IQUID FLOW MONITORING AND CONTROL

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to control the flow rate of the liquid for enhancing the processes and to prevent the accidents. The
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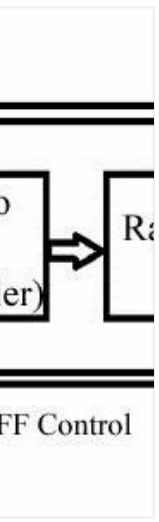
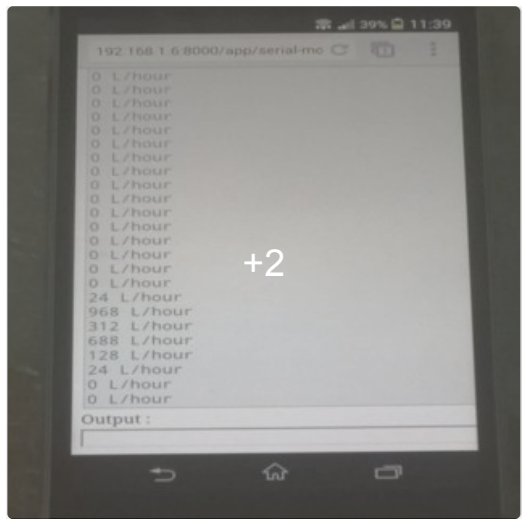


control…

Flow meter sensor

Solenoid Electro-valve



Liquid Flow Monitoring using Smart phone

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ASPBERRY PI BASED LIQUID FLOW MONITORINC CONTROL

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Abstract

there will be many big pipelines carrying various types of liquids, including the flammable li ecessary to control the flow rate of the liquid for enhancing the processes and to prevent the a ethodology to monitor and control the liquid flow in the pipeline of industries through web ser the same, but this is about to monitor and control the flow of liquid using Internet with the help flow rate of the liquid is measured by Hall Effect sensor based flow meter. Arduino, a microco he pulses from the flow meter and sends it to Raspberry pi, a microcomputer to control the el he pipeline. Server was setup by means of Raspberry pi..

Arduino, Raspberry pi, Flow meter, Hall Effect sensor, electro valve.

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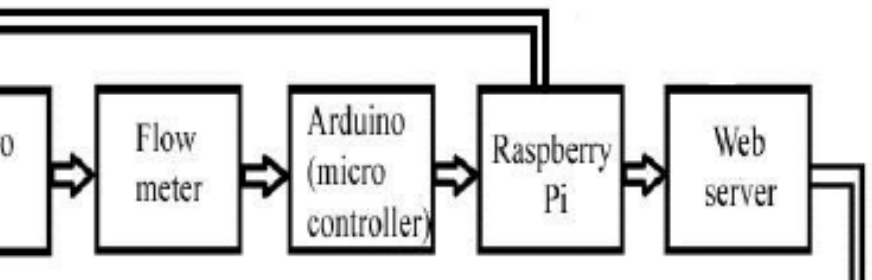
UCTION

e flow of liquids is a critical need in many nts. In some operations, the ability to conduct measurements is so important that it can make between making a profit or taking a loss. In naccurate flow measurements or failure to take s can cause serious or even disastrous results. quid flow measurement instruments, the flow nined inferentially by measuring the liquid's e change in kinetic energy. Velocity depends re differential that is forcing the liquid through duit. Because the pipe's cross-sectional area is emains constant, the average velocity is an he flow rate.

portant to know what a flow meter can do as do. Each type has both advantages and . Technological improvements of flow meter considered. It is always considered about the flow meter. The satisfaction received with the ds on the care used in selecting and installing istakes when installing the device is common. has some tolerance to variable velocity the pipe. Without it accuracy and performance orrect. The biggest problem is with metering. ay not be clearly understood that is they may t parameters. Regularly the meters have to be l the flow meters require initial calibration. tion depends on how well the meter fits the There are number of factors influence requirements and the life expectancy of flow ajor factor is matching the right instrument to application. There are many other flow meters us places. They are monitored using the wired computer systems. The person can notic in the computer system and using the p to monitor the flow. So that for monito needs an individual computer. The pers flow when he was not in the place proposed system helps to monitor and liquid through internet by mobile or com

