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Control System And Automation Of Smart Grid Network

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Abstract -Electrical system is the system that automates all several processes that were fall within the domain of Smart Grids and their method. purpose of the Smart Grids are resource power i.e. distribution at a substation, that will be an extent autonomous in the sense that they operate logically which reduce the manual operation in the scheme at substation region. We figure a Smart electrical power Grid that mechanizes all the controlling operation include in power grid, using centralised server, even we can shift the power supply to require substation of the city just with one tick of a key. Even can invert power to fault generating micro grid from a new generating source. With the Wide Area Network interface we provide remote connectivity through attendant, term the World Wide Web on the internet. Thus we can control the grid with the help of web browser and internet remote connectivity.

Index Terms –electric smart grid, grid controlling scheme, energy management, central computer server, web page.

I. INTRODUCTION

Electricity presence a very essential part of life is found being spread over nearly all portion of country. The delivery of electricity income room done a 'grid' recognized as the electric power system, which store all system control action, and broadcast in power line, like from the generating station to each and all electric DP. Here grid is unknown but a mesh shiny the delivery of power over all substation. Switch such a grid is a deadly job.

Controlling here include switching switches ON and OFF, offering load shedding for limited access, distinct alteration method in fault act location etc. of electricity in the mini delivery substation scheme. Phenomenon of power Switching turning supply ON or OFF manually. It's often mandatory during conservation work as well as while re-establishing faults. As, fine power greedy country like ours, load shedding is a shared wonder. This over consist of converting. Diverting power is required when a major fault occurs over a power line and hence electricity from another grid or another part of the grid is strained here i.e. inverted here to continue providing power to the user.

Entirely goings-on i.e. switching supply ON or OFF, as long as load shedding is an difficult task may require the mechanical switching in need site i.e. with the help of manually switch power ON or OFF with the help of mechanical switches done in electrical power contour. Equally diverting power is the procedure which would demand a number of switching over various two-way switches and this is certainly not a possible way to do, regularly a need transpire.

The proposal to develop a solution to systematise these activity, where we can switch a complete power grid, i.e. the complete power scheme of a city by one federal attendant. Even can change on the power supply ON or OFF just by one clicking button through the controlling screen. We can redirect main power supply from another distribution unit to whichever area we required. Here we work on the function like online fault monitoring schemes, providing load shedding to whichever area, data record and recovery, power diversion process when main faults can be operated from one centralised server.

II. BLOCK DIAGRAM OF PROPOSED SYSTEM

The dominant server system that we proposal to progress is a comfort made schemes. It is alike to the UNIX ability comfort and would effort on awareness. We proposed to devolpe GUI for leading and monitoring fault shelter using VB 6.0 software. This attendant would be developed in 'C'. We were use 'C' for developing comfort is fairly springy when prepared in 'C'. Besides, since this attendant would essential to communicate with our hardware model through the serial port DB9, its find that 'C' is able of giving straight admittance and calm software design with the serial ports RS232 during serial transmission. It is discover that the all bulge are wirelessly linked with server in planned system. In our system we measured bulge that can be considered they are distribution unit, feeder, substation, mini area and so on.

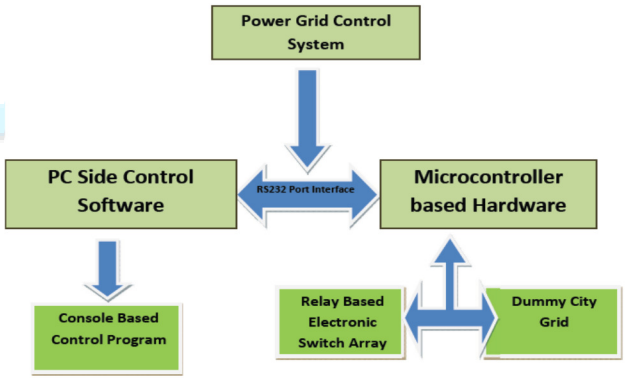


Fig.1. Block diagram of proposed system

So, we are going to develop the system that can demonstrate capabilities like online remote fault detection, which will help us in finding the exact location of any faults in the distribution power lines through feedback and relays for other features which include diversion, providing load shedding and so on, thus it can communicate with our server wirelessly and controlled using combined server. We were generating limitation system of logging, i.e. creating a Web page logging that can communicate with the centralised server for important parameters, like amount of energy reading analysis, and frequent change in voltage and current limitations will be achieve by our expedient. This evidence will be connected wirelessly to our attendant, and a permanent best ever will be made here for future position.

