

Organization: Python Software Foundation

Sub-Organization: FURY

FURY: Update user interface widget + Explore new UI Framework (Full Time Project)

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About Me:

Hello, I am Praneeth Shetty, a third-year student at Savitribai Phule Pune University in India. I have been programming in Python for 3 years now, and during this time, I have gained experience in various libraries and frameworks such as NumPy, OpenCV, Mediapipe, Tkinter, Pygame, VTK, Seaborn, Plotly, and more.

As a former GSoC (Google Summer of Code) student, I am familiar with the standard code contribution process and have a good understanding of how the projects works. It has also given me the opportunity to gain practical experience in coding, testing, and documentation. I am eager to continue contributing to the project and make an impact in the community.

I also enjoy managing a community called IODump, which aims to help students stay up-to-date with technological trends and apply them in practical scenarios. As a YouTuber, I run a channel called Aledutron, where I post tutorials on practical lab questions from the university syllabus in Python. In addition to my programming skills, I have a passion for game development which made me explore fields such as computer graphics, blockchain and metaverse.

Other Information:

| | |
|------------|--|
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Project Overview:

The main objective of this project is to update the existing UI system without impacting the current functionality, while also creating tests for each new change to ensure reliability. The project will focus on several key areas including Layout Management, Creating Scrollbar as an individual element, Completing Tree UI implementation, Spin Box Implementation, and Improving the Border Implementation. Additionally, the project will include fixing multiple UI elements such as ComboBox, TabUI, Filedialog, and Tree UI. Furthermore, the project will involve exploring a new framework with the existing UI element, which will enable selecting them together. Overall, the project aims to enhance the UI system while ensuring that it remains stable and reliable.

Project Description:

- **ColourPicker:**

The current state of the Colourpicker UI is incomplete, with two pull requests attempting to solve the problem but falling short. Additionally, the inability to apply shaders to Actor2D elements has resulted in inaccurate color representation. I will be working to create a fully functional and complete Colourpicker UI element that will overcome these issues. I plan to refactor the existing pull requests and generate a standalone Colourpicker UI element that can be used anywhere, while ensuring that it accurately represents colors.

- **Tree UI:**

The TreeUI is a crucial feature that has been requested by the FURY community for a long time. Antriksh started working on a pull request to create the Tree UI, which serves as the foundation for the Accordion UI. However, the PR isn't merged yet. My goal would be to work on the TreeUI and ensure that it provides the expected functionality, allowing users to navigate and organize hierarchical data structures easily. This will include features such as expanding and collapsing nodes, highlighting selected nodes, and drag-and-drop support. With this UI element, users will be able to visualize and manipulate complex data structures more effectively, making Fury more user-friendly.

- **Accordion UI:**

The Accordion UI was started by Antriksh in a previous GSoC project. However, due to dependencies on the Tree UI, this PR is still awaiting completion. My plan is to first complete the Tree UI, and then refactor and fix the Accordion UI as an independent component. This will provide a much-needed UI element to the toolkit and increase its flexibility for users.

- **SpinBox UI:**

The SpinBox UI element is an essential input control in most user interfaces, allowing users to select a numerical value from a predefined range. While there exists an active PR for implementing this UI element, the updates in the master have caused conflicts, and further changes are necessary to incorporate additional expected functionalities. One such expectation is the ability to iterate through a list of values or through alphabets. My goal is to resolve the conflicts and incorporate the required changes to complete the SpinBox UI element and ensure that it functions seamlessly.

- **File Dialog:**

The current File dialog (FileMenu2D) lacks some intuitive design and features, which is why I will be working on modifications to improve its functionality. My aim is to make the file dialog more user-friendly and aesthetically pleasing. This will involve making changes to the layout and design of the dialog, as well as adding new features to enhance its usability. With these improvements, users will have a better experience when navigating and selecting files using our UI.

- **TabUI:**

TabUI allows users to create and manage multiple tabs in their application. However, the current version lacks flexibility in terms of styling options for the tabs. My aim is to enhance the TabUI to support customizable styling of the tabs, allowing users to create visually appealing and cohesive designs that match their application's aesthetic.

In addition, I plan to add shortcuts for users to easily open and close tabs. This will improve the user experience by providing a more streamlined way to manage multiple tabs without having to manually click on each tab's close button.

- **ComboBox UI:**

The current implementation of the combobox UI element has a few issues, such as always starting in an expanded mode and making it difficult to position on a panel. Additionally, UI elements behind the combobox panel cannot be clicked, which can be problematic. These issues need to be addressed in order to improve the functionality and usability of the combobox element.

