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Embedded Based Wind Mill Direction Using Object Sensor

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Abstract: Our research idea is to implement the object sensor in wind mill. At present they are using anemometer for control the direction of wind mill. Compare to the anemometer it is most effective for control the direction while replace the anemometer is replaced by object sensor. The wind blades are rotated depends upon the availability of wind force. The wind blades are not rotated continuously because the air flows in a various direction in a time by time so this time wind blades are idle. Our system is used to optimize the idle time of the windmill and produce the continuous power supply using object sensor. The microcontroller is directly communicated with object sensor and microcontroller programmed in a way such that will can trace out where the wind flow is occurs.

Keywords: Microcontroller, Object sensor, Moving plate, ADC.

I. INTRODUCTION

In the last few years wind mill direction control by the anemometer. In our idea we implement object sensor is replaced by anemometer where the direction of the air flow is there. Proximity sensing based on infrared signal acquisition and processing typically requires two parts to form the optical front end an infrared LED and an optical sensor. The infrared LED beams infrared signal toward the sensing object, a portion of that signal bounces back and is detected by the infrared CMOS optical sensor. Through on-chip signal conditioning and analog-to-digital conversion, the digitized infrared signal can be given to the microcontroller. After receiving signal microcontroller process the direction of wind position by using stepper motor.

II. LITERATURE SUREVY

The Small-scale wind generators are now available in shops with prices ranging from a few hundred to a few thousand dollars. With the exception of especially inaccessible or known high wind locations, it is not clear in advance of most installations whether a generator would be cost effective in comparison to grid connection or solar panels. A logging weather station can be used to carry out a survey, but may represent a substantial fraction of the cost of deploying a small wind generator in the first place, and these units are not generally designed to be used in the absence of power and connectivity. Global databases of prevailing wind conditions are rarely useful in the case of small installations, since microclimates and local terrain alter wind exposure of small-scale sites a great deal, while surveys target commercial-sized installations that use wind at heights from 10 to 200 meters.[1], [2]

There are a number of professional logging air-speed meters on sale. They typically cost $400 or more, and at least another $100 with proof of traceability if required.[4] A low cost logging anemometer has been described, using similar technology to the design in this manuscript, but it is not designed for free-standing, self-contained operation, nor is it designed to run for extended periods on small dry cells.[3]

That design logs direction as well as speed from the same cup-type sensor, using an ingenious asymmetry in the cups and cyclic variation in shaft speed. No establishment of its accuracy or traceability is presented. Our solution to this problem is a small anemometer of the cup type commonly seen on domestic weather stations and yacht masts.[5]

III. TECHNOLOGY OVERVIEW

A. Infrared proximity sensing basics:

The infrared proximity sensing can be illustrated simply. Figure 1 demonstrates there is no sensing object in the proximity-detection path. No reflected infrared signal can be bounced back to be captured by the proximity sensor.

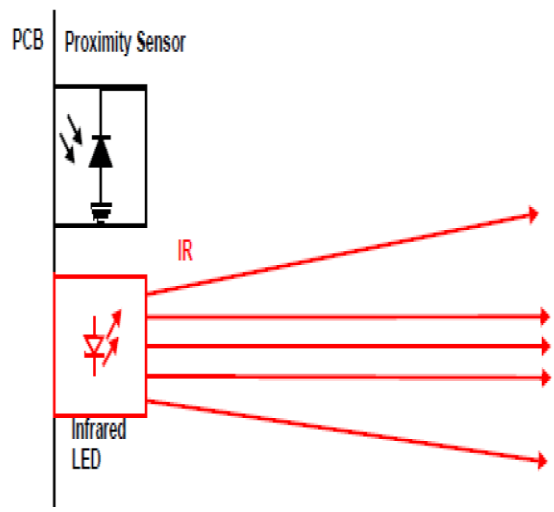

Figure.1. No sensing object in proximity-detection area

Conversely, when the sensing object is within detectable distance as demonstrates in Figure 2, the proximity sensor captures the reflected infrared signal. The proximity readout is linearly proportional to the captured infrared-

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light signal intensity and inversely proportional to the square of the distance.

