# Web App UI Cleanup

Google Summer of Code 2021

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# **About Me**

I am currently in the 1st year of my Bachelor in Technology Degree from the prestigious Indian Institute of Technology (BHU), Varanasi (IIT Varanasi). I have been tinkering with code since high school. I love working on web apps and the UI/UX part, making web apps more enjoyable and interactive. I have spent many of my nights up hacking on such projects. I also enjoy Android development and have developed many projects also.

Most recently, I was working with **Amahi** on the **Amahi Android app**. The app allows users to access their Amahi HDA (Home Digital Assistant) files anytime, from anywhere. The HDA are home servers used to store all kinds of personal data, safely and securely, with the users within their home.

Working on such large projects taught me a lot about **Teamwork**, **Problem Solving**, **the Ability** to find and fix bugs, Review code of other teammates, etc.

I learned how to provide **efficient and high-quality code** for global projects used by thousands of people across the globe.



Seeing my contributions in Amahi organization, Carlos Puchol (Founder of Amahi)

gave me a letter of recommendation

for Google Summer of Code 2021.

March 14, 2021

To whom it may concern:

I and pleased to recommend Prakhar Agarwal for your GSoC organization.

I am familiar with his work through his contributions to the Amahi Android app. He's skilled in the Android API and open source collaborative development. He has a great ability to apply this knowledge into practice.

He is enthusiastic and timely in completing his work. He has been easy to communicate with and he has a good relationship with other contributors.

His contributions at Amahi were outstanding. I am convinced that Prakhar will prove to be a great asset to your organization.

Sincerely yours,

Carlos Puchol Founder and Lead

Amahi

cpg@amahi.org

# **Overview**

I wish to contribute to the Purr Data web app development and take up the project Web App UI Cleanup. This project aims to complete the development of Purr Data as a web app by solving various UI/UX problems the current alpha version has. I want to take this work forward and make it more robust and usable. The general goal of this project is to improve the overall usability. There are several existing problems to be resolved and multiple planned features that I plan to work on.

# **Work Experience (Open Source)**

- → Purr Data (Purr Data web app Contributions)
  - ◆ I am contributing to the Purr Data web app's development since the second week of March 2021. My contributions include fixing bugs, adding features, improving the documentation, raising issues, and reviewing code.
  - ♦ My Major Contributions (up to March 2021) -
    - Added separate scrolling of each canvas feature (#669)
    - Added collapsible sidebar (#625), Fixed menu not closing bug (#716)
    - Updated all old dependencies (#638, #637, #636, #635, #617)
    - Added scrollable sidebar (#665), Disabled scrolling of main container (#616)
    - Improved initial loading of web app ( $\frac{\#621}{}$ ), Sidebar shows on option click ( $\frac{\#742}{}$ )
    - Override browser shortcuts with web app shortcuts (#678)
    - Added truncate file name feature (#680), Added spinning animation (#691)
    - Improved layout and UI/UX (#622, #640, #683, #692, etc.) and many more...
  - My Contributions -
    - Pull Requests
    - Issues Created
- → Amahi (Amahi App Contributions)
  - ◆ I am contributing to the Amahi Android app's development since November 2020, and my contributions include code commits, creating issues, fixing bugs, and reviewing code.
  - My Contributions -
    - Pull Requests
    - Issues Created
    - My Commits

# **Goals/Deliverables**

- → Making shortcuts work depending on the device platform (macOS, Windows, Linux)
  - Make the shortcuts on the web app work the same way as on the desktop app depending on the device platform.
  - ◆ There are some reserved shortcuts in the browser, and it might not be possible to override some of them (e.g., ctrl + w), so either assign different shortcuts or simply not support them.

### Solution Approach -

 In the action.js file, we have add\_shortcuts function, which listens for keydown events and checks if any keyboard shortcuts are pressed.
 Currently, it does not check for the Cmd key for macOS. I will change it to something like this:-

```
function add_shortcuts(cid){
   if (cid === undefined) cid = "";

   document.onkeydown = function (e){
        // Check modifiers
        var shortcut = e.ctrlKey ? "Ctrl+": "";
        shortcut += e.metaKey ? "Cmd+": ""; // Checks cmd key on macOS
        shortcut += e.shiftKey ? "Shift+": "";
        shortcut += e.altKey ? "Alt+": "";
        // Add key
        shortcut += e.key.toUpperCase();
        if(window.shortkeys[cid].hasOwnProperty(shortcut)){
            window.shortkeys[cid][shortcut].click();
        }
    }
}
```

Override default browser shortcuts with the web app shortcuts using
 e.preventDefault() function when a shortcut is matched. Then we can
 change web app shortcuts to match with the native application.
 It will look something like this:

Some of the shortcuts (e.g., ctrl + w) do not reach the client-side in the latest versions of Chrome, Firefox, etc. (more info). To support them, I will assign different shortcuts to them after consulting with mentors.

