Wireless Sensor Network For Industrial Monitoring

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Abstract: During Industrial Operations, Many By Products Are Generated Which Can Be Hazardous To The Health Of Workers Working There. Very Few Industries Setup Such Wireless Sensor Networks (Wsn) In Their Workshops As The Cost Of These Systems Are High. The Purpose Of This Concept Is To Provide A Low Cost Integrated Sensor System Consisting Of Various Sensors. This Device Would Collect The Data And Send It To The Main Database Via Api Where The Information Would Be Analyzed And Necessary Measures Can Be Taken To Avoid Mishaps.

Keywords: Wireless Sensor Network (Wsn), Application Protocol Interface (Api).

I. Introduction


II. Experimental setup

Client Section Comprises Of Microcontroller, Sensors And Transmitter Module And Initiates The Data Collection Which Would Send The Sensor Data Which Will Be Received By The Sever Section. The Server Section Comprises Of Microcontroller, Ethernet Adapter. The Server Section Will Log The Data On Cloud Database Viaembooapi. If Any Abnormal Activities Are Sensed In The System Then It Would Notify Via An Alarm System Or Sms Service To The Concerned Person.
1. Client Section- The Client Side Including transmitter (Transmitter) I.E. 2.5 Ghz, Micro Controller, And Sensors Required Measuring The Desired Parameters. The Data From The Sensors Is Collected By The Micro Controller And Data Packets Are Formed Which Are Finally Sent To Server. The Transceiver Is Collected By The Micro Controller Via Spi (Serial Peripheral Interface). The Spi Bus Specifies Four Logic Signals-

1. Serial Clock (Sclk) - Output From master.
2. Master Input, Slave Output (Miso) - Output From slave.
3. Ss: Slave Select (Ss)- Active Low, Output From master.
4. Mosi: Master Output, Slave Input (Mosi) - Output From master.

When Communication Starts, Clock Is Configures By Bus Master, Using A Frequency Supported By The Slave Device. Then On The Select Line Slave Device Is Selected By Master With A Logic Level 0. Such As For Analog To Digital Conversion, If A Waiting Period Is Required, The Master Must Wait For At Least That Period Of Time Before Issuing Clock Cycles. A Full Duplex Data Transmission Occurs During Each Spi Clock Cycle. On Mosi Line The Master Sends A Bit And The Slave Reads It, On The Miso Line While The Slave Sends A Bit And The Master Reads It. This Sequence Is Maintained Even When Only One-Directional Data Transfer Is intended.

2. Server Section- Server Consists Of Micro Controller With Ethernet Shield/ Adapter. The Ethernet Shield Is Connected To A Local Router Through Ethernet Cable. This Enables The Controller To Access The Internet And Upload The Server Side Data On Cloud. The Cloud Service Called Google Drive Is Being Used In The Project. Google Drive Allows Storing Of Sensor Data In Form Of Row And Columns In The Excel Sheets. The Micro Controller Communicates To Transceiver And Now Works As A Receiver To Receive Sensor Data Packets. The Data Is Collected Into Variable In String Format.

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Advantages
1. Low cost
2. Low Power consumption.
3. Good Accuracy Of data.
4. Use Of Open Source Hardware And software.
5. Monitoring Can Be Done From Remote Areas Via Internet.
6. Easy Adaptability As Per Required application.

III. Applications
1. Area Monitoring- In The Network Of Sensors, They Have A Common Application I.E. Area Monitoring In Which Sensors Are Deployed Over A Region Where Some Phenomenon Is To Be Monitored. Take An Example Of Military And Civilian In Which Enemy Intrusion Is Detected Through Sensors In Military, Geo-Fencing Of Gas Or Oil Pipelines In Civilian respectively.
2. Intelligent Buildings/Bridges- In These Measurements About Temperature, Energy Wastage and Monitoring Of Mechanical Stress Levels.

IV. Conclusion
Thus We Would Be Able To Design Sensor Network Systems Which Are Capable Of Sensing Different Parameters I.E. Temperature, Pressure, Humidity Etc. This Sensed Data Is Interfaced Via Transceiver The Server Node. These Sensed Values Are Processed By The Microcontroller. The Designer Can Observe The Sensed Data Globally If The Sensor Nodes Are Connected To The Api’s Like Temboo.

References