III. ARCHITECTURE

A] Hardware Architecture:

We intend to use 8051 microcontroller, which will act as the brain of our project. We prefer microcontroller because it has inbuilt UART for serial communiqué, four input/output ports, intrinsic memory and timers. All these item used in our project and will be employed via programming.

MAX 232 IC will be used to implement RS-232 protocol. It acts as a medium of communiqué between the controller and attendant or PC.

Relays showing important role in controlling. They are performing an operation for all the switching activities performed over here. Relays perform work on the 12v DC supply, which will be attained straight from 12v adapter. Microcontroller 8051 and other components work on 5v DC. For that it is essential to transform 12v to 5v by mean of voltage regulator IC LM7805.

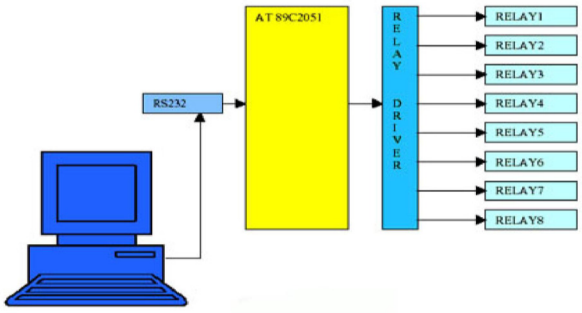


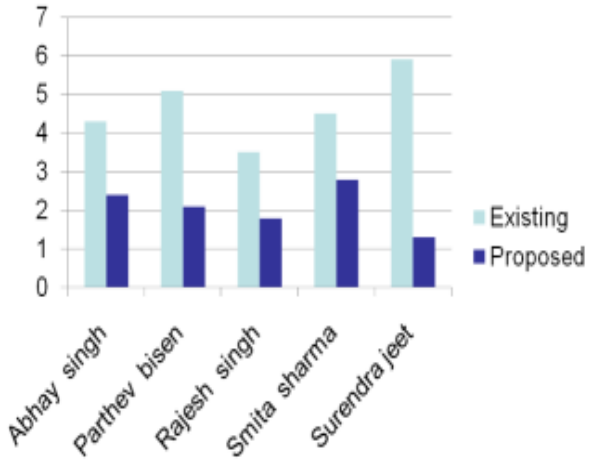
Fig.2. Hardware Architecture

B] Software Architecture:

Here we are using the embedded "C" coding for controller programming as it is simpler to code and easy to understand using Kiel uVision4 and Flash magic is the software (for burning the code into microcontroller board). For developing the GUI i.e. fault monitoring screen and controlling screen we use Visual basic 6.0 software and we resolve by mean of Xpress PCB software for scheming the layout of main controller board.

Comparative analysis of fault reporting

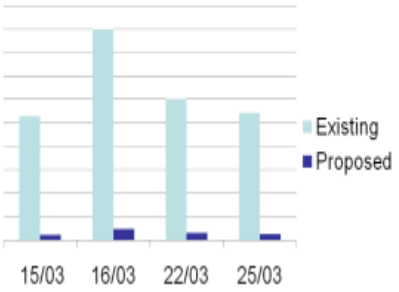
SR no	Consumer name	Date	Area(address sector)	Fault occurrence Time	Fault reporting time (existing)	Fault reporting time (proposed using GSM)	Time lapsed between occurrence and report (existing)	Time lapsed between occurrence and report (proposed)
1	Abhay singh	22-02-15	Balaji nagar (sector 5)	11.45 AM	1.20 PM	12 PM	96 min	15 min
2	Parthev bisen	24-02-15	shankar nagar(sector 13)	9 AM	10 AM	9.11 AM	60 min	11 min
3	Rajesh singh	25-02-15	Wardhamn nagar(sector 9)	8.45AM	10.35 AM	8.55 AM	110 min	10 min
4	Smita sharma	25-02-15	Deendayal nagar(sector 6)	1 PM	2 PM	1.12 PM	60 min	12 min
5	Surendra jeet	26-02-15	Pratap nagar(sector 3)	2.20 PM	3.15 PM	2.34 PM	55 min	14 min



