

## **The Illuminated Pixel**

### **Adaptation of Infrared and Visible Light Reflectance Transformation Imaging (RTI) in Exploration of a Medieval Illuminated Manuscript**

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More than ten years have passed since the Polynomial Texture Mapping (PTM) photography method was first introduced by Malzbender, Gelb and Walters in Hewlett-Packard Technical Report HPL-2000-38.

The RTI file, as it is now called, is a complex mathematical model describing luminance random light direction data for each pixel in a given image. The stored information within the pre pixel (kind of metadata information) contains data about surface scattering, shades, inter reflections and colors, which allows virtual enhancement of a photographic image. This dynamic method of texture visualization transforms the visual appearance of a given surface from a two-dimensional representation to a three-dimensional one.

RTI techniques have gained much attention in various image processing fields, and are applicable to conservation practices as well. RTI enables conservators to explore the surface in a new way and possibly to discover details invisible to the naked eye. At present, RTI research is not limited only to real size digital photography it also extends to use with microscopy.

This paper suggests to the conservation community how to build a relatively low-cost RTI installation with which we explore the surface of a 15th century illuminated Jewish manuscript from the collection of the Jewish Art & Life Wing of the Israel Museum in Jerusalem Israel.

The ongoing research compares the use of near infrared RTI with visible light RTI and offers a visual method of quantifying the effects of paper conservation methodologies.

<http://www.hadassah.ac.il/Site/AcEn/Departments/Photography/about.asp>

<http://www.imj.org.il>