

# INTEL Science Fair - 2013

## LOW COST AUTOMATED IV DRIP MONITOR

### ABSTRACT

The objective of this experimental research project is to provide a cost-effective system for monitoring the intravenous drip systems used in the hospitals. The relevant principle here is the optical activity and opacity of the IV drip solutions, detected by a logic circuit with buzzer alarm. The setup consists of polarimeter to detect the rotation of plane-polarized light on 5% dextrose IV used in hospitals.

We use pure distilled water as our reference solution. For dextrose -IV we obtain rotation of  $8.6^\circ$ , with the value of specific rotation equal to  $0.02\text{rad/kg/m}^2$ . The rotation for required length of the solution is extrapolated from a graph (specific rotation and concentration being constant). This corresponds to the maximum intensity. This procedure is repeated for the following (1) DNS (5% - dextrose, 0.9 % saline) (2) RL (sodium lactate solution) (3) NS (0.9% saline). The analyser plane is fixed parallel to that of the polarizer. Thus any rotation due to optical activity of the substance in between will result in low intensity in the emergent beam. This light signal is optically coupled to a photo-transistorized buzzer circuit that will not beep for low input and will beep for higher intensity. In case of blood, we use the property of its opacity to achieve the same. However, sensitivity of the detector and response of saline solutions have to be improved.

This project will help us to implement a low-cost drip-monitoring system even in rural health-care centres which may face shortage of manpower.