Implementation of Two-dimensional (2D) Convex Hull Construction Algorithms and Comparing Their Performances

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This project aims to implement and demonstrate an analysis of four different convex hull-building algorithms for a given set. The planned product is expected to generate a user-controllable number of points in a 2D plane with different distributions. These distributions are Gaussian distribution and Uniform distribution.

These points then, are to be used for the convex hull-building algorithms. Namely:
- Graham's Scan Algorithm.
- Jarvis March Algorithm.
- Quick Hull Algorithm.
- Merge Hull Algorithm.

The resulting hull as well as the steps for the building of these hulls are to be visualized on desire with the help of a simple UI. The UI will also be used for adding new, user-controllable amount of points. The scene will be navigable by simple mouse controls that implement zooming in/out and translation. Users will also be able to create new points using these simple mouse controls. The hulls are to be recalculated for newly added points.

The results of the time performance of the four algorithms are to be compared and analyzed against different setups and scenarios that are to be determined after the implementation is complete. These experiments involve the alteration of the number of points that are added, the number of initial points, the distribution function, etc. The results are then to be visualized and discussed.

The implementation and visualization will be done on javascript using WebGL, and the visualization of the experiments will be delivered using pyplot library of Python.