

# Curve Reconstruction Algorithms

OGO Group 3

Welcome the keynote of group 3 for the course OGO 2.1. I am Etienne van Delden and I am your presenter for today.

## Agenda

- Who are we?
- The Curve Reconstruction problem
- The Nearest Neighbor Algorithm
- The Directed Nearest Neighbor Algorithm
- The Improved Nearest Neighbor Algorithm
- Multiple Curve Algorithm
- Questions

We will be talk about several subjects this keynote. First I will introduce our group. Then I walk talk about the problem we have been given, followed by our solutions to the problem. And the end of the keynote there is time to answer questions.

## Who are we?

- Robin Wolffensperger - Documentation Manager
- Janôt Sijen - Secretary
- Tom van der Hoek - Code Manager
- Tim Hermans - Algorithms Manager
- Etienne van Delden - Project Manager

We are a group of 5 people; Robin, our Document manager; Janot, our secretary; Tom, Our code manager, making sure all program code is made, and making sure it is correct; Tim is our end responsible for our algorithms; And Etienne, your host for today as mentioned, and also the project manager. Even though we each have our responsibilities, we have all worked together on multiple parts of this project, to work as efficient as possible.

## Agenda

- Who are we?
- **The Curve Reconstruction problem**
- The Nearest Neighbor Algorithm
- The Directed Nearest Neighbor Algorithm
- The Improved Nearest Neighbor Algorithm
- Multiple Curve Algorithm
- Questions

We will be talk about several subjects this keynote. First I will introduce our group. Then I walk talk about the problem we have been given, followed by our solutions to the problem. And the end of the keynote there is time to answer questions.

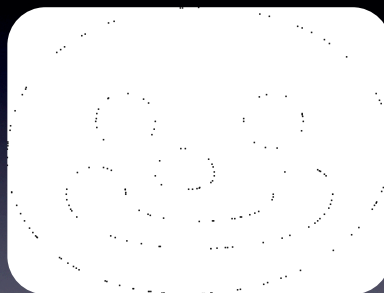
## Curve Reconstruction

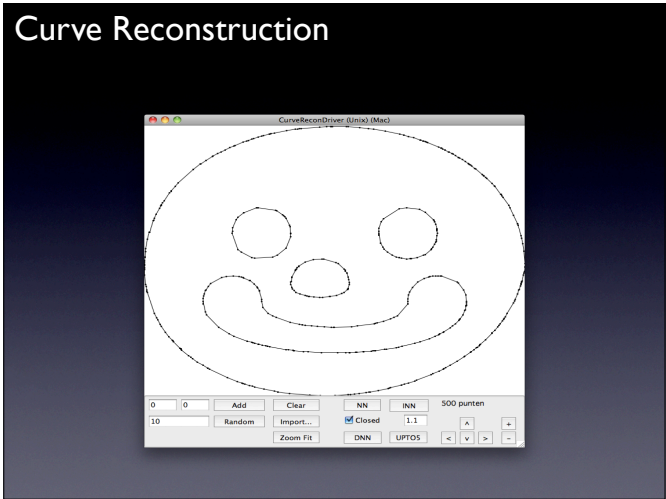
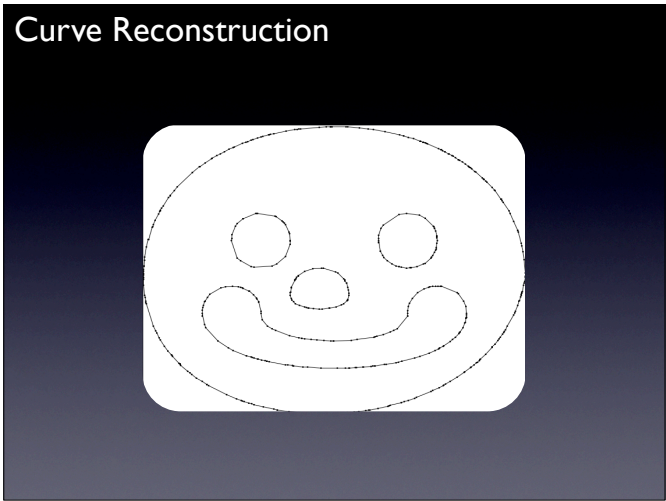