- **Scrollbar as an individual element:**

Currently, we have the scrollbar integrated into a few UI elements, such as ListBox2D. However, we believe that having it

as a separate, standalone element will increase flexibility for users and enable us to reuse the element wherever necessary. To this end, we have a preliminary version of the Scrollbar created by Soham, an ex-GSoC participant, which I have updated here. I would refactor this version and create a complete Scrollbar without any external dependencies. This new Scrollbar would provide users with a consistent and intuitive way to navigate through content and would be a valuable addition to our UI toolkit.

Extended Plans:

- **Implementing UI Border:**

Adding a border to UI elements can greatly improve their visual appeal and user experience. Although there is an existing pull request to add borders to the Panel2D element, this can be a major update as Panel2D is a basic element used in many UIs. An alternative approach could be to implement borders using Rectangle2D, which would be more memory-efficient. With the addition of borders, the UI elements will have a more polished look and feel, enhancing the overall user experience.

- **Working on Physics Integrations:**

Our first step will be to improve the integration of Pybullet and make sure that it works as expected. We will explore different options to enhance Pybullet and make it more efficient. Once we are satisfied with the improvements, we will start exploring other physics engines to see if there is a better candidate that can replace Pybullet. If we find a physics engine that is more efficient and meets our requirements, we will migrate to it.

- **Exploring new UI Framework:**

I will research and evaluate various frameworks and tools that can be integrated with the existing work. It is important to consider factors like compatibility, ease of integration, community support, and future development roadmap.

It is also important to ensure that the integration process does not introduce new bugs or affect the performance of the existing code.

Finally, testing and debugging the integrated code to ensure that the new framework is functioning as expected and not causing any issues with the existing work.

Project Timeline:

| Community Bonding Period May 4 - May 28 | |
|---|--|
| May 4 - May 14 | <ul style="list-style-type: none">• Discussing the project goals and requirements• Prioritizing the project objectives• Discussing and finding different approaches to work on the projects• Discussing the stretch goals and implementation sequence |
| May 15 - May 21 | <ul style="list-style-type: none">• Working on these below issues.• #562• #731• #775• #776 |
| May 22 - May 28 | <ul style="list-style-type: none">• Working on the pending DrawPanelUI issues• Fixing & Completing #653• Working on #695 & #696 |
| Phase - 1 May 29 - July 14 | |
| May 29 - June 4 | <ul style="list-style-type: none">• Completing the SpinBoxUI Implementation #499• Adding supports for choosing values of different data types (ie. characters, list of strings, etc.) |
| June 5 - June 11 | <ul style="list-style-type: none">• Debugging the code• Adding unit test and demos |
| June 12 - June 18 | <ul style="list-style-type: none">• Creating Scrollbar as an individual element #592• Resizing the scrollbars |
| June 19 - June 25 | <ul style="list-style-type: none">• Testing the work and fixing bugs• Creating tutorials• Updating the UI elements which has scrollbar |
| June 26 - July 2 | <ul style="list-style-type: none">• Starting with ColorPicker UI• Working on the colour distribution across the plane |
| July 2 - July 14 | <ul style="list-style-type: none">• Testing the ColorPicker• Creating Tutorials using Colour Picker.• Buffer Week to clear any backlog. |

| Phase - 2 July 14 - August 28 | |
|---|---|
| July 14 - July 16 | <ul style="list-style-type: none"> Starting with TreeUI PR #460 Rebasing and solving the conflicts |
| July 17 - July 23 | <ul style="list-style-type: none"> Adapting changes to work with Accordion UI Working on Accordion UI #487 |
| July 24 - July 30 | <ul style="list-style-type: none"> Testing the Updates Adding Tutorials and Demo |
| July 31 - August 6 | <ul style="list-style-type: none"> Starting work on FileDialog Continuing #294 Updating the Layout |
| August 7 - August 13 | <ul style="list-style-type: none"> Debugging and testing Creating Tutorials |
| August 14 - August 20 | <ul style="list-style-type: none"> Updating TabUI to support styling of Tabs Add shortcuts to easily open/close tabs. |
| August 21 - August 28 | <ul style="list-style-type: none"> Creating Tutorials and Demo after testing. Buffer Week to work on anything else. Working on Documentations. |

Contributions:

Pull Requests:

1. Merged:

This is the list of all the merged PRs:

[Merged Pull requests - fury-gl/fury](#)

2. Still Open

This is the list of open PRs:

[Open Pull requests - fury-gl/fury](#)

Issues:

1. Closed:

This is the list of all the closed issues:

[Closed Issues - fury-gl/fury](#)

2. Open:

This is the list of open issues:

[Open Issues - fury-gl/fury](#)

Commitments and Availability:

- Only applying to FURY for GSOC-23
- Semester Exams may occur in June and October for a duration of 8-10 days