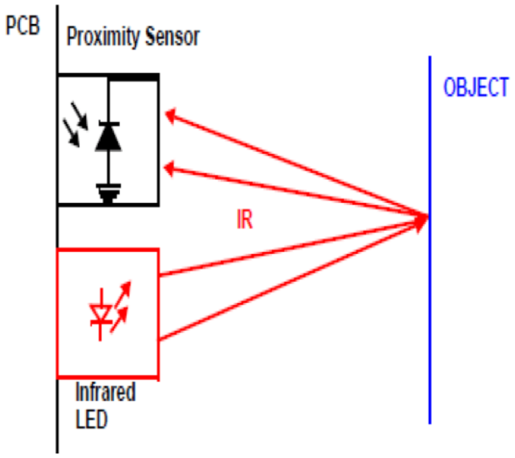

Figure.2.Sensing object within proximity-detection area

IV. PROPOSED ARCHITECTURE

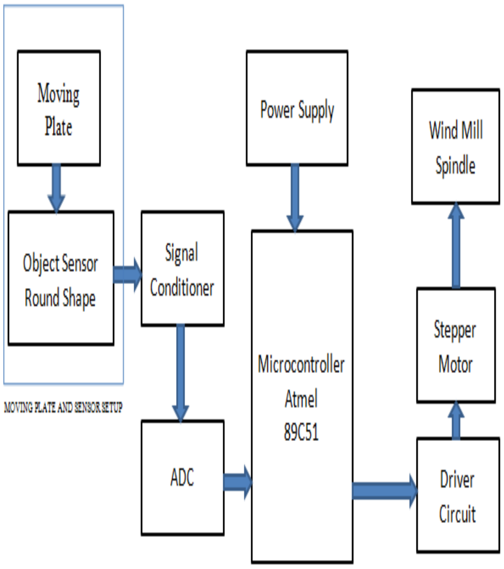

Figure.3. Proposed Architecture

V. MOVING PLATE OBJECT SENSOR ARRANGEMENT

A. Infrared LED:

Another important part of the optical front end is the infrared LED. Different infrared LEDs have different peak wavelength, radiant intensity and view angle. A high-intensity infrared LED with typical peak wavelength from 850 nm to 950 nm will match the ISL29011 proximity-sensor spectrum. A narrow viewing angle with higher radiant intensity will improve proximity-detection distances. It is important to choose an infrared LED that balances the trade-offs among view angle, mechanical footprint, radiant intensity and power consumption.

B. Moving plate placement dimensions:

Component placement plays a crucial role in the mechanical design that determines the proximity-detection distance. There are many deciding factors: space dimension between sensor to optical barrier, distance between optical barrier and infrared LED, barrier height variations, whether to use a light pipe, among others. Figure 4 shows a proximity-sensing system solution with typical component-placement dimensions.

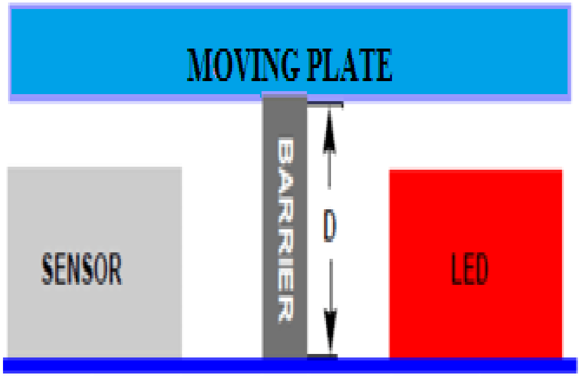

Figure.4. Moving plate and object sensor arrangement

C. Typical proximity measurement:

After all design and implementation techniques have been applied to the proximity-sensing system, a reasonable proximity-detection measurement can be obtained as illustrated in **Figure 5**. An optimized ambient-light and proximity-sensing system is based on customer-specific applications requirements.