Lorem

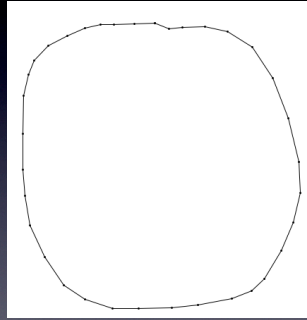


## Curve Reconstruction

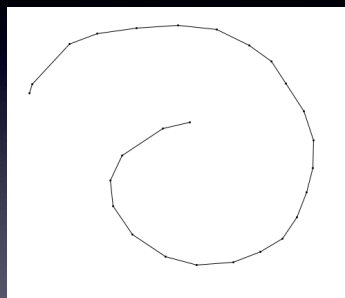




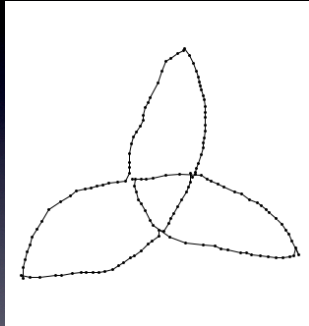
Closed Curve



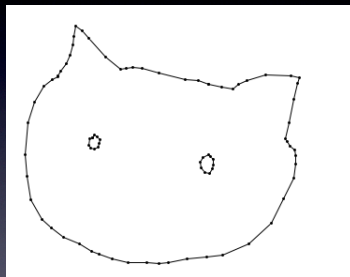
Open Curve



## Self-Intersecting



## Multiple Curves



# Agenda

- Who are we?
- The Curve Reconstruction problem
- **The Nearest Neighbor Algorithm**
- The Directed Nearest Neighbor Algorithm
- The Improved Nearest Neighbor Algorithm
- Multiple Curve Algorithm
- Questions

*Of all the possible next points,  
the nearest one is probably the  
right one*



# Nearest Neighbor

- Small amount of code
- Easy to implement
- More points gives better accuracy
- Running Time:  $O(n^2)$

*Demo*



# Problems of NN

- Zigzagging
- Lost points
- Intersections

# Agenda

- Who are we?
- The Curve Reconstruction problem
- The Nearest Neighbor Algorithm
- The Directed Nearest Neighbor Algorithm
- The Improved Nearest Neighbor Algorithm
- Multiple Curve Algorithm
- Questions

*The next point lies near to the current, in the same direction*

## Directed NN

- More accurate
- No zigzagging
- More points gives better accuracy
- Intersections
- Running Time:  $O(n^2)$

*Demo*

## Problems of DNN

- Intersections
- range- $\alpha$
- (More) Lost points

# Agenda

- Who are we?
- The Curve Reconstruction problem
- The Nearest Neighbor Algorithm
- The Directed Nearest Neighbor Algorithm
- The Improved Nearest Neighbor Algorithm
- Multiple Curve Algorithm
- Questions

*Insert the points that are  
skipped by the NN-algorithm*

# Improved NN

- No zigzagging
- More accurate
- More points gives better accuracy
- Open Curve
- Running Time:  $O(n^2)$

*Demo*

# Problems of INN

- Intersections
- No Multiple Curves
- Less accurate than DNN

# Agenda

- Who are we?
- The Curve Reconstruction problem
- The Nearest Neighbor Algorithm
- The Directed Nearest Neighbor Algorithm
- The Improved Nearest Neighbor Algorithm
- Multiple Curve Algorithm
- Questions



*When the starting point is seen  
for the second time, start a  
new curve*

## Multiple Curve Algorithm

- More points gives better accuracy
- Multiple Curves
- Running Time:  $O(n^2)$



*Demo*

## Problems of Multiple Curve Algorithm

- Less accurate than DNN
- Needs more points to find all curves

# Conclusion

- Multiple algorithms
- Running time of  $O(n^2)$
- Most Testcases can be solved

?