2. PROPOSED SYSTEM

The proposed system to monitor the flo consists of electro-valve, flow me microcomputer and web server. The b system is shown in the fig.1. To measur liquid, Hall Effect sensor based flow m and Raspberry Pi will act as a microcomputer respectively. The electr connected to the pipeline in which the f The electro valve is connected with th sensor. The flow sensor measures the analog pulse. The flow sensor/ flow me arduino in order to read the pulses from arduino reads the analog pulse from sends the signal to the raspberry pi component to control the electro valve. electrically connected to the raspberry energized to open or close the valve. programmed to read the arduino signa electro valve. The raspberry Pi is also p a Web server by which the electro valv the LAN (Local Area Network), or Arduino is responsible for collecting th meter and sends it to the raspberry interfaced with Arduino directly.



ON/OFF Control

diagram of the proposed system to control the flow of liquid.

er works on the principle of Hall Effect sensor. ct sensor is a transducer whosw output voltage onse to a magnetic field. As the liquid flows ow meter, Hall Effect sensor senses the liquid ds the corresponding data to Arduino through The next part involves the uploading of data received from the arduino to raspberry pi. is a microcomputer which is of light weight Linux Operating System capable of handling ware interfaces. Arduino is directly connected al Serial Bus port that is available in raspberry n is used as a primary coding language by the to receive the data from the serial port and o the server and also running the server. The the liquid can be controlled by electro valve he raspberry pi through the internet. Raspberry of controlling hardware using the GPIO pins ose Input/output pins) it has. The electro-valve to the GPIO pins and is accessed through GPIO pins in raspberry pi are capable of ver. The electro-valve is a solenoid valve. This will interrupt the liquid flow until 12v power en. The power supply to the solenoid valve is ns of GPIO pins from raspberry pi and controls b server.

ARE

omponents used in the proposed have been fly.

ect Flow Sensor

of the liquid is measured with the help of Hall type flow meter. Hall Effect type flow sensor e fig.2.A Hall Effect sensor is a transducer that ut voltage in response to a magnetic field. The the production of a voltage difference across conductor, transverse to an electric current in and a magnetic field perpendicular to the ffect sensors are used for proximity switching, speed detection, and current sensing The flow meter is capable of measuring 1-30 ute. It can withstand the pressure of water less to 2.0 Mpa. The flow sensor is connected to a It senses the flow of liquid in the pipe and esponding analog signal to arduino.

