

#### GROUP INFO:

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| 1. CHETAN AMRAO | 3874/T150053015 | 8407988795 |
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PROJECT GUIDE: Mr. Shridhar Galande

GROUP NAME: N8\_5

PROJECT TITLE: NON-INVASIVE TEMPERATURE MEASUREMENT

ACADEMIC YEAR: 2017-18

DOMAIN OF PROJECT: HARDWARE / MICROCONTROLLER

#### ABSTRACT:

In the realm of manufacturing and production industry every mechanical assembly has bearings. Whenever there is transfer of rotational power from one location to another we have a bearing of some type on the other end of the power source. Most common type of bearing you can encounter is a circular roller ball bearing. It has four major parts the inner race, the outer race, the roller ball cage and the roller balls itself. Each of these undergo various levels of stress during its operation. To ensure proper functioning of roller ball bearings there is a need for appropriate and timely maintenance of the bearing. This maintenance can be of various forms like lubricating the bearing, checking for alignment with the source shaft, checking for rust and other impurities that can hamper the performance of the bearing and so on. The most important factor of the bearing performance is the temperature it is operating at as bearings can undergo serious stress in a high load, high temperature environment. Temperature is also relevant in the process of maintenance of the roller ball bearing. As it is possible to simply monitor the temperature and keep the bearing in proper temperature range for optimum performance by using a sensor and reading the data on a microcontroller but it can be difficult to just get the temperature of the bearing metal itself. There are many solutions on the market that help you measure the temperature as given in an industrial report on temperature measurement, we found that there are thermometers, probes (using RTD, thermistor, thermocouple etc) and non-contact methods to measure the temperature. Non-contact methods involve measuring radiation using CCD in cameras and complex data acquisition systems. These type of non-contact methods are costly and are not be practical for small scale applications. A paper by name “Wireless Temperature Sensor Operating in Complete Metallic Environment Using Permanent Magnets” explains measurement of temperature using magnetic field. Here they used a Hall sensor at a distance from the metal plates and stuck a ring magnet to the inner race of the roller ball bearing. The temperature and magnetic field value from the sensor have a linear relationship. Now when we first use a ball bearing if we know at what magnetic sensor value the temperature is harmful for operation we note it down and operate the roller ball bearing below the value always.

Thus, our aim was to implement a circuit to measure the hall sensor value and monitor the continuous temperature values.

Keywords: Temperature measurement, monitoring, sensing, Hall effect, Non-invasive, magnetic field, ball bearing.