

GNG2101 Deliverable D

Accessible Digital Drawing: Detailed Design, Prototype 1, and BOM

Submitted by

Group B25

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Introduction

The goal of this project is to develop an accessible digital drawing experience for our client who suffers from a fluctuating disability. Our final product will allow them to switch between different tools of a Photoshop alternative called GIMP by voice command or by using a macro recorder application. These features will allow them to access their drawing tools with no difficulty. We recently had our second meeting with Madison, where they provided feedback on our concept design from the previous project deliverable.

Summarization of the client feedback

The client enjoyed the voice command feature and was wondering if it could stay on the screen permanently. This will not be changed since the speech-to-text software we are using, LilySpeech, stays on the screen until the user explicitly ends the process.

However, the client expressed their desire of having the GIMP search bar, triggered by the keyboard shortcut “/”, to permanently stay at the top of the screen. Although it is possible to keep the action search bar open while the user works on their project, it does not automatically appear when the user opens GIMP: it has to be manually triggered. Therefore, in order to satisfy that requirement, we would need to design a macro that automatically triggers the search bar when GIMP starts up.

They also approve of the enlarged icons integrated in the GIMP interface. However, they found that the icons on the right side of the GIMP user interface were a bit small. Those icons belong to GIMP’s layers window. The reality is that, by setting the icon size to “Large” in GIMP’s preferences menu, all icons should be set to their largest size. But for some reason, the icons in the layers window did not become as large as the ones in the toolbox. We believe that this is simply due to GIMP’s native design. This can be solved by increasing the width of the layers window. This necessitates dragging the window to the left in order to expand it.

Also, they believe that instead of having the application call out the name of the tool vocally, a text pop up confirming the selected tool would be better. Their ideal confirmation message would be similar to dialogue bubbles in the game series Animal Crossing. (see Fig. 1).



Fig. 1 A dialogue bubble from the game Animal Crossing

The client seems to appreciate the design of text boxes in that game, meaning that a similar design in our application could satisfy their needs. We have yet to discover a concrete way to integrate this feature into the product, and will implement it in later prototypes.

The client liked the concept of the local web page containing buttons that would trigger macros, but was concerned of the size it would take on their computer screen since they only have one monitor. They also would like it to always stay on the screen, just like the speech-to-text window because switching between tabs quickly could cause them to have a seizure. Therefore, we must design the macro recorder widget in a way that allows it to be pinned above the GIMP interface. We have decided to create an Electron application instead of a simple HTML page. Electron is a JavaScript framework that allows the creation of desktop applications using web technologies. By creating a desktop GUI, we could customize it in a way that makes it a small window that is always at the top of GIMP.

Finally, the client stated that for the buttons of the macro application, they prefer icons over the name of the tool written in plain text. We have adjusted our design accordingly and replaced all text with images.