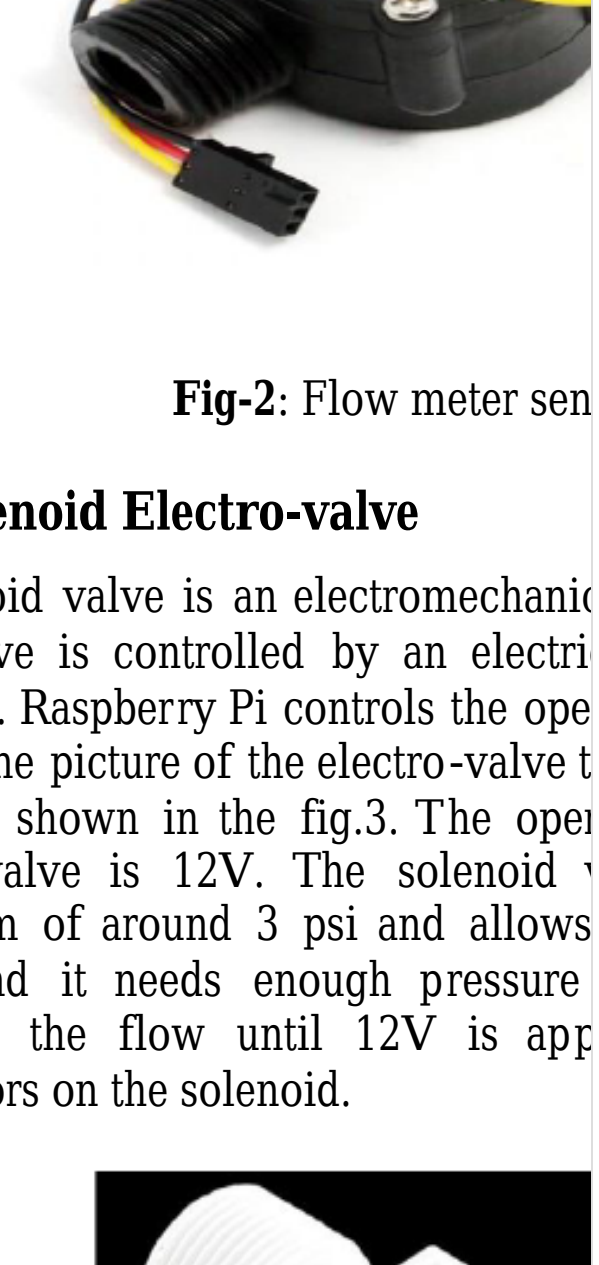


Fig-2: Flow meter sen

3.2 Solenoid Electro-valve

A solenoid valve is an electromechanic The valve is controlled by an electri solenoid. Raspberry Pi controls the ope valve. The picture of the electro-valve t liquid is shown in the fig.3. The oper electro-valve is 12V. The solenoid minimum of around 3 psi and allows flow, and it needs enough pressure interrupt the flow until 12V is app connectors on the solenoid.

Fig-3: Solenoid Electro-

The electro valve is connected to the The valve is connected to the elec energizes the valve to open or close When the OPEN switch is activated energized and lets the liquid to flow switch is pressed the valve gets energi circuit and it gets closed and does no flow.

3.3 Arduino

Arduino is a single board micro control the application of interactive objects or accessible. There are many types of Ar ARDUINO UNO REV3 model. has be in the fig.4. The Arduino Uno is a mi based on the ATmega328. It has 14 digi (of which 6 can be used as PWM output 16 MHz ceramic resonator, a USB conn

ler, and a reset button. It contains everything pport the micro controller; simply connect it to th a USB cable or power it with an AC-to-DC tery to get started.

