



Bachelor Thesis

Generating Realistic Polygons

Janik Teune

janik.teune@ovgu.de

November 24, 2024

First Reviewer:

Prof. Dr. rer. nat. habil. Stefan Schirra

Second Reviewer:

Tetiana Lavynska

Abstract

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequale doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguere possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et collaudata est, cum id, quod maxime placeat, facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut rerum necessitatibus saepe eveniet, ut et voluptates repudiandae sint et molestiae non recusandae. Itaque earum rerum defuturum, quas natura non depravata desiderat. Et quem ad me.

This thesis template is available at <https://github.com/parcio/templates> and consists of Chapters 2 to 5. It also contains Chapter A.

Contents

1. Merge Closest Chains Algorithm	1
1.1. Pseudocode	1
2. Introduction	2
2.1. Motivation	2
3. Background	3
3.1. Citations	3
3.2. Tables	3
3.3. Math	3
4. Evaluation	4
4.1. Listings	4
5. Conclusion	5
5.1. Todos	5
Bibliography	7
A. Appendix	9

Chapter 1.

Merge Closest Chains Algorithm

The main idea of this algorithm is that vertices that are far apart from each other should less likely be part of the same edge. During the process, the algorithm builds up long polygonal chains. In each iteration, the polygonal chains that are closest to each other are merged. A single point is also considered a polygonal chain, so in the first iteration the algorithm will merge the two points with the smallest distance.

1.1. Pseudocode

```
1 function merge_closest_chains(PointSet point_set) -> Polygon {
2   polygonal_chains := point_set
3   while (polygonal_chains.size > 1) {
4     a, b := find_pair_of_nearest_chains(polygonal_chains)
5     c := merge_chains(a, b)
6     polygonal_chains.remove(a)
7     polygonal_chains.remove(b)
8     polygonal_chains.add(c)
9   }
10  return Polygon(polygonal_chains)
11 }
12
13 function find_pair_of_nearest_chains (PolygonalChainSet polygonal_chains) ->
(PolygonalChain, PolygonalChain) {
14   // TODO add implementation
15 }
16
17 function merge_chains(PolygonalChain a, PolygonalChain b) -> PolygonalChain {
18   // TODO add implementation
19 }
20
```

bla

Chapter 2.

Introduction

In this chapter, Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequale doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut.

2.1. Motivation



(a) Left



(b) Right

Figure 2.1.: Caption

You can refer to the subfigures (Figures 2.1a and 2.1b) or the figure (Figure 2.1).

Summary

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequale doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguere possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et.

Chapter 3.

Background

In this chapter, ...

3.1. Citations

You can comfortably reference literature [Duwe et al., 2020].¹ BibTeX entries for a large number of publications can be found at <https://dblp.org/>. [Girshick, 2015]

3.2. Tables

Header 1	Header 2	Header 3
Row 1	Row 1	Row 1
Row 2	Row 2	Row 2

Table 3.1.: Caption

You can also refer to tables (Table 3.1).

3.3. Math

$$E = mc^2 \tag{1}$$

Summary

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequale doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguere possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et.

¹This is a footnote.

Chapter 4.

Evaluation

In this chapter, ...

4.1. Listings

```
1 printf("Hello World!\n");
2
3 // Comment
4 for (int i = 0; i < m; i++) {
5     for (int j = 0; j < n; j++) {
6         sum += 'a';
7     }
8 }
```

Listing 4.1.: Caption

You can also refer to listings (Listing 4.1).

Summary

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequale doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguere possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et.

Chapter 5.

Conclusion

In this chapter, ...

5.1. Todos

FIXME

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequi doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguere possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et collaudata est, cum id, quod maxime placeat, facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et.

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequi doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguere possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et.

FIXME:
remove
this

Summary

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequi doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguere possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et.

Bibliography

- [Duwe et al., 2020] Duwe, K., Lüttgau, J., Mania, G., Squar, J., Fuchs, A., Kuhn, M., Betke, E., and Ludwig, T. (2020). State of the Art and Future Trends in Data Reduction for High-Performance Computing. *Supercomput. Front. Innov.*, 7(1), 4–36. (Cited on page 3)
- [Girshick, 2015] Girshick, R. (2015). Fast R-CNN. (Cited on page 3)

Appendix A.

Appendix

```
1 printf("Hello World!\n");
2
3 // Comment
4 for (int i = 0; i < m; i++) {
5     for (int j = 0; j < n; j++) {
6         sum += 'a';
7     }
8 }
```

Listing A.1.: Caption

Statement of Authorship

I herewith assure that I wrote the present thesis independently, that the thesis has not been partially or fully submitted as graded academic work and that I have used no other means than the ones indicated. I have indicated all parts of the work in which sources are used according to their wording or to their meaning.

I am aware of the fact that violations of copyright can lead to injunctive relief and claims for damages of the author as well as a penalty by the law enforcement agency.

Magdeburg, November 24, 2024

Signature