Detailed design

User Interface

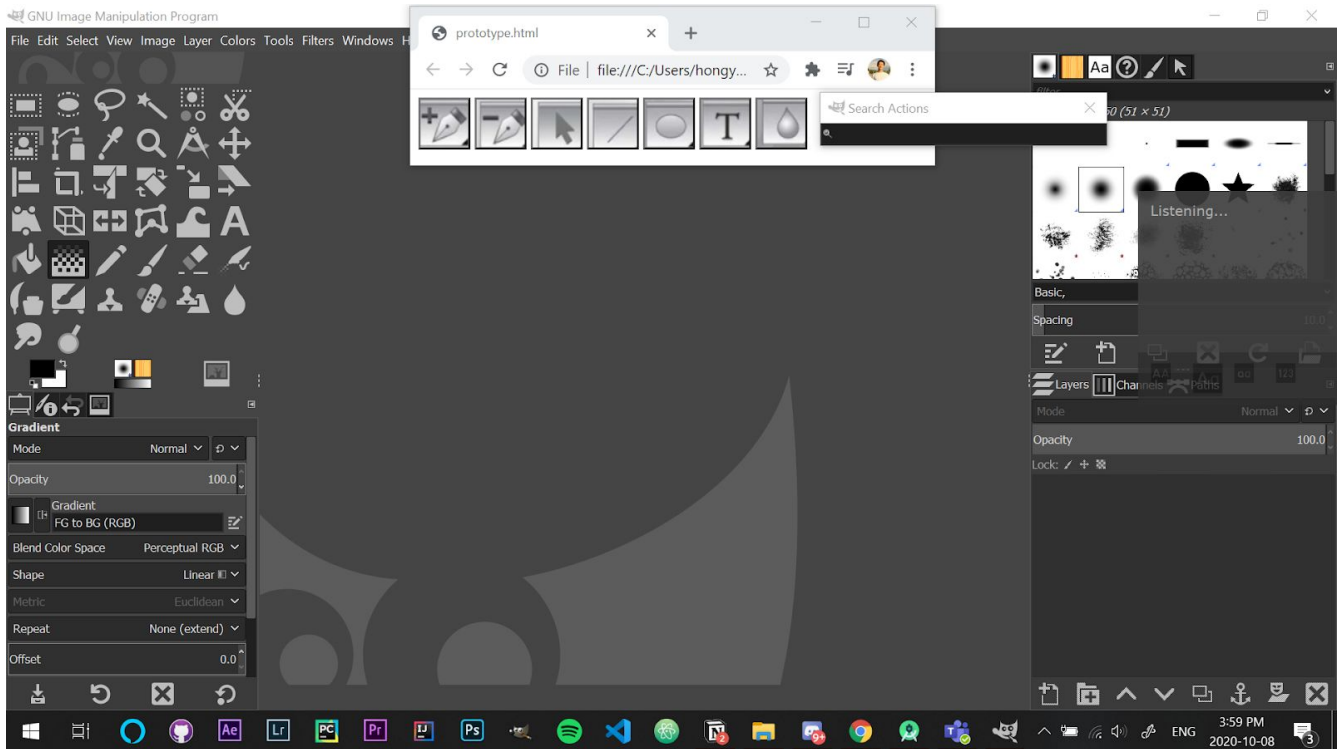
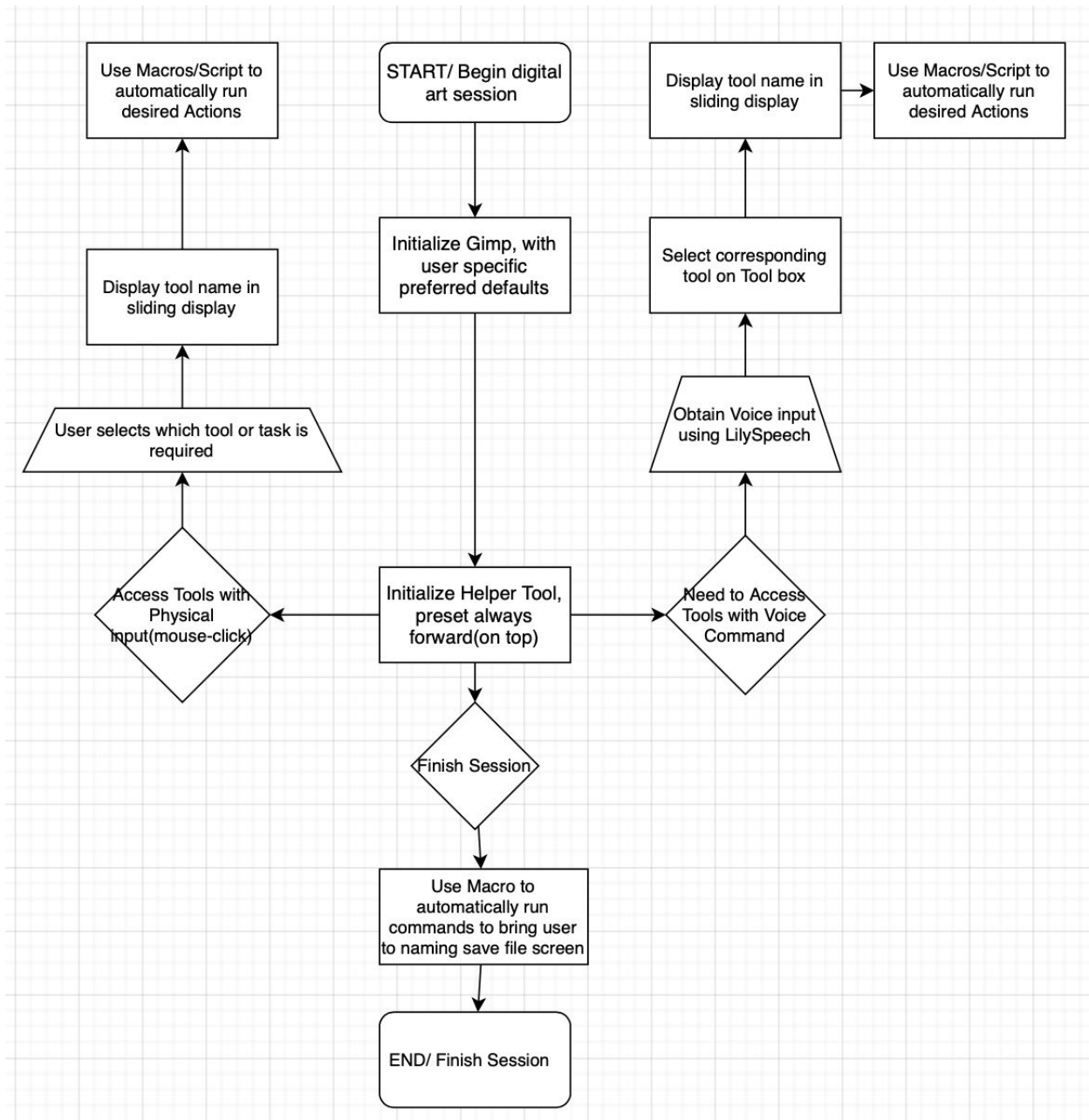


