Plastic Optical Fiber Based Pressure Sensor Carpet For Gait Analysis…..

ABSTRACT

An implantation of tomographic imaging based on plastic optical fiber (POF) sensors which is way to develop imagers for various parameter utilizing this inexpensive sensor material. The work is aiming to implement real time tomographic imaging based on POF sensor. As the system uses light (photons) guided along the sensor to capture the information and deliver a signal at the periphery of sensor. Un-grooved POF are considered as candidate for developing the tomographic imaging modality. Sensor head size 27cm*18cm is capable of performing the imaging task as well as storing the numerical data for processing. Spatial resolution is estimated as 3cm for system.

Fig .Basic configuration of POF based sensor system

Fig. Prototype of POF based pressure sensor

SENSOR DESCRIPTION

A number of similar POF sensors can be deployed as a sensor system consisting of arrays of sensors, arranged in certain geometry to be used as sensor head for tomographic imaging. This system consist of sensor unit, optical receiver unit, processor and display(Laptop). Arduino based application is used to control the operation of the system combined with MATLAB based application for image reconstruction.
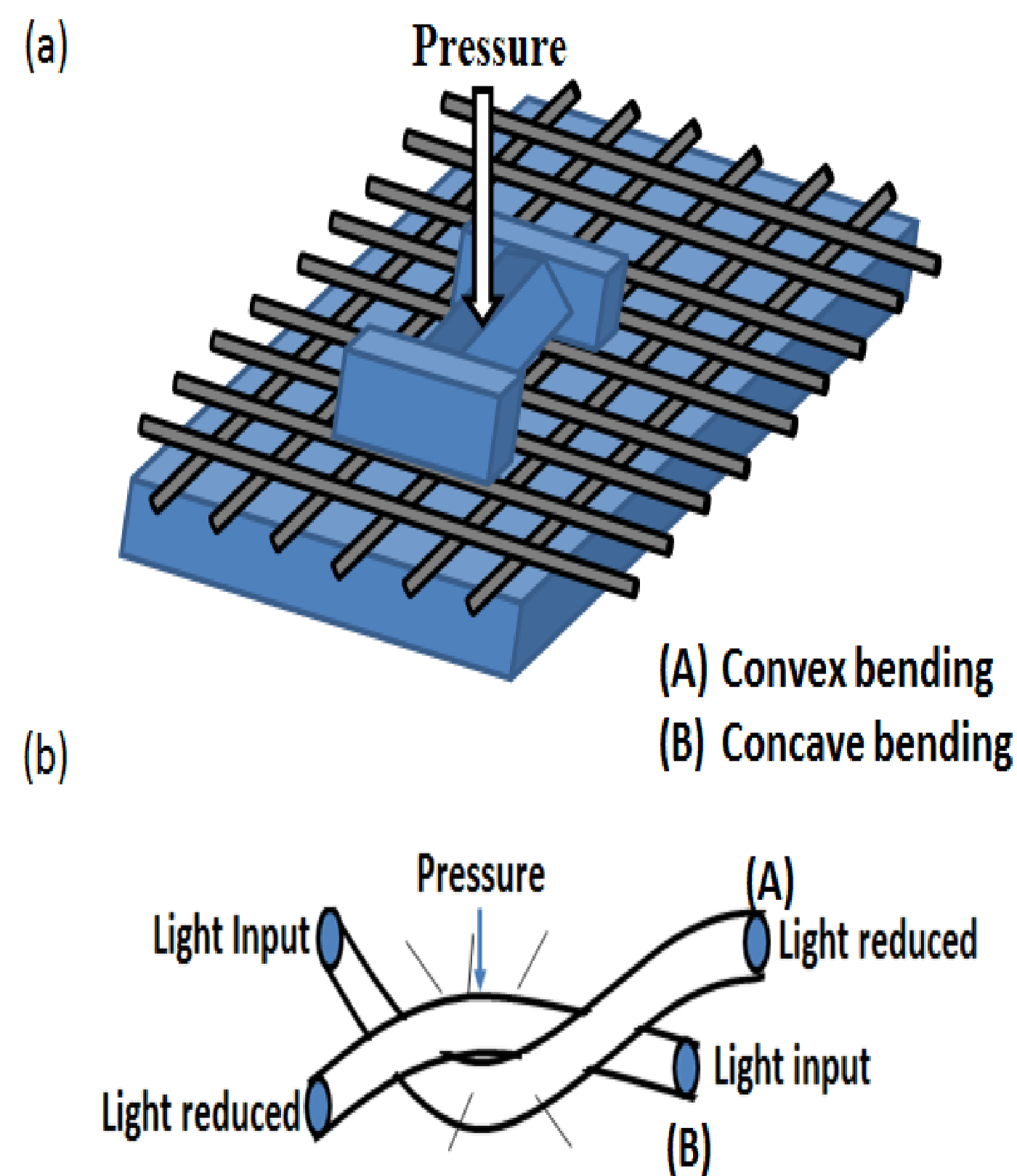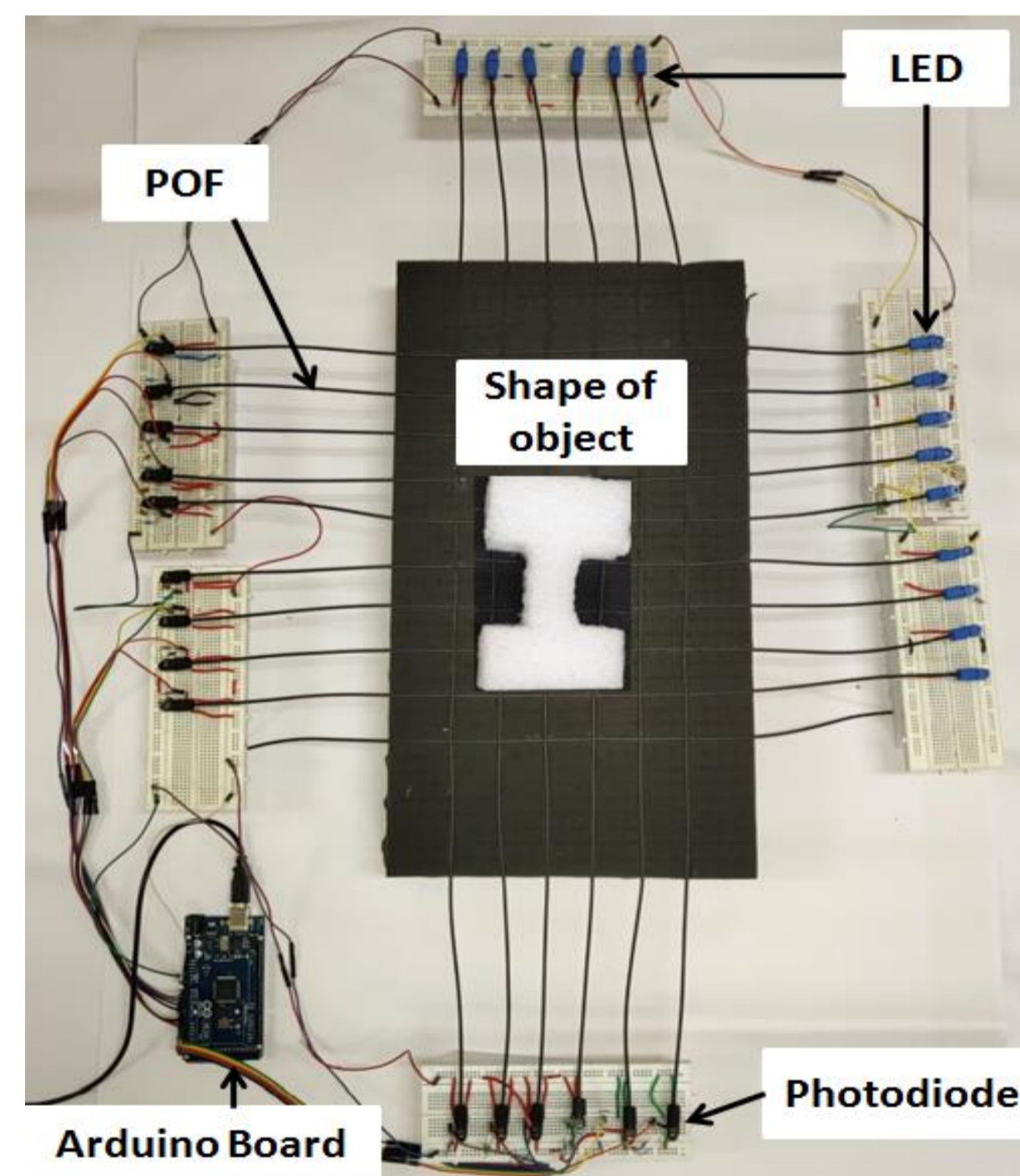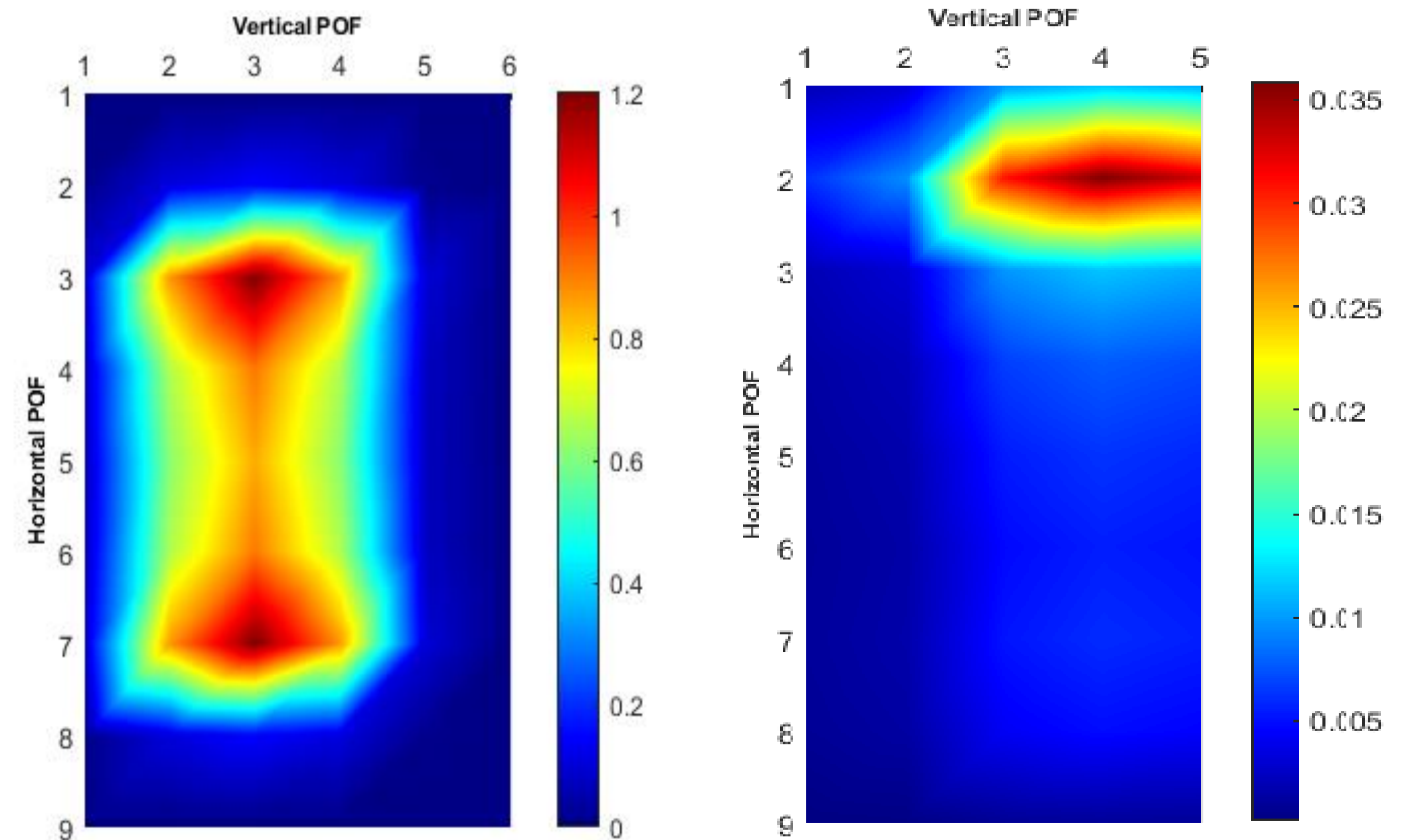.

Fig. Pressure Image reconstruction results of I-shaped and square objects

APPLICATION

A wide range of parameter can be monitored by optical fiber based sensors including strain, temperature, pressure, humidity, vibration, specific chemicals, acoustic, emission and fraction. This research focus on footstep sensing as being gait analysis reorganization. Gait is a walking pattern which comprises the speed of walking, the distance between footsteps and pattern of footfall. A footstep sensor capable of gathering data for gait analysis without biometric capability can be useful in the field of healthcare and sports.

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