

Identifying Target Features In A Layered Stereoscopic Display

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Introduction

- Computer visualizations of 3D medical or geological data often require the simultaneous display of multiple layers.
- These displays tend to be difficult to interpret visually.

Introduction

- Research has shown that surface textures are clearly effective in enhancing surface shape perception.
- However, many questions remain concerning the optimal combination of textures for layered visualization.

Introduction

- Goal of the experiment
 - Seeking to improve understanding of the role that texture, applied to two surfaces, plays in helping to locate target features in such simultaneous displays.

Experiment Design

- Previous studies have shown that fine grid-like surface textures are particularly effective on layered displays.
- This experiment focuses on the combination of grid texture opacities on the top and bottom surfaces.

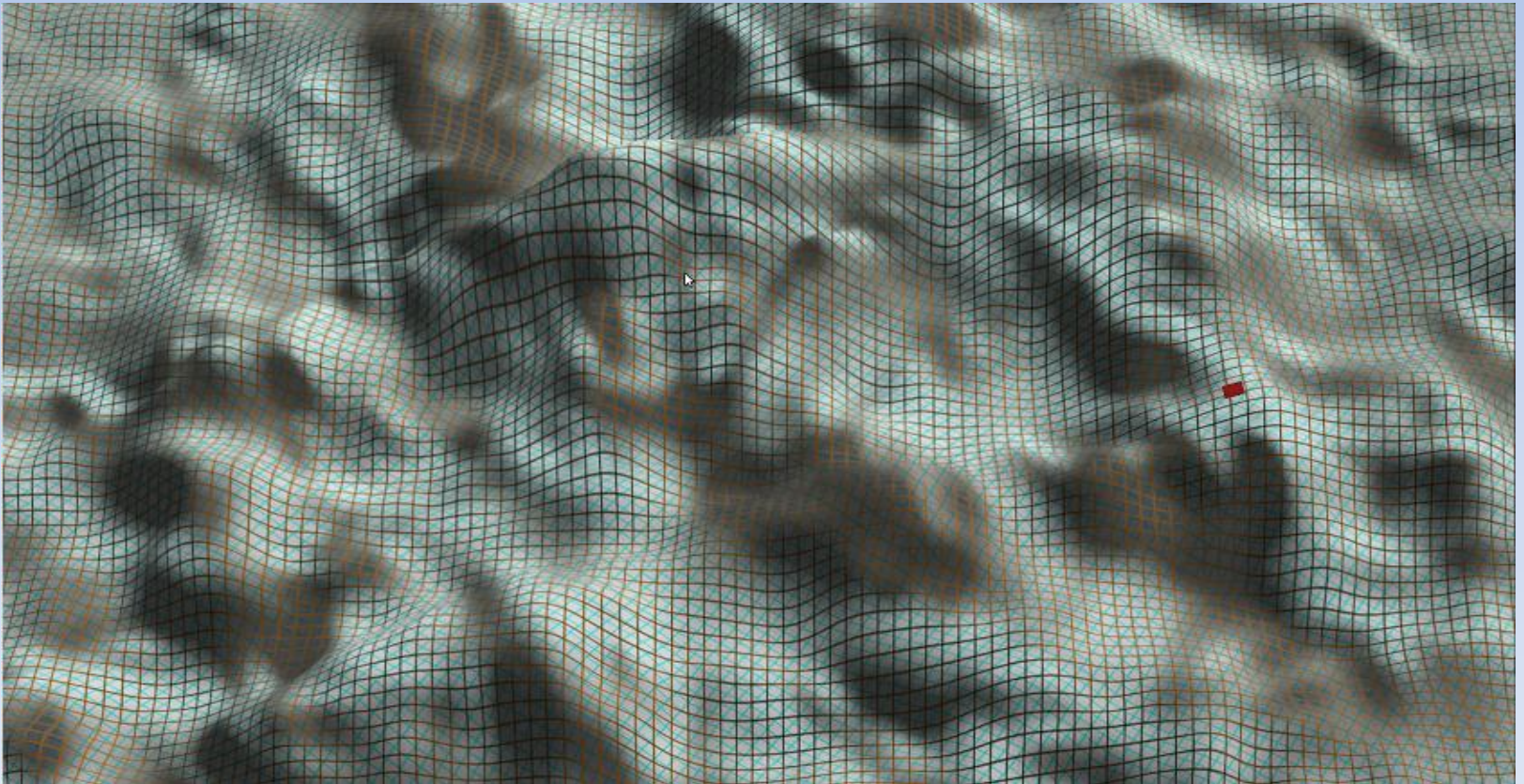
Experiment Design

- Stereoscopic display



Experiment Design

- Terrain-like surfaces (with grid textures)