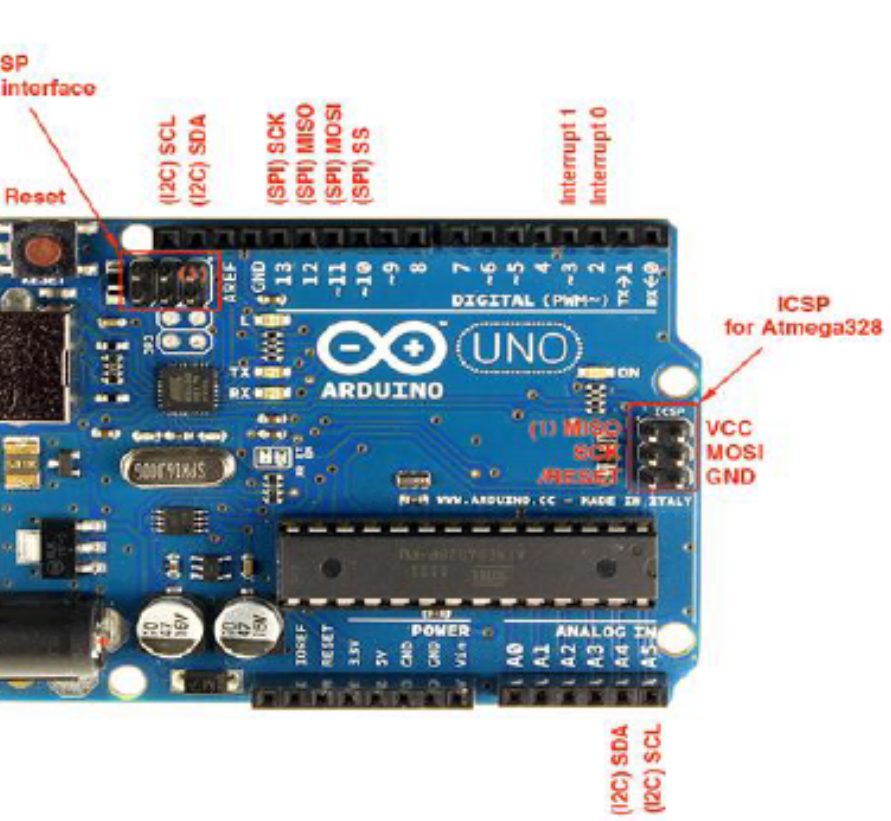


Fig-4: Arduino board

rogram Arduino, arduino IDE (i.e.) arduino platform is installed in a Windows Pc. The ritten in the arduino ide and then uploaded to ith the help of a serial cable Universal Serial onnected to the pc. The arduino will read the flow meter and convert it as it is programmed. is received from the flow meter in the form of converted to digital pulses by arduino so that an read it.

ry Pi

is a credit card sized single board computer able of doing the entire job that an average uter does Like spread sheets, word processing, gramming, Games etc .It consist of 512mb v6 Processor,2 USB and an ethernet port, A ports for display,3.5mm Audio jack,SD card), General purpose I/O pins, runs on 5v. The model is shown in fig.5.

the help of transistor and relay so tha switch off it whenever needed.

4. RESULTS AND DISCUSSION

The prototype model to control the flow server is shown in fig.6.Water is used as setup.