Comparative analysis of control operation

Date	Total no. of control operation performed	No. of switching operation	No. of maintenance shutdown	No. of diversion operation	Time taken per switching operation In existence system	Total time taken for all control operation In existence system	Time taken per switching operation in proposed system	Total time taken for all control operation in proposed system
15-03-2015	11	6	4	1	16 min	176 min (10560 sec)	2 sec	22 sec
16-03-2015	15	7	7	1	20 min	300 min (18000sec)	2 sec	30 sec
22-03-2015	10	4	5	1	20 min	200 min (12000sec)	2 sec	20 sec
25-03-2015	12	6	5	1	15 min	180 min (10800sec)	2 sec	24 sec

Comparative analysis of control operation



IV. APPLICATIONS

- Load shedding
- High voltage grid control
- Industrial automation
- Electro, Hydraulic and pneumatic valve control
- Robotic control and many more
- Hotel power management
- Street light management
- Home automation.

V. Result

- Thus we can switch the entire power grid, i.e. the whole power scheme of a substation level by one a centralised attendant.
- We can invert the power supply to any substation DP ON or OFF with the tick of a button.
- We can invert power to any substation from another generation station.
- We are performing the functions like online fault monitoring, providing load shedding of fix time, invert power to fault occurring location from new generating area, controlling operation by one centralised attendant.
- No need manual operation during reporting in power lines.
- Sorting of various factor linked to power broadcast can be done.
- Control entire power grid using one centralised attendant.
- Internet or any other such network for the purpose of communication for third authenticated user from any place.
- It is an easy to use Interface.
- Command Console for advanced users.
- Password protection to avoid misuse.

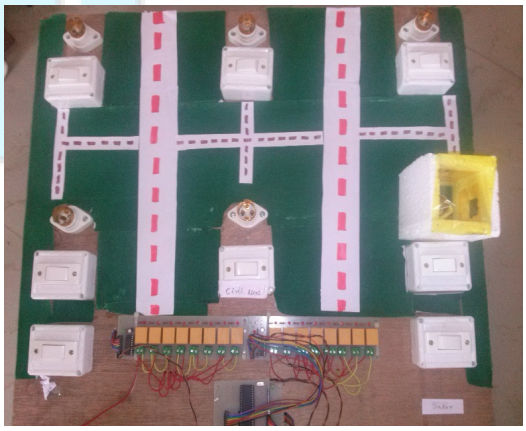
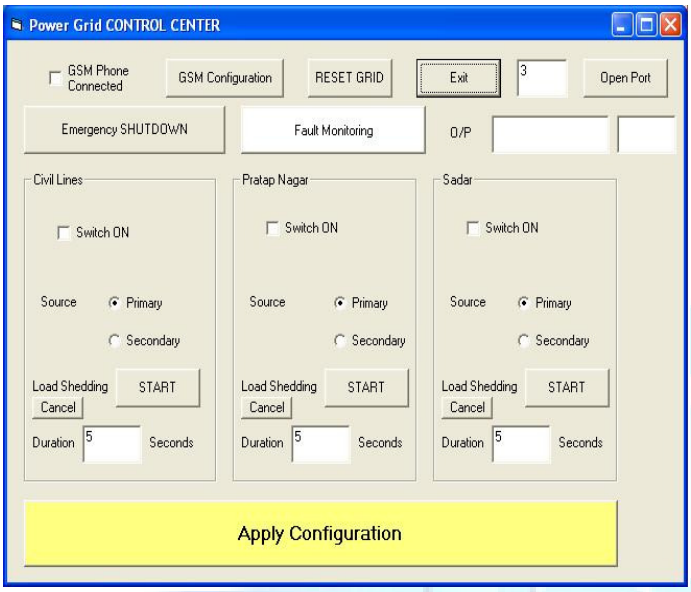


