

DEPARTMENT OF COMPUTER SCIENCE
DOCTORAL DISSERTATION DEFENSE

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**Foveation Techniques and Scheduling Issues in
Thinwire Visualization**

1:15 p.m., Monday, April 6, 1998

Abstract

We are interested in the visualization of large images across a network. Upon request, the server sends an image across the network to the client, who in turn, presents this image to the viewer. A key observation is that, at any moment, the viewer is mainly interested in a region around his gaze point in the image. To exploit this, we let the viewer interactively indicate this point and the selected region will have higher priority in the transmission process. As a result, the displayed image is a “space-variant” image.

A fundamental difference between this scheme and the usual progressive transmission scheme is that we place more emphasis on the visualization process. This shift in emphasis opens up new perspectives on the problem. In this thesis, we focus on this difference.

In chapter two, we formalize the operation of “foveating an image”, study how to distribute the resolution over an image, and how to progressively refine such a space-variant image. Motivated by properties of human vision, we propose two methods for the construction of space-variant images. In chapter three, we formulate and study an abstract on-line scheduling problem which is motivated by interactions between the client and the server. In the fourth and last chapter, we describe details and issues in an implementation.