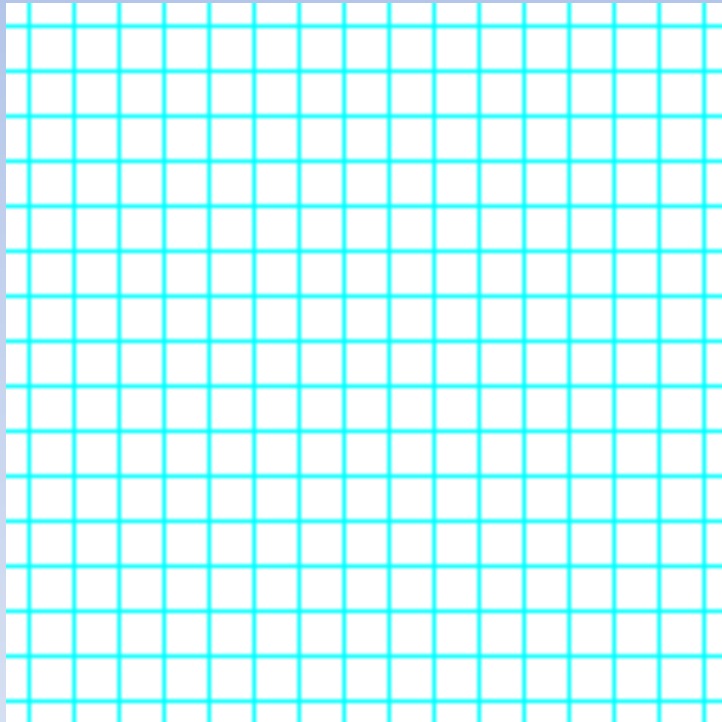


Experiment Design

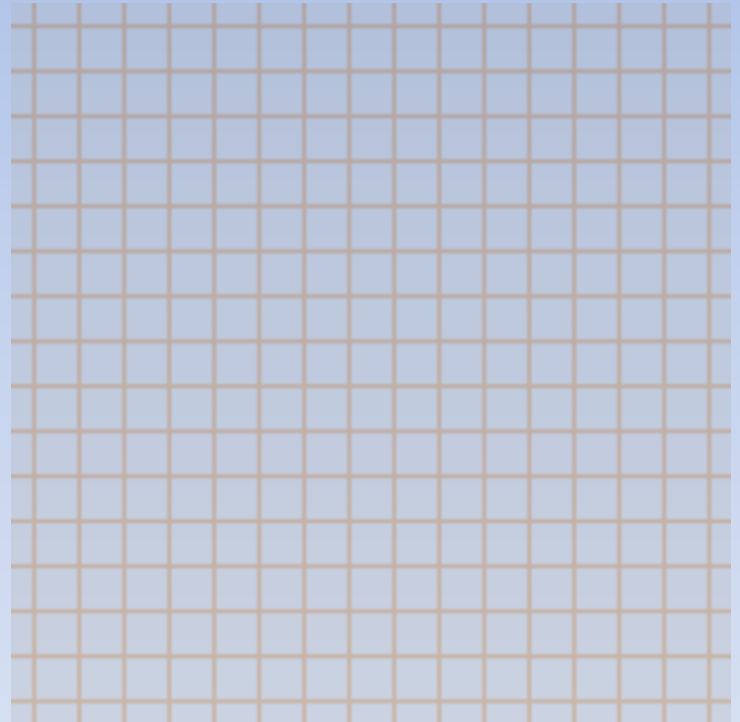
- Grid textures
 - The grid had a 6.25mm spacing with a line width of 0.635mm.
 - The top texture was orange and the bottom texture was cyan.
 - The entire top texture was rotated -15° and the bottom texture was rotated $+15^\circ$.