Fig 2. City model



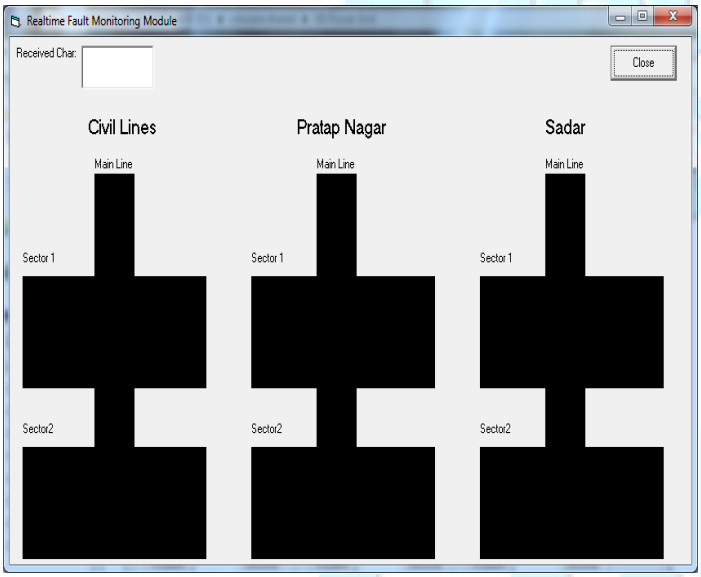


Fig 3. Controlling screen

VI. FUTURE SCOPE

With the help of proper planning and process of integration of data, we can increase the efficiency of the system and also work on providing the greater efficiency in future. Several recommendations are given to optimize the potential benefits in future: Take a holistic view of smart grid infrastructure early in the planning lifecycle stage before deployments begin. If this step is omitted, a utility may miss the technology's full potential and often have to spend considerably more to integrate the functionality post deployment.

If we integrate the distribution unit with the smart grid infrastructure in real time it will be flexible in electrical distribution over the power lines and effort proficiently. If the accomplishment isn't satisfy, it indicate to create the new system and data will be addressed over there to communicate with existence one. Efficiency is the important aspect in the wireless system. A majority of energy is produced at station and send to the receiver or receivers so that it make system efficient at any stage.

The important concept that taken in consideration they are: - resolving interoperability issues, crucial the minimum practical necessities for the system and establishing the appropriate technical standards. Further, because of growing environmental concerns, it is found that Asian grids are far more flexible than today but using distributed automation technique we can use various energy efficient technique for efficiency consideration

VII. CONCLUSION

We build a Smart Grid that automates ALL of its processes, using centralised server even perform controlling operation, and also gives remote connectivity to this server via a Wide Area Network interface. Even can switch the power supply to any area of the substation on or off only with the help of one tick button. Also invert power to any substation from a new home. Hence we perform the functions like online fault monitoring, performing load-shedding of fixed time of whichever substation, emergency shutting down during emergency, power inversion when faults occur, etc. This is done using one centralised attendant , Due to there is no need of any manual switching as it is replaced by automated system. Data Logging which contain numerous factor related to power broadcast and controlling that that will be operated using our system i.e. using a centralized control of entire power grid. Client server application and WAN can be used for the determination of communiqué because using this interface we can easy manage everything. This Command console are used by advanced users and for security purpose we use Password protection to avoid misuse.

We were obtaining without an additional help, each state takes a risk and responding to utility AMI agendas and forgoing any opportunity to move forward with their own Smart Grid agendas which could potentially create more competitive and robust market activity and simultaneously more user benefit. Even with this special consideration for states is that it must correlate with additional scheme. Many requirement and problematic are alike with other scheme. Thus it is necessary to come in work with the collaboration and devolpe an AMI to integrate with a smart grid system.

In Asia demand of electricity is varied but due to demand of increasing electricity we can improve the amount requirement in India and China after getting the information of improve smart grid and placement in Korea. In Asia the quantity of placement regarding to the placement, controlling and security and distribution is quite less in modern society. Therefore the need of the hour and for modern revolutionizing societies of Asia-Pacific region is to consider as a Smart Grid Vision.