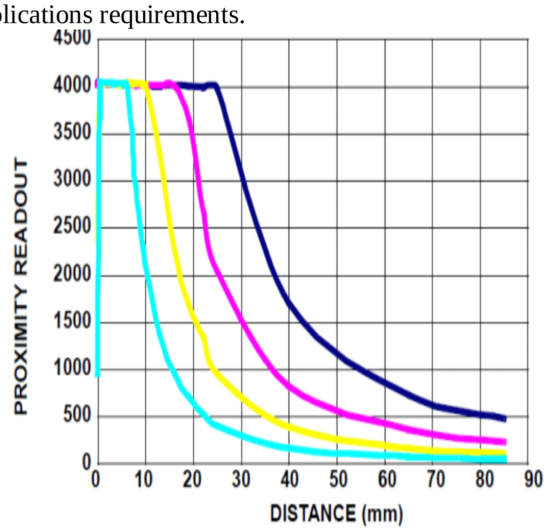

Figure .5.Proximity sensing with four different LED driving currents

VI. SIGNAL CONDITIONER

signal conditioning performs manipulating an analog signal in such a way that it meets the requirements of the next stage for further processing Signal conditioning can include amplification, filtering, converting, range matching, isolation and any other processes required to make sensor output suitable for processing after conditioning.

VII. DESCRIPTION OF PROPOSED METHOD

The windmill is fixed on the wind blowing area. The stepper motor is fixed at the bottom of the windmill arrangements. The center of the windmill motor shaft is attached. The stepper motor is used to turn the required direction of the windmill to air flow area. The direction controlling arrangement is fixed on the area not affected by wind blade's air force. The direction controlling arrangement consists of sensors, microcontroller (control unit), direction indicator and motor. The direction indicator is a light weight and it is arranged on horizontal. It will rotated depends upon the airflow direction. The one end of the direction indicator is used to identify the direction of the wind flow by using sensor. The sensor is fitted below the direction indicator which is shown as in the diagram.

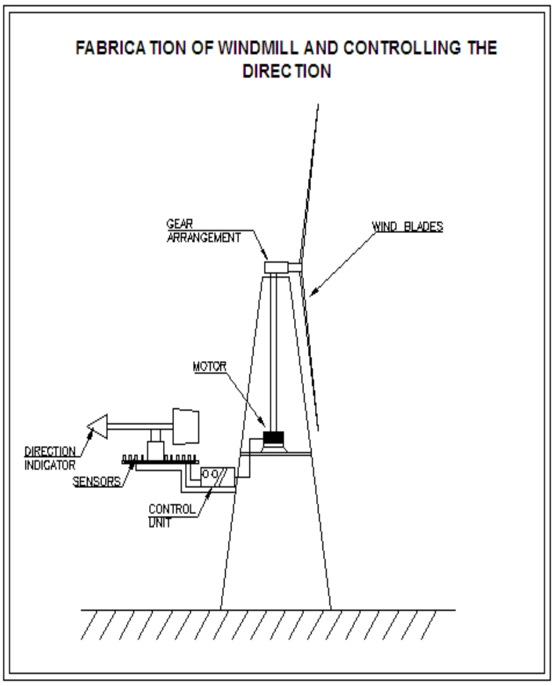

Figure.6. Schematic representation of proposed wind mill direction

Usually the moving plate turns through the direction of air. The object sensor used to predict the position of the moving plate. It will trigger a signal conditioner based on the moving plate positions. That signal is manipulated in signal conditioner to meets it requirement for further process. The conditioned analog signal is converted into digital signal by ADC and digital signal process in microcontroller. The microcontroller, which is programmed to determine the airflow direction based on the input signal. Signal information is provides the position of the moving plate which helps out to find out the air flow direction. Finally the controllers trigger the stepper motor on the air flow direction. Now motor rotates the corresponding sensor values. Motor shaft is connected to the wind mill spindle.

VIII. CONCLUSION

The implementation of object sensor in wind mill it will provides the better performance when compare with anemometer. Our researched idea describes the concept of feedback system in electrical response. Every system is modeling in electrical signal will provides high accuracy. Here the yawing concept is replaced by stepper motor interface for the betterment of high efficiency the microcontroller will be replaced in ARM families.

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BIOGRAPHIES

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