Digital projection, including LCD and DLP systems, can be applied in a wide range of settings including theaters, clinics, and schools. However, current projection techniques are ill suited to project images upon non-planar surfaces without the use of complex optics and surface-specific customized systems. This technology provides a digital projection image-correction system that projects sharp images onto any surface.

**Universal projection onto all surfaces using compact hardware and cost-effective image correction algorithm**

Traditional projection techniques are designed for flat planar projection screens, leading to blurred and warped images when projected on non-planar surfaces. Some existing techniques include sophisticated optics systems for projection upon a specific surface, however these systems are not versatile or easily adaptable to new surfaces. This technology combines an integrated optical sensor, projector, and digital processing device to evaluate the projection surface and digitally correct the image to ensure focused projection. A patterned illumination is projected onto the desired surface, and the point-by-point depth of focus of the scene is determined. This information is then used to compute the needed compensation in the image pixel-by-pixel to ensure focused projection. The image is corrected as needed and projected in-focus upon the surface. By utilizing an image-correction algorithm, this approach is universally applicable to non-planar surfaces, and requires no additional hardware or adjustments.

The image-corrected projection of this technology has been demonstrated experimentally in the lab of Shree Nayar at Columbia University.

**Lead Inventor:**
Shree Nayar, Ph.D.

**Applications:**
- Projection systems for architectural designs
- Projection systems for virtual reality and virtual environments
- Projection systems for artistic stage design for concerts, live performance, and exhibitions
- Projection systems for rear projection displays including, LCD and DLP projectors

**Advantages:**
- Ability to characterize projection surface
- Universally applicable to all surfaces both planar and non-planar
- Utilizes algorithm to correct image rather than complex optics or projector systems

**Patent information:**
Patent Pending (US 20090244090)
Tech Ventures Reference: IR Mo8-085

**Related Publications:**

**Inventors**
Shree Kumar Nayar