Fig. 2 The user interface of the first prototype

- The icons in the toolbox (left) and the layers window (right) were scaled to their largest size after we modified the interface settings in the Preferences menu.
- The grey widget on the right that says “listening” is a LilySpeech, a speech-to-text software that converts microphone input into text output.
- The action search bar receives LilySpeech’s text output and lists all the tools matching the search term. The user can then select the desired tool among the results.
- The browser tab at the top of the screen is a web interface that contains large buttons that represent GIMP tools. Clicking on them would activate macro recorders programmed to select the buttons’ designated tool via keyboard shortcut. This browser page will be replaced by a more sophisticated Electron application.

Flow Chart of Concept and Processes



Most critical product assumptions

1. Is the native interface of GIMP modifiable to the client's needs?
2. Voice input is successful in obtaining correct commands with good precision
3. Voice input can be displayed in GIMP, and can easily be accessed or closed
4. The helper tool is non-intrusive to GIMP and client work(plug-in or organizing a layout that fits alongside GIMP are valid options)
5. Automating multi step tasks(saving, creating new layer) using macros is successful

Product prototype

Figure 2 is an image of the prototype that tests what are the native settings that can be changed on GIMP in order to make the user interface more intuitive. As you can see from the figure, we were successfully able to modify the native buttons to occupy a larger portion of the screen and we've received client feedback that suggests the native color palette is actually a good option. We've also tested that the helper-tool can be placed on top of the GIMP application without occupying a significant amount of space or being intrusive to the working space of the client.

