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Jotting Email Server Hoisted for Users

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***Abstract:** It has been a want to monitor status and performance of machines and systems from remote places with authentic collected data, information and time stamping. This needs to be saved for permanent record were the user can view at any part of future. Presently cloud and cloud computing has been a passion for it which costs for running. Recurring cost of such systems limits their utility in products were the user cannot afford financially. Establishing an encrypted link between a server and a client like an Email server and an Email client will deliver the data and information faithfully. Here data could be collected information from sensors from the machine or systems employed to collect data from vicinity of deployment of the server. This is targeted to use in farming and aquaculture applications.*

Keywords: SSL, GSM Modem, Memory, Microcontroller, AT Command set, UART.

I. INTRODUCTION

This is an attempt to eliminate use of cloud and cloud computing for industrial automation. Source of data to be posted to the client can be hoisted from the deployed point through a dedicated server. SSL encrypts network connection at the transport layer. SSL ensures confidentiality and reliability of communication. This has become an industry standard secure communication on the internet. Web browsers generally combine the HTTP and SSL. This is Transport Layer Security TSL [1].

GSM module is used as an Internet gateway and a personalised email Id is used to port out the collected data. This is an attempt to utilise this method in an application were farmer uses it for aquaculture. Obviously, the running cost needs to be as low as possible to afford it. GSM Module of Simcom SIM800 is used and its AT command set supports sending and receiving emails. To send Email, SIM800 uses HTTPS communication, default port: 465 [1].

In aquaculture, a specific application to continuously monitor Power, Water Turbidity, Dissolved Oxygen in water and temperature of water need to be communicated to the owner of the artificial ponds. Each pond carries set of such sensors and are logged on to a centralised station were GSM Module hooks up to relay the data to the user. Microcontroller is employed to log the data into a memory and periodically port into GSM Module. GSM Module SIM800 is addressed using its AT Command Set.

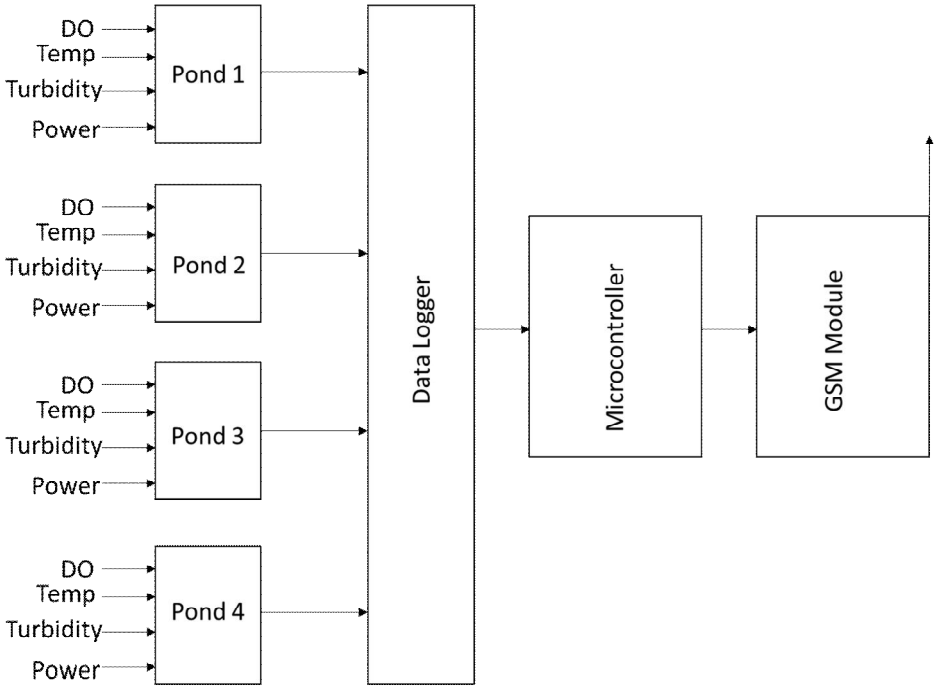

Fig.1 Block Diagram of data logs porting to client server

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Fig.1 is the block diagram of the system were parameters are collected and sent to the client server. Client server is user terminal. Four ponds are operated with water treatment with aquatic animals dwelling in the pond. Each of the ponds gives data of DO level, Water temperature, Water turbidity and Electrical power condition operating the pond equipment. Pond parameters are logged into one unit where they are streamed into a microcontroller. Microcontroller saves the data in a memory temporarily for a certain amount of time. At time periods the data is pushed out to the user as a mail using AT Commands of SIM800.

