

StarFinder: Identifying Constellations from a Subset of Stars

Yumeng Bai (yb2542), Stella Park (shp2147), & Michelle Tang (mt3486)

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Project Summary

This project aims to develop an efficient and parallelized Constellation Finder program in Haskell, capitalizing on the language's inherent strengths in concurrent and parallel programming. This system will take a collection of 2D-coordinate dots as input and deduce their corresponding constellations by employing rotation and pattern recognition algorithms, utilizing a predefined database of constellation coordinates for comparison.

The core strategy involves several key components: first, the design will prioritize parallelizing the computationally intensive tasks involved in parsing the input dots against the constellation database. Leveraging Haskell's robust concurrency primitives and functional nature, the program will distribute workloads across multiple cores or processors to boost performance. Second, the implementation of rotation algorithms will accommodate various orientations of the input dots. By comparing rotated versions against the constellation database, pattern recognition techniques will be employed to identify the closest matches. Additionally, efficient management of the constellation database through optimized data structures like balanced trees or hash maps will streamline lookup processes and enhance overall performance.

- The input is given as a set of coordinates, which are "stars."
- The reference database is a collection of constellations in coordinates, provided by [1].
- The input set of coordinates can be rotated to be compared with the database.
- The input set can be a combination of subset of stars coming from more than one constellations.

- The output is a list of constellations that consist the input set. There can be more than one list as an output.

For testing purposes, we would start by using constellations without rotation, and then add in different orientations to test the rotation algorithms. We would also conduct tests to see how much speedup is gained through parallelization.

References

- [1] Nancy G. IDENTIFICATION OF A CONSTELLATION FROM A POSITION. Roman 1987
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