We've also tested LilySpeech during our client meeting. It can be activated by pressing "CTRL" and "D" on a keyboard as shown in Figure 3. The client actually found this tool to be highly effective for their problem. Figures 4 and 5 below demonstrate how Lilyspeech is able to listen to the client and then directly place the voice input into the search field for the client. We are currently learning how to implement this automatically so there is no manual input for the client if they need LilySpeech to access tools.

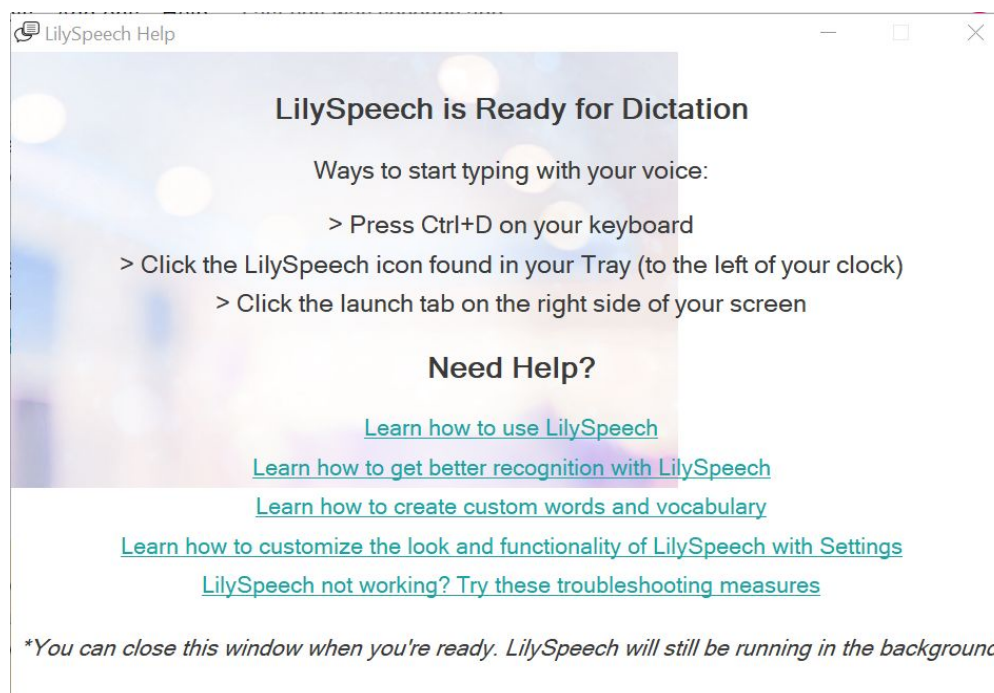


Fig 3 LilySpeech's splash screen

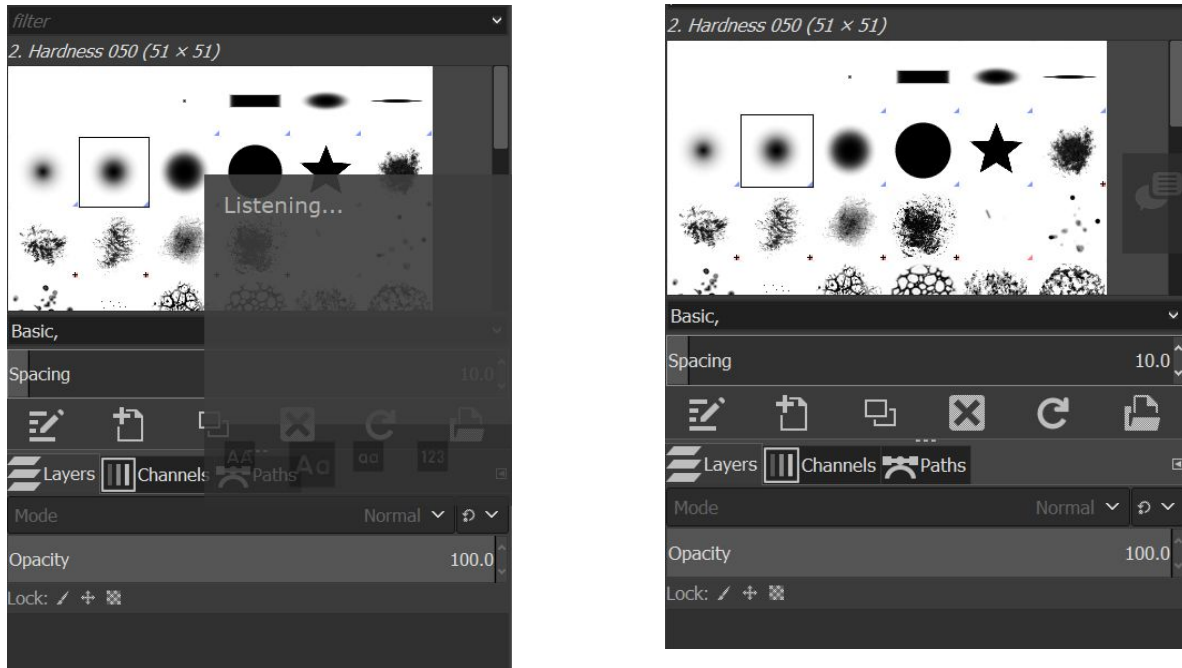