A. Jotting Data and Hoisting

Collected information or data is put in a format for an easy understanding of the user. It is keyed in through AT Commands in a sequence.

Data format is as follows
Time: HH.MM
Date: ddmmyy
Turbidity: tt %
DO: oo ppm
Temp: ttt degC
PO: vv ii ff

To send this in email initial settings of the module are required which are done through AT Commands. That is a sequence of commands which defines the GSM module to send data to an Email ID. The sequence is as following.

AT+SAPBR=3,1,"APN","CMNET"
This Configures bearer profile 1 in the module and returns with OK.
AT+SAPBR=1,1
This opens GPRS context and returns OK
AT+EMAILCID=1
Sets EMAIL Use bear profile 1 and returns OK
AT+EMAILTO=30
Sets EMAIL timeout and returns OK
AT+EMAILSSL=2
Sets EMAIL to begin encrypt transmission with normal port and returns OK
AT+SMTPSRV="SMTP.GMAIL.COM"
Sets SMTP server address, port is omitted, means use the default ports: 25 and returns OK
AT+SMTPAUTH=1,"pondset1","password"
Sets user name and password and returns OK
AT+SMTPFROM="pondset1@gmail.com","pondset1"
Set sender address and name and returns OK
AT+SMTPSUB="Test" or it can be HHMMmmddyy
Sets the subject and returns OK
AT+SMTPRCPT=0,0, "jeshu.hyd@gmail.com","jeshu.hyd"
Sets the recipient (To:)
AT+SMTPBODY=19
Returns DOWNLOAD
Time: HH.MM
Date: ddmmyy
Turbidity: tt %
DO: oo ppm
Temp: ttt degC
PO: vv ii ff
Returns OK
Sets the body
AT+SMTPSEND
Returns OK

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And after is sent returns
+SMTPSEND: 1
Sends the Email
This process is repeated whenever Jotted data needs to be sent to the user. Refreshed data is collected from the memory employed on the board and is addressed to GSM Module with the sequence of AT command set. Subject in the code can be Test or any other fixed desired word or it can be time and date stamp.
AT+SMTPSUB="Test" or it can be HHMMmmddyy
This gives a clear picture of subject. In place of Test adding HHMM and mmddyy makes the user reachable to the mails easily. The user when receives the email can see the subject as time and date to inform the data received time period. It will be useful when user searches the logged data and saved in mails. Typing date and time gives the email received at that time.

II. EMAIL WIDGET

Mails sent by the dedicated server GSM Module can be seen in computers or on mobile phones. This is an attempt to facilitate the user to get information on the go [2]. Mobile access is desired and notified on receiving the data. Widget can be developed to keep the mails monitored and on receiving can be displayed with the content of mail. Also, a search bar is provided to get access of data received on a time stamp [3].

Fig.2 Widget showing received mails

Fig.2 indicates widget showing received mails and with time and date stamp in the subject. This helps the user a very easy access of records saved in emails from the search bar. A dedicated widget can be developed to notify emails received from one email id which is a need in this application [4].

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III. ANDROID APP TO DISPLAY AND PRINT THE DATA

An exclusive app can be developed to monitor the email id of user interacting with man and machine. This is facilitated to print data on a Bluetooth thermal printer. It has search bar to search emails by subject which is date and time stamp. Data from those mails is collected and saved into local memory temporarily [5]. One mail can be printed, or selective mails can be printed. Collected data can be used to form graphs for analysis of health of the pond. The analysis can be mailed to a target email id or transferred to a computer through Bluetooth in xl format. Once xl sheet is ready and transferred though mail or Bluetooth, the data from the local memory is deleted.

This system does not occupy space in a dedicated cloud and does not consume terminal memory to maintain the data.