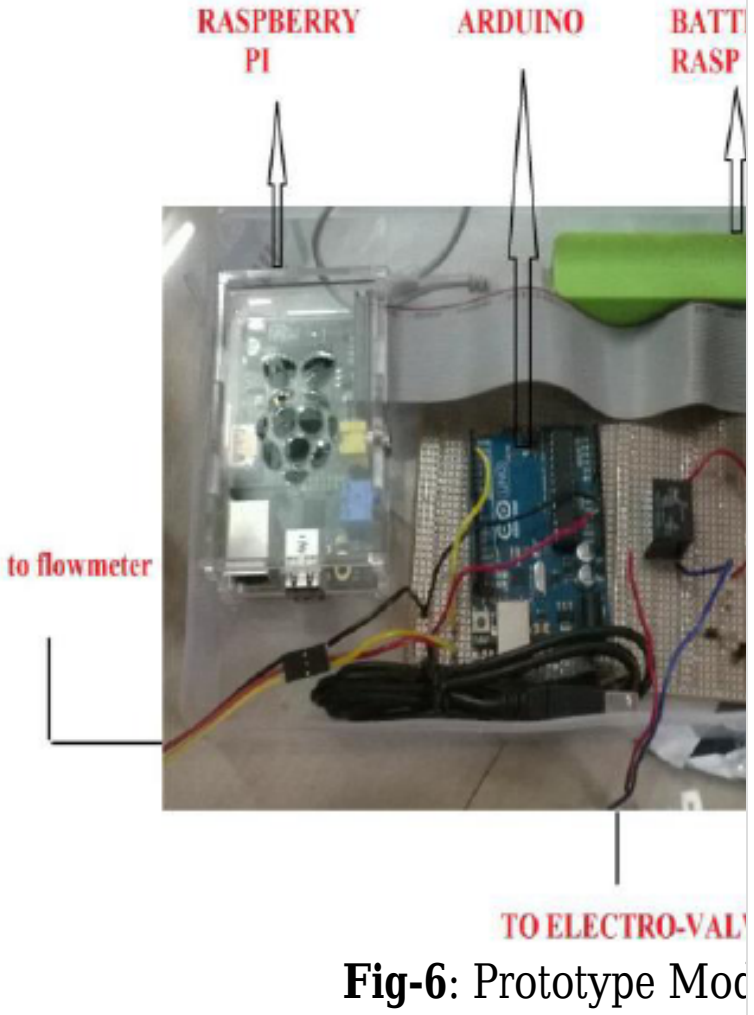


Fig-6: Prototype Moc

Snapshot of the water flow setup According to flow meter sensor's data s litres. The program is written to send th First of all, a small tank with low pres data was like this (The liquid used L/hour,321 L/hour,278 L/hour,345 L/h flow was very slow. But even when the there were some reading like 20L/h indicating zero error. All the compo carefully, It was found to be loose con interrupt pins in arduino, sending blank port and has been rectified. Now t checked again and the water flow is there is no error and the data it shows

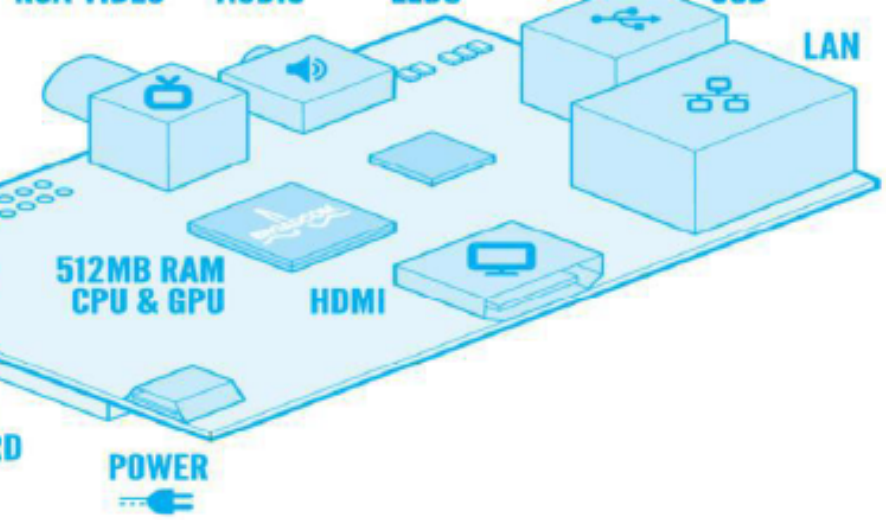
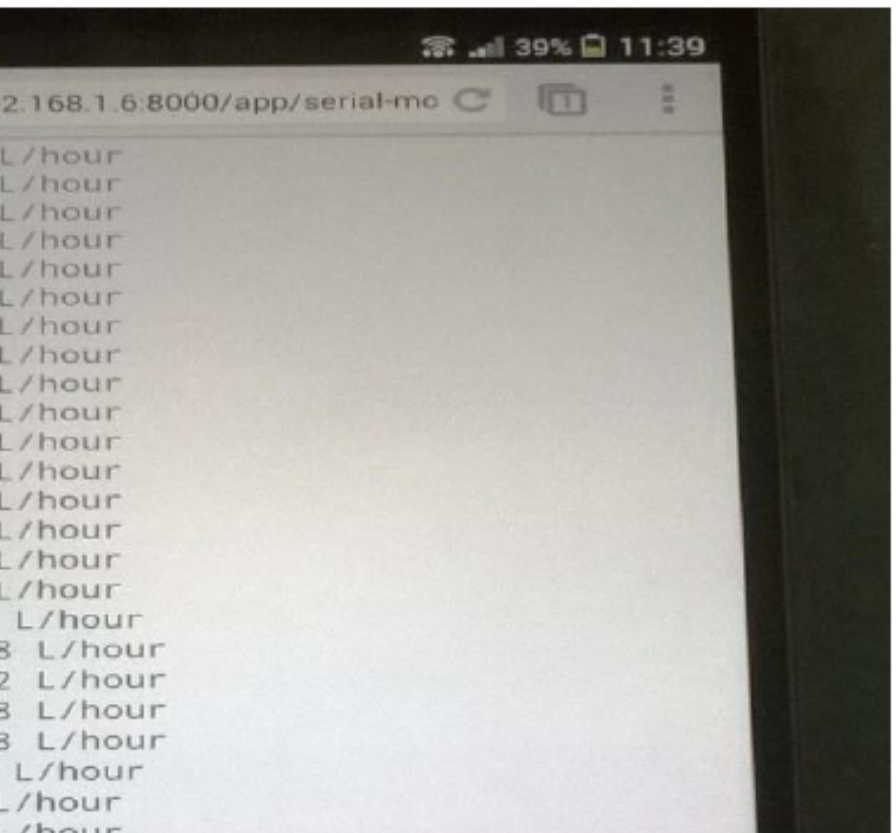