Fig 4 and 5 LilySpeech when activated (Left) and LilySpeech when idle (Right)

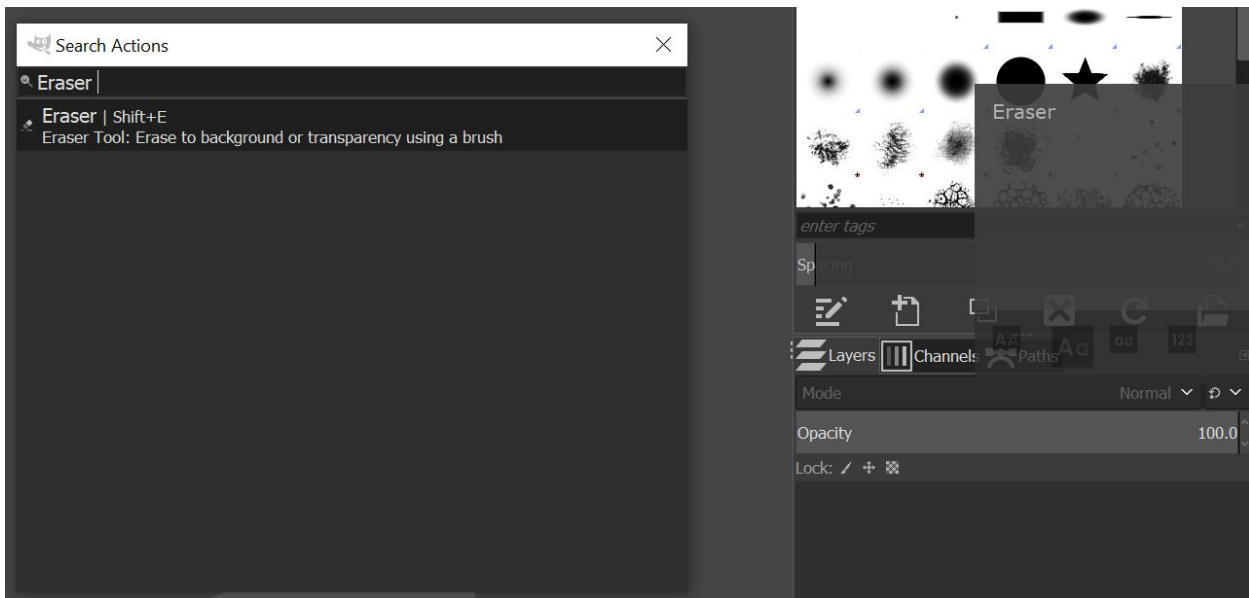


Fig 6 Demonstration of how LilySpeech allows the client to search for tools using their voice

Pressing “/” on their keyboard makes the GIMP action search bar pop up. Using LilySpeech, the client can then dictate the name of the command they would like. The words recognized by the speech-to-text software will then be typed into the search bar, which will then show a list of tools matching the search term. That way, the client does not have to navigate through a list of buttons if they do not wish to.