Experiment Design

- Grid texture



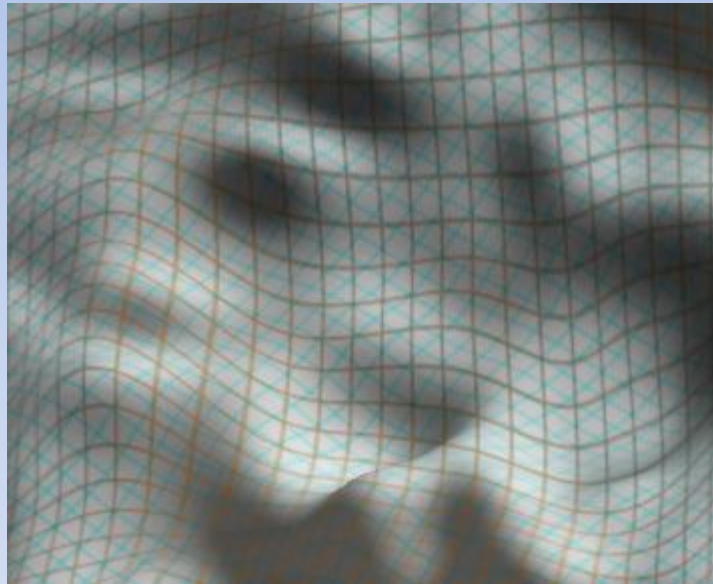
Bottom texture with opacity 0.9



Top texture with opacity 0.3

Experiment Design

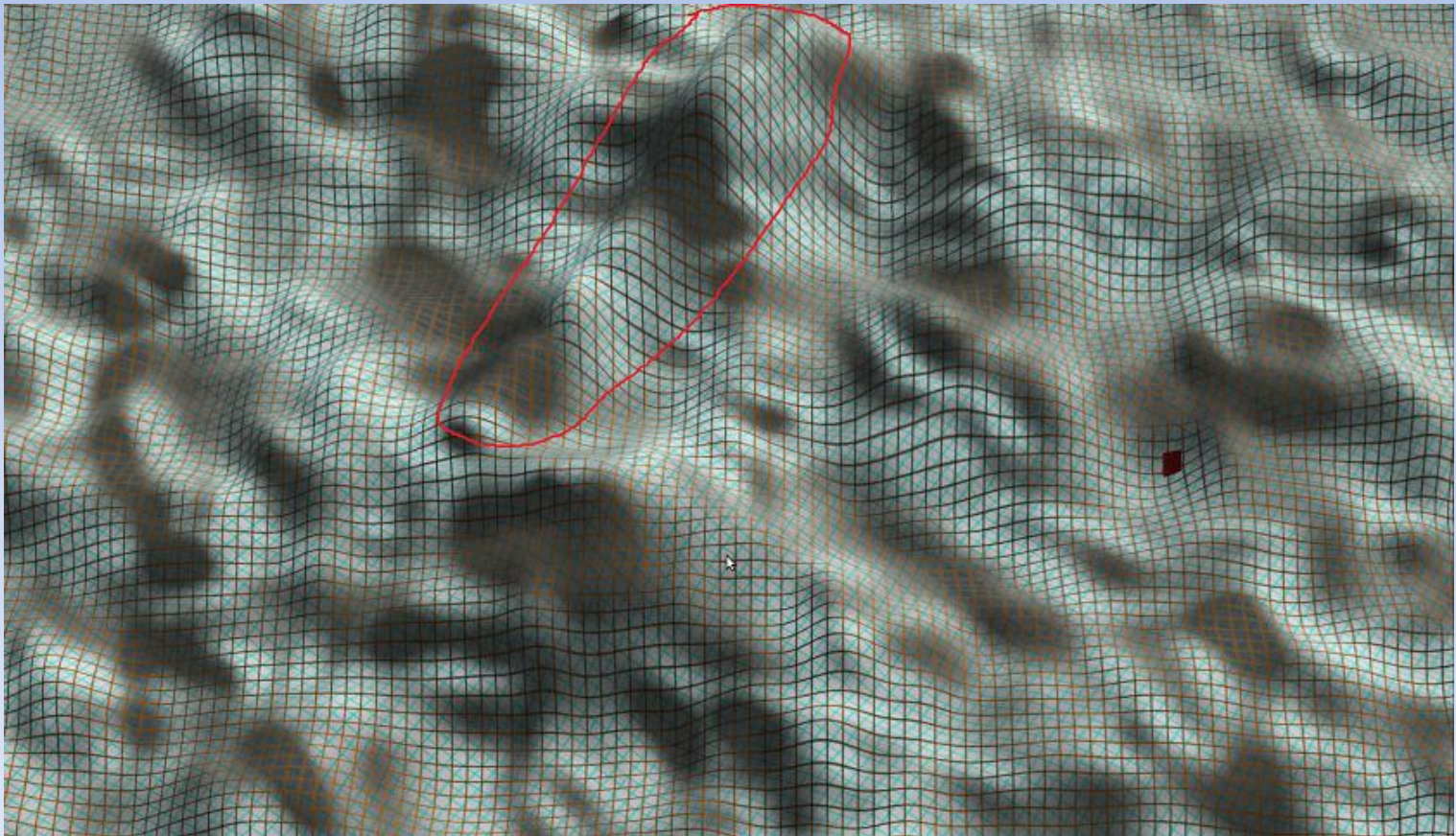
- Grid texture



Bottom texture with opacity 0.5
Top texture with opacity 0.5

Experiment Design

- Target feature (on top surface)



Experiment Design

- Factor – grid texture opacity
 - There were 5 texture opacities for both top and bottom surfaces:
 - 0.1, 0.3, 0.5, 0.7 and 0.9
 - Therefore, there were $5 \times 5 = 25$ combinations.