## → Improving the file manager so files/folders can be added/renamed/deleted

- ◆ At present, we can only add files. I will implement functionality also to rename and delete files.
- ◆ Implement the documentation browser so that the user can find all the files including tutorials, object help files, etc.

# Solution Approach -

- I wil will appear beside the file name upon hovering ovel create rename and delete options thatr it.
- Afterward, I will attach the fs.rename() function to the Rename option, which will take the oldPath, newPath, and a callback function, to rename the file. Similarly, I will use the fs.unlink() function to Delete files that will take the file path as an argument.

The doc browser builds its index in the GUI, using node.js. But in the web
app only the backend has access to whatever the emscripten file-system
abstraction is called. A probable solution is to add doc browser index and
then try to load it up in the web app.

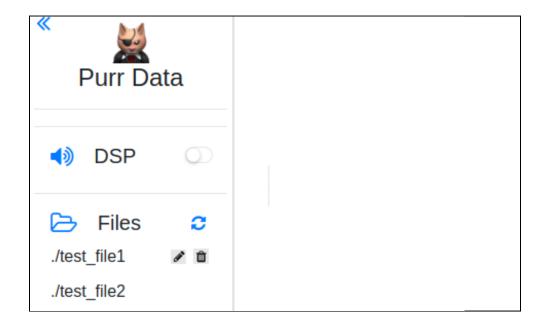
```
// Rename the file
fs.rename("prev_name.txt", "new_name.txt", () => {
    console.log("File Renamed!");

    // Update all the filenames after renaming
    update_file_ls();
});

// Delete the file
fs.unlink("fileToDelete.txt", () => {
    console.log("File Deleted!");

    // Update all files after deleting
    update_file_ls();
});
```

### Finally, it will look like this:-



### → Improving the layout of menu and patch windows for better user experience

- Merge the patch menu into the global menu and make it work depending on the focus of patches.
- Style the patch to show the focus state and add some buttons (e.g., close)
- ◆ Implement the best UX to reduce the number of current menu options by leveraging the sidebar, console and the canvas window itself.
- Make the patch window resizable by dragging its border.
- Make the patch window rearrangeable by dragging its menu bar.
- Improve scrollbar appearance in the web app.
- ◆ Make the dialog windows(e.g., property, text) appear on the right side of the patch instead of the left sidebar.
- ◆ Display the property dialog when a corresponding object is selected on the canvas.

### Solution Approach -

• I will use jQuery's **focus()** and **blur()** function to listen to focus changes on the patch and display the menu bar accordingly.

```
$(".patch").focus(function() {
    // Show patch menu bar
});

$(".patch").blur(function() {
    // Show global menu bar
});
```

• I will add a **border** around the patch that the user is currently working on to show the focus state and also add convenience (eg., **close**) buttons.



 One example of reducing the menu options is by adding the find option directly in the console head. On clicking the find icon we will be prompted to search the console. This way is much more intuitive and hence improves UX. Also later if we wish we can remove it from menu options altogether.

```
console

stable classinfo methods: size
objectinfo: v.0.1
stable objectinfo methods: class
[import] $Revision: 1.2 $
    [import] is still in development, the interface could change!
    compiled against Pd-l2ork version 2.11.0 (20210322-rev.4a378539)
pd 0.48.0
working directory is /
```

 I will use jQuery's resizable() function to resize and sortable() function to rearrange the patches. <u>Demo link</u>

```
$("#sortable").sortable({
    revert: true
});
```

 I would further add a modern and semi-transparent scrollbar to minimize the occlusion of the content behind the scrollbars. Mockup and code below:-

```
width: 14px;
height: 18px;
}
::-webkit-scrollbar-thumb {
    height: 6px;
    border: 4px solid rgba(0, 0, 0, 0);
    background-clip: padding-box;
    -webkit-border-radius: 7px;
    background-color: rgba(0, 0, 0, 0.15);
    -webkit-box-shadow: inset -lpx -lpx Opx rgba(0, 0, 0, 0.05), inset lpx lpx Opx rgba(0, 0, 0, 0.05);
}
cyr rgba(0, 0, 0, 0.05);
}
::-webkit-scrollbar-button {
    width: 0;
    height: 0;
    display: none;
}
::-webkit-scrollbar-corner {
    background-color: transparent;
}
```

The idea is to make the UI like Visual Studio IDE (or any other modern IDE)
where on the left side we can see all our project files and on the right side,
we can see all the properties when we click some widget.
That way we will be able to better utilize the space, multitask, and also
improve the UX because the user won't have to continuously scroll down
the sidebar every time he needs to access the files.

