**Parallel Scientific Computing And Visualization Project Idea**

**Visualization Of Stress Distribution In A Plate With Hole Of Variable Size Subjected to Variable Uniaxial Load**

1. **Team Members: -**
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4. **Abstract: -**

**This project involves analysing the stress distribution in a plate with hole subjected uniaxial loading by using a suitable FEM model. This involves understanding the stress distribution taking place in the plate with a focus on the stress concentration taking place at certain points in the plate and then visualization of the same using Mayavi. This plate with hole problem serves a simple yet a good model for understanding stress flow phenomenon taking place and how stress concentration is taking place, so visualising this problem has its own merits.**

1. **Outline: -**
2. **Develop a code of the FEM model governing this plate with hole problem by making use of numpy library, for loops etc.**
3. **Making use of Mayavi data structures create an assembly of elements and associate the results of FEM model to these elements.**
4. **Using Mayavi, visualize the data associated with these elements. And show various graphical results associated with this problem of plate with hole.**
5. **Build an interactable UI, which can be used to vary the size of hole, the magnitude of uniaxial load that is acting on the plate, and the see the effect of the same on the visualization of stress distribution and stress concentration on the plate.**
6. **Deliverables: -**
7. **A code that can calculate stress distribution in a plate with hole of given size and given uniaxial loading.**
8. **Visualization of the stress distribution and the stress concentration taking place on the plate with hole.**
9. **An interactable UI where we can alter either the size of the hole, the magnitude of uniaxial load acting on the plate.**
10. **Timeline: -**

**The project is expected to take 5 to 6 weeks to complete, first few weeks will be used in studying the plate with hole problem, the FEM model that we will be using and developing the code that will be used to calculate the stress distribution in the plate. The next few weeks will be used in developing code for visualizing the data from the calculation followed by the development of the interactable UI for the same. The remaining time will be used in making the necessary presentation/report.**