IV. CONCLUSION

Handling of data through emails has delivered the product with low budget, low running cost and low memory in the user terminals. The hoisted point of data collection operates as server without using cloud which costs something to the farmer. Failure of internet may cause loss of data if cloud is used. Here the server unit does not transmit the data through email when there is no power or data connection is absent in the used SIM. Text data and numerical data is saved in local memory of server. Once connectivity is available the data is emailed to the user conveying a message for the cause of interruption. A bless to the farmer is delivery of cost-effective product.

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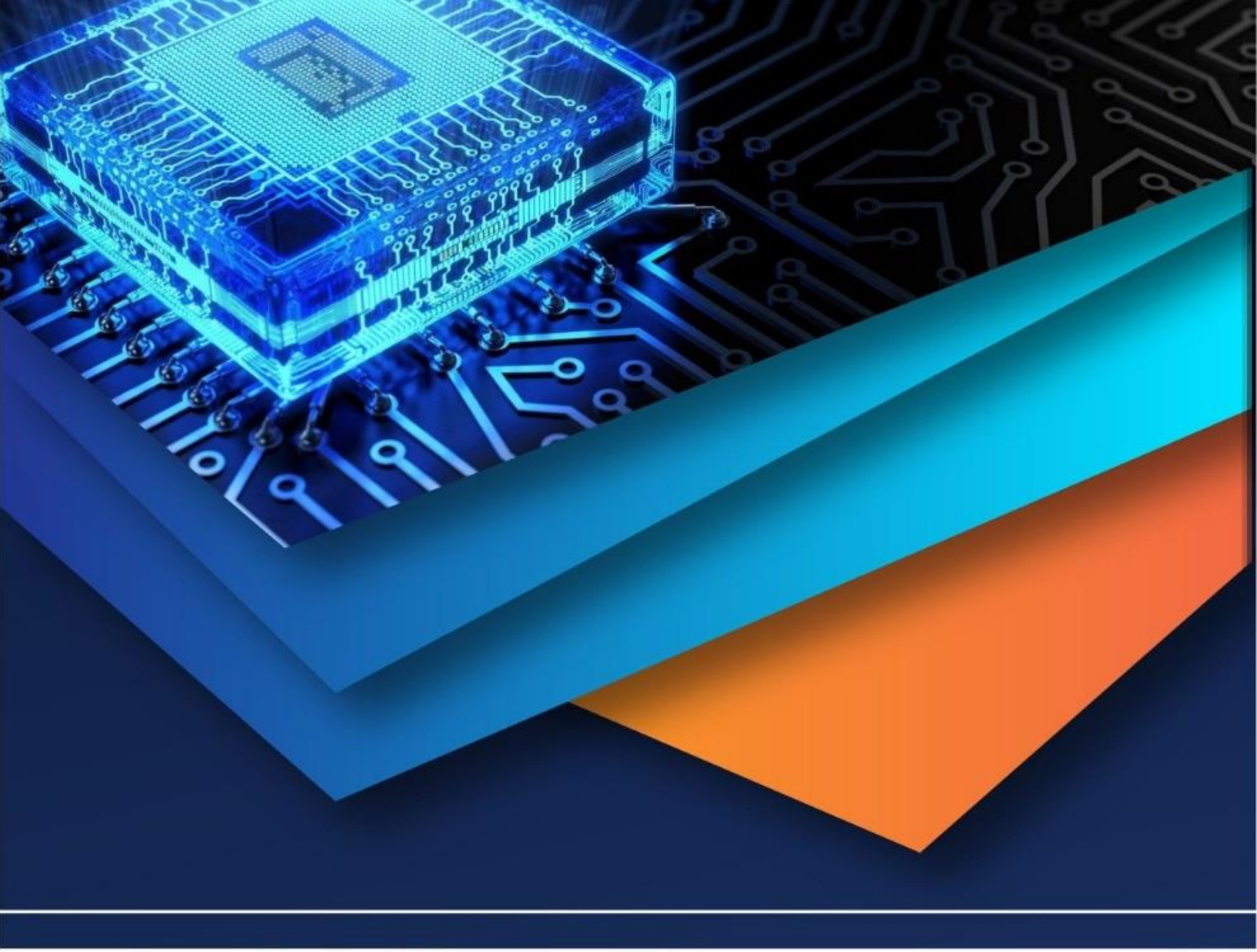

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