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Analysing and Monitoring Windmill using Internet of Things

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Abstract:
The Proposed systems used to monitor industry by implementing industry standard protocols using IoT. In this system monitoring industrial applications like vibration of an machine and through wireless devices. Recent developments in wind energy research counting wind speed prediction, wind turbine control, operations of hybrid power systems, as well as condition monitoring and indiscretion detection are surveyed. Approaches based on statistics, physics, and data mining for wind speed prediction at different time scales are reviewed. Comparative scrutiny of prediction results reported in the literature is presented. Studies of classical and inventive control of wind turbines draw in different objectives and scenario are reported. Duplicate for outlining operations of various hybrid power systems in addition to wind generation for various objectives are addressed. Methodologies for condition monitoring and fault detection are discussed. Future research directions in wind energy are proposed.

Keywords: UBIDOT, PIC16F877A,VIBRATION SENSOR, FLEX SENSOR.

I. INTRODUCTION

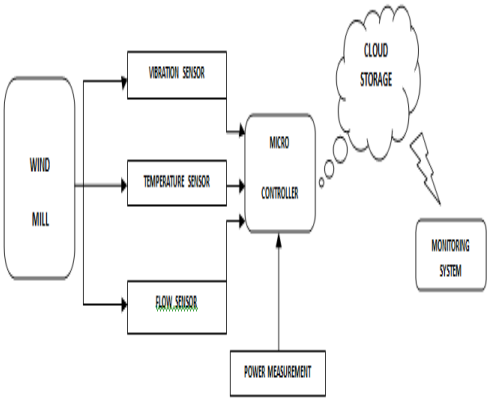
Wind power uses the same concepts as most other energy sources, using some force to turn a turbine. The turbine will then transfer its energy into a generator where electricity will be produced. The force to turn the turbine in wind energy comes from wind. Generally, wind power could only be harnessed in high speed wind locations, where wind is annually over 13mph, but due to new technology and increased efficiency in generators, even curtailed speed winds can produce cost efficient wind power. These newer automation include smart windmills where the pitch of the blade can be varied with the strength of the wind to achieve better efficiency .The methodology allows the creation of a non-parametric model of the power curve that can be used as a reference profile for on-line monitoring of the power generation process, as well as for power forecasts. The results obtained show that the non-parametric approach provides fair performances, provided that a suitable pre-processing of the input data is accomplished.

II. RELATED RESEARCH

Machines of some kind are used in nearly every aspect of our daily life. When a machine fails is breaks down, the consequences can range from annoyance to financial disaster, or personal injury and possible loss of life. For this reason, there must be an early detection, Identification and correction of machines problems, is paramount to any one involves in the maintenance of industrial machinery vibration and noise to insure continued safe and productive operation. This work introduced the vibration and noise measurement of two industrial plants in the oil and refinery companies. Vibration and noise are considered an indicator of machine conditions. It is quite nature for machine to vibrate and thus generate emitted noise(unwanted sound). Even machines in the best of operating conditions, will have some vibration because of small, minor defects. accordingly each machine will have a level of vibration that may be regarded as normal. When machinery vibration increases or becomes excessive some mechanical trouble is usually the reasons. Some causes of vibration increments are due to unbalance, misalignment, worm gears or bearings, looseness etc.

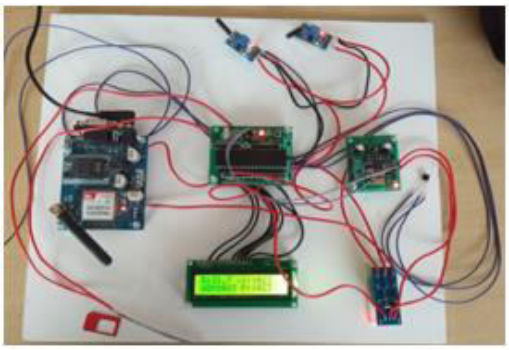
III. SYSTEM DESIGN

The system can be considered as a product with a sensor board and a smart phone application. The sensor board contains a flux sensor, two vibration sensor and a temperature sensor. The system also contains PIC microcontroller (PIC 16f877a) and GSM SIM900A. The flux sensor is used to detect the flux occur in the wire which is connected between Generator and the base station. The temperature sensor senses the temperature of the machine. The use of GSM is to provide the alert message to the administrator. These incorporate on-chip 12-bit analog-to-digital converters (ADCs), 16-bit PWMs, 8- and 5-bit digital-to-analog converters (DACs), practical amplifiers, and high-speed comparators with 50 ns response time, along with EUSART (including LIN), I2C and SPI interface peripherals. The PIC16F178X are the first PIC MCUs to implement the new programmable switch-mode controller (PSMC), which is an advanced 16-bit pulse-width modulator (PWM) with 64 MHz operation and high-performance capabilities.



The system starts working when the PIC microcontroller gets the input from all the three sensors. The temperature and the vibration of the machine is calculated and displayed on the smart phone using the database from the IoT. This data can be stored in the cloud and can be used for future reference.

IV. EXPERIMENTS AND RESULTS



The system is used to monitor the windmill through wireless communication system through an Internet of things. This system monitors the Temperature, vibration of the windmill. This system is mainly used to detect the cable twist occur in the windmill by using the flex sensor. The application used in the mobile phone for the monitoring the values obtained by the sensor is monitored by an UBIDOTS.

V. CONCLUSION

In the Windmill monitoring system there will be an large number of Human work involved in it. With the help of smart phone, our system can monitor the windmill through remotely over the internet. Satellite communication is possible to monitor the windmill. The main fault in the windmill is Cable Twist. This system detects and automatically reduces the Cable twist. The results have been analysed and is found to be satisfactory.

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