Fig.5: Rasperry Pi model

runs on Linux kernel based operating systems. runs from the SD card. It does not have any ory other than the ROM. It has an SD card slot ble of reading up to 32 GB. The GPIO pins of pi are programmed using Python programming . Electro-valve is connected to GPIO pins with

ows the monitoring of the liquid flow through one. The electro-valve needs minimum of 12- k. Initially, the electro-valve was connected to k (low pressure), when triggered it does not . Small tank that we used for flow meter did o overhead tank has been used. After doing the nections, the electro-valve was triggered and it



water is switched OFF it correctly show

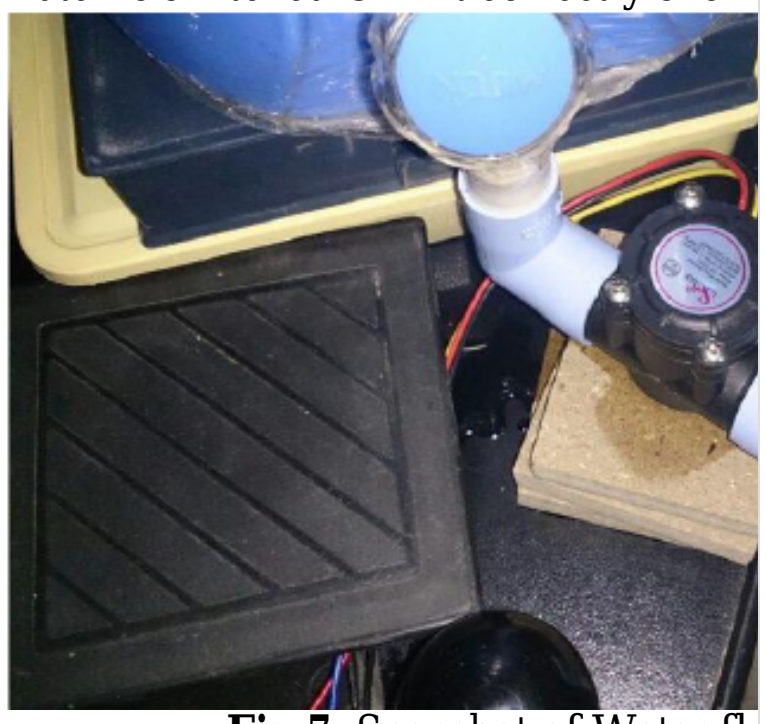


Fig-7: Snapshot of Water flo

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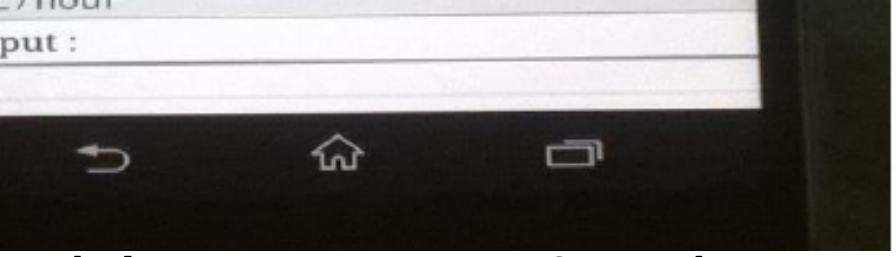
[10]. Precise dosage system for contr



quid Flow Monitoring using Smart phone

pen the server in any browser the IP (internet ress of the server need to be known.. The designed uses java script, so whatever the ed, it must be installed with java plugin or else not be displayed properly. For security reasons gned username and password for the user to ata, to enter the website. When the web page will be two options Flow data and Control. The n shall be selected