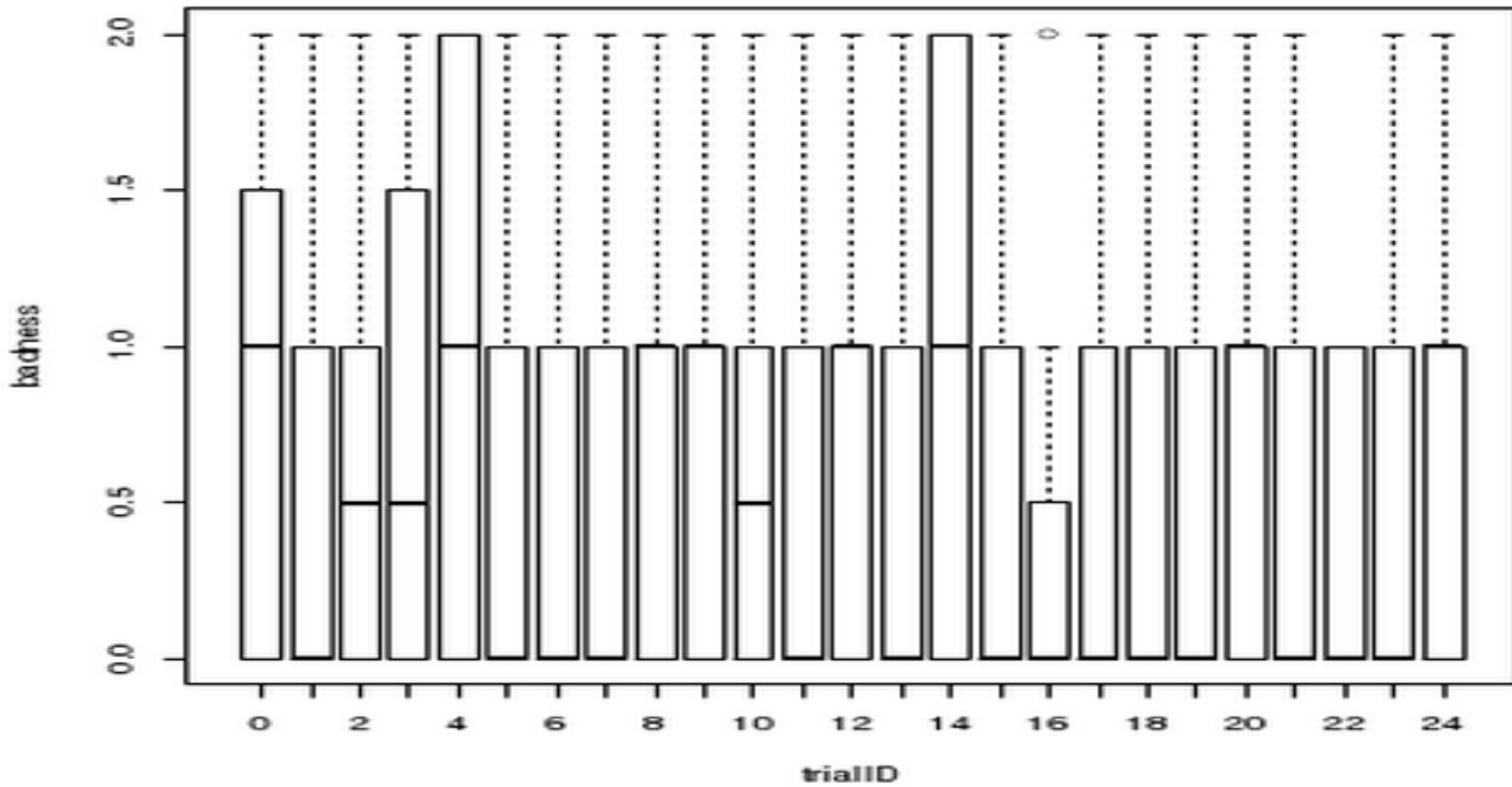
Experiment Design

- Trials
 - Based on 25 combinations, we set up 25 trials with 2 presentations per trial.
 - 10 subjects yielded a total $25 \times 2 \times 10 = 500$ result data.
 - There were $2 \times 10 = 20$ result data for each opacity combination.

