Projects

Algorithms for Geographic Information Systems

Sommersemester 2015
Project 1: Stop Detection
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Given a GPS trajectory...
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... detect stops / stay regions.
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possible applications include:
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• detecting beautiful picnic areas in national parks
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possible applications include:

- detecting beautiful picnic areas in national parks
- analyzing the movement patterns of wild animals
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Alewijnse et al.: A Framework for Trajectory Segmentation by Stable Criteria
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Project 2: Viewshed Analysis
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Given a DEM, compute the *viewshed* of a location $l$. 
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= 
digital elevation model
Project 2: Viewshed Analysis

Given a **DEM**, compute the **viewshed** of a location $l$.

digital elevation model  area visible from $l$
Project 2: Viewshed Analysis

Given a digital elevation model (DEM), compute the viewshed of a location $l$. The viewshed is the area visible from $l$.

image: http://gis.stackexchange.com/questions/57197/how-can-i-use-field-of-view-in-arcgis
Project 2: Viewshed Analysis

Given a **DEM**, compute the **viewshed** of a location $l$.

- digital elevation model
- area visible from $l$

**possible applications include:**

Project 2: Viewshed Analysis

Given a **DEM**, compute the **viewshed** of a location $l$.

digital elevation model  \(\rightarrow\) area visible from $l$

possible applications include:

- placement of radio masts
Project 2: Viewshed Analysis

Given a **DEM**, compute the **viewshed** of a location \( l \).

\[
\text{digital elevation model} \quad \text{area visible from} \quad l
\]

**possible applications include:**

- placement of radio masts
- finding hidden routes

Project 2: Viewshed Analysis

Given a **DEM**, compute the **viewshed** of a location \( l \).

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digital elevation model       area visible from \( l \)

possible applications include:

- placement of radio masts
- finding hidden routes
- finding scenic routes

Project 2: Viewshed Analysis

Given a **DEM**, compute the **viewshed** of a location $l$.

- digital elevation model
- area visible from $l$

**Possible applications include:**

- placement of radio masts
- finding hidden routes
- finding scenic routes

Problem well known, lots of literature. Task: Try to design fast algorithms!
Project 3: Scenic Route Planning
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Given a road network, plan a scenic route.
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Given a road network, plan a **scenic** route.

in terms of:
Project 3: Scenic Route Planning

Given a road network, plan a **scenic** route.

in terms of:

- visiting points of interest
Project 3: Scenic Route Planning

Given a road network, plan a *scenic* route.

**in terms of:**
- visiting points of interest
- using attractive edges of the road network
Project 3: Scenic Route Planning

Given a road network, plan a scenic route.

in terms of:

- visiting points of interest
- using attractive edges of the road network

Task: Think about a reasonable problem definition, design algorithms to solve it.
Overview
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Project 1: Stop Detection
Given a GPS trajectory, detect stops or stay regions.
Overview

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Given a GPS trajectory, detect stops or stay regions.

Project 2: Viewshed Analysis
Given a digital elevation model, compute the viewshed of locations.
Overview

**Project 1: Stop Detection**
Given a GPS trajectory, detect stops or stay regions.

**Project 2: Viewshed Analysis**
Given a digital elevation model, compute the viewshed of locations.

**Project 3: Scenic Route Planning**
Given a road network, plan a scenic route (using POIs or attractive road segments).