Finally we managed to use MacroRecorder in order to test if this was a viable application to create macro/script files that we can place on our buttons. These macros/script files are intended to automate multi-step tasks or tasks that require the client to use the top menu bar, as this menu bar is entirely text and much more difficult to understand and navigate through.

Link to MacroRecorder site: <https://www.macrorecorder.com>

Link to a video recording of a working macro test that was performed is attached:
<https://drive.google.com/file/d/1IU1a806C33LtNgwW-l6V6RGUOdQ1xNWH/view?usp=sharing>
(viewable only to UOttawa accounts)

Prototype testing, analysis and evaluation of the performance compared to the target specifications

developed in Project Deliverable B and document all your testing results. Present your testing in an organized, tabular format that shows expected versus actual results. Important reminder: Every prototype you create must have a purpose and must be tested. What product assumption is each prototype trying to verify?

Metric	Expected Results	Actual Results
RBG	92, 88, 88 (GIMP) + 255, 255, 255 (Macro page)	92, 88, 88 (GIMP) + 102, 98, 98 (LilySpeech) + 255, 255, 255 (Macro page)
Intensity	Mostly muted colours with no red visible.	Greyscale environment with minimal colours.
Button Size	Buttons were to all be enlarged to accommodate the clients vision.	Some buttons were not properly enlarged and required enhancing.
Amount of pages for the client to navigate through to access features	Minimal navigation with ideally one page.	One main page is used, however there are also smaller windows used for the text to speech option
Compatibility with the clients operating system and version of photoshop	No issues with compatibility.	Switched to GIMP which is compatible with the clients operating system.
Size of executable file (.exe)	9MB	10MB: 9MB (GIMP) + 1MB (LilySpeech) + 0MB (Macro page)

What to present at the next client meeting

At our client meeting, we plan on presenting our modifications made to GIMP such as the addition of the tool that announces which tool the client is using, as well as the extended range of enlarged icons. We will also demonstrate the updated use of LilySpeech and the action search bar as the search bar will now remain on the client's screen for prolonged periods of time. We will also demonstrate a functional version of the macro application programmed using Electron. Essentially, we will most likely have our second prototype ready for our third client meeting, since it is due only 2 days after.

Furthermore, we will ask the client for any feedback on the updates we have made. We would like to know if they think our second prototype could be easy to install and use and if there are any specific changes that they would like to see. Based on their feedback, we will improve our second prototype.

Preliminary bill of materials and parts (BOM) for your final prototype

List of products used:

1. Electron.js (Open source): \$0.00
2. GIMP 2.0 (Open source) : \$0.00
3. Lilyspeech Free version (there exists a pro version but we intend to use the free version): \$0.00
4. MacroRecorder free version (there exists a pro version but we intend to use the free version): \$0.00

At this point in time, we plan on spending a total of \$0.00.. Things might change with the customer's needs but all the software we are planning on use for the final prototype are all free. No purchase is necessary.

Conclusion

To conclude, we found the client meeting was extremely productive and useful for continuing our project. We've obtained vital information that will greatly help us in leading us to the direction that the client is interested in. The demonstrations of LilySpeech and GIMP have shown us the client finds voice input to be an important tool. We also learned GIMP is a Photoshop alternative that the client is willing to use. We've demonstrated how macros work to the client and we are currently looking forward to integrating these various sub-functions to our overall design concept and presenting it to the client. Through these various deliverables we've found that there are some tools that can be carried forward and be used in developing our product. Target specification made in deliverable B was especially useful when making the prototype, as this gave us a clear scope of what was necessary and what needed to be implemented into the final product.