USION

low can be monitored and controlled from the world using internet through personal Smartphone. The system has been tested for owing liquid successfully. The work can be quids that are used in various industries with iderations of parameters like pressure, corrosion, etc with appropriate use of flow ectro-valve.

CES

of networking liquid flow measurement and control system based on .NET, Ya-Ping Shi et ference Publications,2011.
Measuring of Flow Meters for Petroleum and Other Industrial Applications , A. et al, IEEE Conference Publications, 2007.
based on fast MEMS based flow sens
IEEE Conference Publications, 2009.
[11]. www.raspberrypi.org
[12]. www.arduino.cc

eferences (7)

ve water flow data by analysing rotation count of the wheel. A microcontroller is required to process this ow the rate of water flow through [1] . Then the data will be sent by the microcontroller to the end node via

bee sensors will be transmitted by wireless network to a computer connected directly to the sensor Rfbee. nd control the water flow through a web server is carried out in Reference [1] . Monitoring and controlling is ct Flow Sensors, Arduino, Raspberry PI, and Solenoid Electro Valve. Hall Effect Flow Sensor with Arduino while Raspberry PI will control solenoid electro valve, which is used to close or to open the flow of fluid ection shows data retrieved by the sensor and then transmitted by Arduino to the monitoring application no Ethernet shield. ...

g and Leak Detection using Flow Liquid Meter Sensor

le

Rahmat Budiarto · Baihaqi Siregar · Romi Fadillah Rahmat

ed in the form of a single syllable, the rate of occurrence is 98.30% [3], In 2104 Suresh et al conducted a g and control flowing through industrial pipelines using a web server, with the help of Hall Effect Flow he Arduino to measure fluid flow, while raspberry PI controlled the Solenoid Electro-Valve functioning for ve to control the fluid flow of the pipe. [4] . ...

toring system using flow liquid meter sensor and SMS gateway

le

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bajo costo para sistema de monitoreo de procesos mecánicos.

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Normally big and small industries have many big pipelines carrying different types of liquids, as well as the flammable liquids and acidic liquids. Here we must to control and monitor the flow rate of the liquid for enhancing the processes and to prevent the accidents. In this paper give a scheme to monitor and control the liquid flow in the pipeline of industry during working or not it will be ... [Show full abstract]

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Multiple motion control system of robotic car based on IoT to produce cloud service

February 2017

Maliha Rahman Mishi · Rabeya Bibi · Tanveer Ahsan

The world of control is an exciting field that has exploded with new technologies where the Internet of Things (IoT) vision becomes reality. This paper proposes a multiple motion controlling mechanism of a robotic car using Raspberry Pi which works as master and Arduino UNO which works as slave. Each device is uniquely identifiable by the controlling software which is the core concept of IoT. ... [Show full abstract]

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APLIKASI RASPBERRY PI PADA TELEROBOT PEMBERSIH LANTAI

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Sistem otomasi rumah menjadi makin populer diperbincangkan oleh karena manfaatnya yang banyak. Salah satu aktivitas yang dapat digantikan dengan sistem otomasi tersebut adalah membersihkan lantai. Dalam makalah ini dijelaskan tentang adanya telerobot pembersih lantai, yang dapat membantu pekerjaan manusia. Dengan menggunakan WiFi dan web Browser sebagai sarana komunikasi dan Raspberry Pi sebagai ... [Show full abstract]

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