

I

## Abstract

In this work a multimode fiber sensor has been employed in security field (such as protection of buildings, institutions, workplaces, etc...). This fiber sensor is attached to the fence surrounding of these buildings in order to detect the vibrations and disturbances the intruders cause on the fence. These sensors are more efficient on the mesh chain wire fence because it flexible and movable. An experimental model was built to demonstrate the fiber security sensor depending on the registration and analysis of the so-called (speckle pattern) which emerged from the multimode fiber end. The intensity distribution of this pattern is changed when the fiber is vibrated .The components used in this setup are available at low cost, (Light Source, and an optical fiber multi-modal, webcam, display screen, computer for image processing), MATLAB program was employed to perform image processing (subtraction) for the images acquired by the webcam which images speckle patterns on the screen, and to estimate the frequency response for each case of vibration for the purpose of distinguishing between vibrations or disturbances caused by a intruder on the fiber and vibrations caused by other sources (non-threatening), such as wind and heavy rain and other .Good results has been obtained after comparing the results with those of the readymade device (FD322) which is made by the American company (Fiber SenSys) this device is specialist in security and it employs multi-mode fiber for this purpose . A prototype site has been built in laboratory and it was surrounded by a chain wire fence. (FD322) device was implemented to protect this site. An alarm notification system was built using MATLAB platform so that when an alarm is triggered by (FD322) an E-mail is sent to the user. Also a private network was built between two sites, it was assumed that these sites were protected using (FD322).

II

This network enables the user to access remotely to the computer connected to (FD322) device for each site using special software for checking the alarms which are generated by this device on the computer. Using special program, remote access to both sites was achieved via internet.