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Abstract
The dissertation describes the development of a mesh waveguide sensor capable of measuring both shear and pressure force at the plantar interface. The uniqueness of the system is in its batch fabrication process, which involves a microfabrication molding technique with poly(dimethylsiloxane)(PDMS) as the optical medium. The pressure sensor consists of an array of optical waveguides lying in perpendicular rows and columns separated by elastomeric pads. A map of normal stress was constructed based on observed macro bending which causes intensity attenuation from the physical deformation of two adjacent perpendicular waveguides. A force image algorithm includes a two-layer neural network system was developed to handle the complexity of construction of three-dimensional planar pressure images.
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