### Mockup:



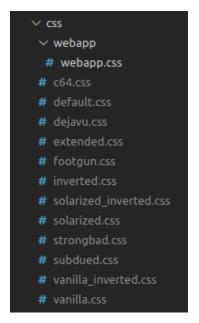
In conjunction with the above point, a great UX feature will be to display
the property dialog when a corresponding object is selected on the
canvas. That way the user doesn't have to right-click on it and choose
"Properties". This will also accommodate touchscreens.

### → Fixing many small bugs to make the app more stable and usable

- Clean the frontend codebase and organize the file system.
- Ask for saving the patch when the user closes an edited patch.
- Fix or disable some of the global menu items not working.
- Fix wrong mouse coordinate issues that happen in some circumstances.
- Make the GUI (e.g., bang, toggle) property dialog window work.
- Improve layout of properties in the sidebar (#750)
- ◆ Fix getting stuck in the loading screen until a mouse/key event is triggered in Firefox/Safari.
- ◆ Fix the patch not responding to mouse events after the help file is opened and not being clicked.
- ◆ Fix contents of sidebar after clicking "Array" option not properly aligned (<u>#741</u>)
- ◆ Fix contents of sidebar "Preference" option not properly aligned (#732)
- Add new and modern dialog box instead of default browser prompts (#737)

## Solution Approach -

There is a lot of scope to clean and organize the codebase. One such
example is the CSS files present in emscripten/project/purr-data/css as
they are almost similar, and only slight differences are present.



I will remove the redundant files and reduce the duplicate code present in such files to make the web app more maintainable.

- Many menu options are not working, like view options Zoom In, Zoom Out, Reset Zoom, Optimal Zoom, Fit to Width, Fullscreen, etc. I have already made progress on these feature (#741, #758, #759). Also in the Help menu we can improve Manual and About Pd-L2ork options to remove external dependencies and fix the Help Browser to work properly.
- Canvas apps often rely heavily on user interaction with the mouse, but
  when the window is resized, the mouse event coordinates that canvas
  depends on are likely changed because resizing causes the canvas to be
  offset in a different position relative to the window. Thus, responsive
  design requires that the canvas offset position be recalculated when the
  window is resized or scrolled. The code will look something like this:

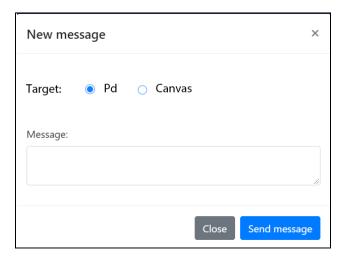
```
// variables holding the current canvas offset position
// relative to the window
var offsetX,offsetY;

// a function to recalculate the canvas offsets
function reOffset(){
    var BB=canvas.getBoundingClientRect();
    offsetX=BB.left;
    offsetY=BB.top;
}

// listen for window resizing (and scrolling) events
// and then recalculate the canvas offsets
window.onscroll=function(e){ reOffset(); }
window.onresize=function(e){ reOffset(); }

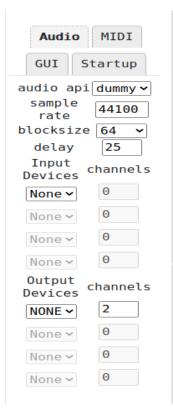
// example usage of the offsets in a mouse handler
function handleMouseUp(e){
    // use offsetX & offsetY to get the correct mouse position
    mouseX=parseInt(e.clientX-offsetX);
    mouseY=parseInt(e.clientY-offsetY);
    // ...
}
```

 In various places we are using default browser prompts, instead, I will add a new and modern dialog box. For eg., The dialog box for sending messages will look like this:-



Also, I will improve the current layout of Preference, Properties,
 Array options, etc., that open in the sidebar. To do this, I will first redesign them to properly fit inside the sidebar and give them a modern touch as they look pretty outdated.

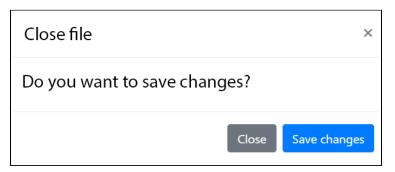
### **Current look:**



# Mockup:

Audio	_
Audio API Sample Rate Blocksize Delay Input Devices Output Devices	
MIDI	<b>*</b>
GUI Startup	•

 We can listen to changes in SVG elements, and if there is any change since the last time the file was either created or saved, we can prompt the user to save the file before closing it.



### → Blog Posts

- Write a blog about the starting of a new experience in open-source with Purr Data.
- ◆ Write a blog wrapping up my whole experience during Google Summer of Code with Purr Data.

