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# Focus+Context Grouping for Animated Transitions

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## Abstract

Animation is a commonly used technique in information visualization for smooth transitions between different views. When observing animations of moving objects, people often need to track several specific objects while identify the major trend of movement simultaneously. In this paper, we propose a novel focus+context grouping technique to facilitate target tracking and trend identification. It divides objects into several groups based on a comprehensive tree cut algorithm and generates a staggering animation in which groups are animated sequentially. A balance between efficiency and accuracy is achieved for an effective animation planning. To evaluate the effectiveness of the proposed technique, a carefully designed user study is conducted. The results indicate that focus+context grouping is effective for users to track targets without losing context (i.e., major trend of movement). Based on the study, we discuss advantages and limitations of the proposed grouping technique and conclude with design implications.

*Keywords:* Animated transitions, grouping, visual tracking, visualization

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## 1. Introduction

When analyzing data, it is common to explore data from different but correlated views [1, 2, 3, 4, 5, 6, 7, 8]. Recent advances in interactive visualization make this exploration process much easier. In many applications [5, 9, 10, 11], animation is a popular approach to transit among different views. When an animation involves shifting locations of objects, continuous movement along the line between the original and updated positions of the object is commonly used to help users keep track of the object. However, how to best design the objects' movement to facilitate people's perception is not an easy task. According to the Gestalt's law, objects with similar movement trends are more likely to be perceptually grouped, which facilitates pattern recognition. Therefore, in this

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