Experiment Design

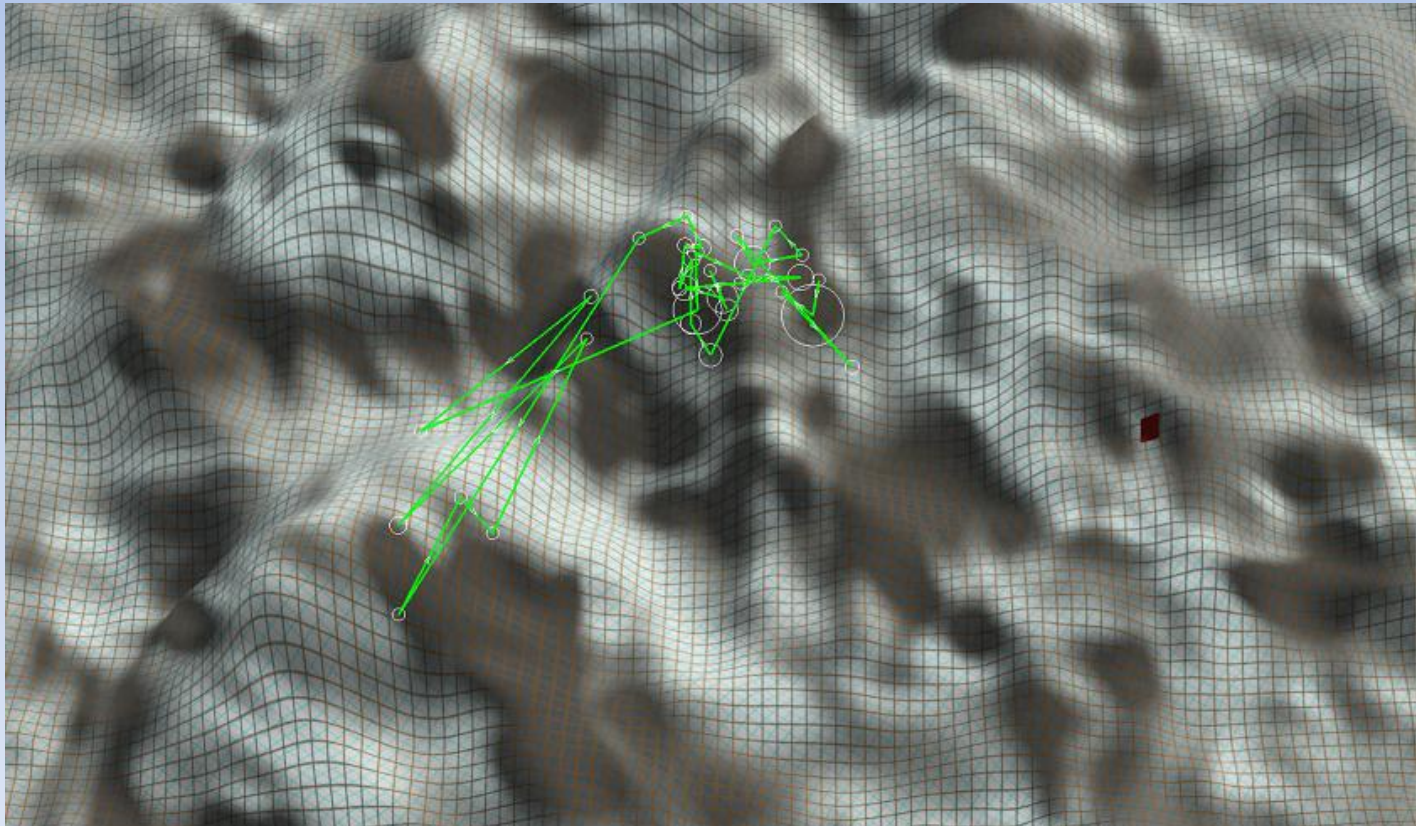
- Result data
 - The subject's response for the target feature location was recorded.
 - By using an eye-tracking system, subject's eye movement was record.

Experiment Result



Experiment Result

- Review subject's eye movement



Future Work

- The future work will focus on experiment data analysis.
- We also hope the eye tracking data can help us to better understand how people visually search layered surface displays.

Thanks!