# **Availability**

I have no other commitments in the summers. I will be able to devote **approx 40 hours to GSoC** every week.

# **Communication with mentors**

I am available from **9:00 AM** to **12:00 AM** (midnight) IST but I am flexible with this. The platform, as well as the time of the day, can be decided based on the mentor's preference.

# **Milestones**

# → Community Bonding Period-

- Fix existing bugs, help to merge pending PRs, close issues, and do code reviews.
- Discuss with mentors about the roadmap and finalize the plan of action.

# → Week 1 | June 7 - June 14 :

- ◆ Make the shortcuts on the web app work the same way as on the desktop app depending on the device platform.
- ◆ Some shortcuts are being used by the browser, and it might not be possible to override some of them (e.g., ctrl + w), so either assign different shortcuts or simply not support them.
- Fix wrong mouse coordinate issues that happen in some circumstances.

# → Week 2 | June 15 - June 22 :

- At present, we can only add files. I will implement functionality also to rename and delete files.
- ◆ Implement the documentation browser so that the user can find all the files including tutorials, object help files, etc
- Fix Help Browser to work properly, this feature allows the user to find the objects they need, as well as quickly finding documentation.

# → Week 3 | June 23 - June 30 :

- Merge the patch menu into the global menu and make it work depending on the focus of patches.
- ◆ Implement the best UX to reduce the number of current menu options by leveraging the sidebar, console and the canvas window itself.
- Style the patch to show the focus state and buttons (e.g., close) for convenience.

# → Week 4 | July 1 - July 7 :

- Make the patch window resizable by dragging its border.
- Make the patch window rearrangeable by dragging its menu bar.
- Fix getting stuck in the loading screen until a mouse/key event is triggered in Firefox/Safari.

# → Week 5 | July 8 - July 12:

- ◆ Fix the patch not responding to mouse events after the help file is opened and not being clicked.
- ◆ Make the GUI(e.g., bang, toggle) property dialog window work.
- Fix or disable some of the global menu items not working.

# → Week 6 | July 13 - July 16 | Evaluation week :

◆ To keep this week as a buffer week and work on the feedback received from the mentors in evaluation and improvise on that.

# → Week 7 | July 17 - July 24 :

- ◆ Make the dialog windows(e.g., property, text) appear on the right side of the patch instead of the left sidebar.
- Display the property dialog when a corresponding object is selected on the canvas.

# → Week 8 | July 25 - August 1 :

- ◆ Add dialog for sending messages (#737)
- Ask for saving the patch when the user closes an edited patch.
- Clean the frontend codebase and organize the file system.

# → Week 9 | August 2 - August 9 :

- ◆ Improve layout of properties in the sidebar (#750)
- Fix contents of sidebar after clicking "Array" option not properly aligned (#741)

# → Week 10 | August 10 - August 16 :

- ◆ Fix contents of sidebar "Preference" option not properly aligned (#732)
- Improve scrollbar appearance in the web app.

# → Week 11 | August 16 - August 23 | Evaluation week :

◆ To keep this week as a buffer week and work on the feedback received from the mentors in evaluation and improvise on that.

# **Future Work**

- Fix graphical arrays being opened if the patch font size changes.
- At present there is no testing protocol for the front end of web app. I will add testing to ensure that the web app is reliable and performant.
- Make the work storable and shareable among users to make it work like the <u>Codepen</u> online editor in which several people can work on the same project simultaneously, and collaborate seamlessly.
- Improve usability and interface of the web app more so to make it more intuitive.
- Help merge the master branch with the emscripten branch in Gitlab repository.
- Try to remove as many menu options as possible, maybe completely remove the menu bar for a better design.
- Thoroughly discuss and implement many such design challenges.
- Continue working on issues and solving bugs to make Purr Data stable and easier to use.

# Why me?

Other than being a self-taught developer for over 3 years, and a passionate open-source contributor, I believe that I am well suited for this project because I amalready working on the project, and I already know very well about the project vision and roadmap.

### Following are some points that I would like to highlight -

→ Consistency - I am very consistent with my work, my contributions are regular & consistent in Purr Data since I have been engaged with the project.

# 246 contributions in 2021 | Jan | Feb | Mar | Apr | May | Ji | Dec | Jan | Feb | Mar | Apr | Apr | May | Ji | Dec | Jan | Feb | Mar | Apr | Apr | May | Ji | Dec | Jan | Feb | Mar | Apr | Apr | Apr | May | Ji | Dec | Jan | Feb | Mar | Apr |

→ Active Contributions - No Matter what the project is, either Amahi or Purr Data, my contributions are the top contributions since I started contributing.

