it might be difficult for them to notice if there isn't some indication they can move the data points. **E1:** not related to every frame (I assume during recording we don't need to move data points), only editing.

B)

- **+(3)** Again good mapping: Play, Stop, Record.
- **+(9)** Good error prevention: when pressed play won't allow editing or recording as these functions are disabled.
- **--(9) (S1,E1)** Might find the record button too small to press when I am actually interacting with the knob. (Except another person is the tester) I am right handed and I probably would use my right hand to turn the knob. I also use my right hand to use the mouse; however in this case, I might have to reach over with my left hand and click the mouse onto the record button to end the recording. Yet with such a small button, higher chance is I would probably miss!
 - **S1 & E1:** won't affect application's functionality; more like some extra concerns for the users.
 -

Scenario #2

- **+(13)** Help section available to learn how to edit (drag points up and down), and superimpose.
- **--(7) (S1,E2)** Mapping incorrect?? OK (or in this case its MERGE) button usually should be on the left side of Cancel in application. (In the superimpose window)
 - **S1:** won't affect application's functionality; but I as a user just find it a little uncomfortable. **E2:** such problem happened in cases where user need to select 'ok' or 'cancel'
- **+(11)** Allow undo since the new file won't overwrite the two older icons.
- **? Unknown Factors:**
 - **a) (11) (S2,E1)** User can't edit when it's playing; only when user presses stop. What if user pressed pause and he/she wants to edit just a little bit and continue playing from where it is? Or does it allow user to drag the play start line to some point on the graph and then press play?
 - **S2:** For sure user will find it annoying if every time they must play from the beginning. **E1:** only related to playing mode.
 - **b) (3) (S2,E1)** In the new superimposed icon; what happened when user presses Record again? Does it just totally rewrite over?
 - **S1:** might be dangerous if user forgot to save the file and pressed record (if it really just overwrites it). **E1:** specific case (pressing record after superimposed)
 -

Scenario #3

- **--(7) (S1,E1)** This user is very familiar with the first version, and he might find some 'mapping' uncomfortable: we use "%" now, and drag bar are all horizontally; where as the drag bar are

vertical and in 1/4X; 5X; etc in the old version. Also older version used milliseconds; but now it used seconds.

- **S1:** not really significant; just might be a better idea to keep the same mapping as older version. **E1:** applies to scroll bars and duration time only.
- -- (13) (S2,E1) He won't need any help function and those pop up help definition might be annoying to him. Can he/she turn the help pop up function off?
 - **S2:** experts will for sure finds those pop up help extremely annoying, and it happens everywhere. **E1:** related just to pop-up help.
- + (11) Good he can preview as many times as he likes before he save it.
- ? Unknown Factors:
 - a) (6) (S1,E1) Can we change duration size?
 - b) (6) (S1,E1) How to change file name?
 - c) (6) (S1,E1) What about Velocity, Acceleration and Friction Resistance?
 - **S1 & E1:** All of these will be something users for sure want to change occasionally, but won't affect the application operation in this stage. However these are just specific problems and so considered to be just an E1.

Other General

- -- (1) (S2,E1) Also system should display clearly what is the current duration in the window.
 - **S2:** won't affect application's functionality; but might be difficult for user if they want to know what the current duration is. **E1:** only relates to labels of graph.
- -- (6) (S2,E2) I am not sure but is the slider the only option to change the value? Can the user type the value themselves? This is unclear.
 - **S2:** under normal usage this is okay, but what if its an expert user and they want 25%? Or 300%? Current slide bar won't allow user to insert such values; and I am not sure if we can enter the values ourselves manually in the number box. **E2:** applies to all slider bars and the value boxes.
- -- (8) (S3,E3) If I want to undo, possible?
 - **S3:** undo is very important to all area in the application, so such functionality must be available and easy to apply. **E3:** important to all areas in the application.

v) Summary Remarks

Overall, the system design of Haptic Editor v2 is good; the available operations are visible to the user, the menus and icons are coherent and sufficient feedbacks are provided. We did not find any serious design flaws. The idea of using the scroll bars to adjust the speed or amplitude is excellent because it is intuitive and functional. Just by looking at the screen, the user would immediately know that he can move the handle on the bar to change the value. However, it could be better if the scroll bars are placed vertical. The vertical bars would match the user's mental model because they are more common than the horizontal bars. In fact, we do not see horizontal bars and they look unfamiliar. Furthermore, it would be easier for the user to drag the mouse vertically than horizontally.

Haptic Editor Version 2 meets the suggested improvements such as the support for the casual user and the preview operation described in the portfolio, though it does not seem to have the function that allows the user to change the acceleration or the velocity of haptic icons. Team 9 might have changed the proposed design after they submitted the proposal. It was hard for us to evaluate the heuristics because we did not

have sufficient information. The scenarios in the prototype describe only a few task examples. So, we guessed many of the system behaviors.

The proposed design of Haptic Editor is already good so there are only minor changes our team can suggest to improve Haptic Editor version 2. First, we suggest that Haptic Editor have calibrations for the time duration and the rotational speed of the knob or something that indicates the motion of the knob. Then the user would be able to get detailed feedback. We also suggest that Merge and Superimposed functions to be combined to one function if they perform the same operation or else those functions have distinguishable names. Finally, we suggest that the mode is indicated at the top of the window. Optionally, the help pop-up could be enabled/disabled for the expert user and could show up within 1 or 2 seconds rather than 5 seconds, the mouse pointer could appear as a hand icon when it is brought near a point on a graph and indicate that the point can be dragged and scroll bars could be vertical.