Middle-East Journal of Scientific Research 20 (7): 799-803, 2014
ISSN 1990-9233

DOI: 10.5829/idosi.mejsr.2014.20.07.11385

A Neural Network Approach to the Detection of Incipient Faults on Power Distribution Feeders

Anithasampath Kumar

Electrical amd Electronics Engineering,
Bharath University, Chennai-73, India

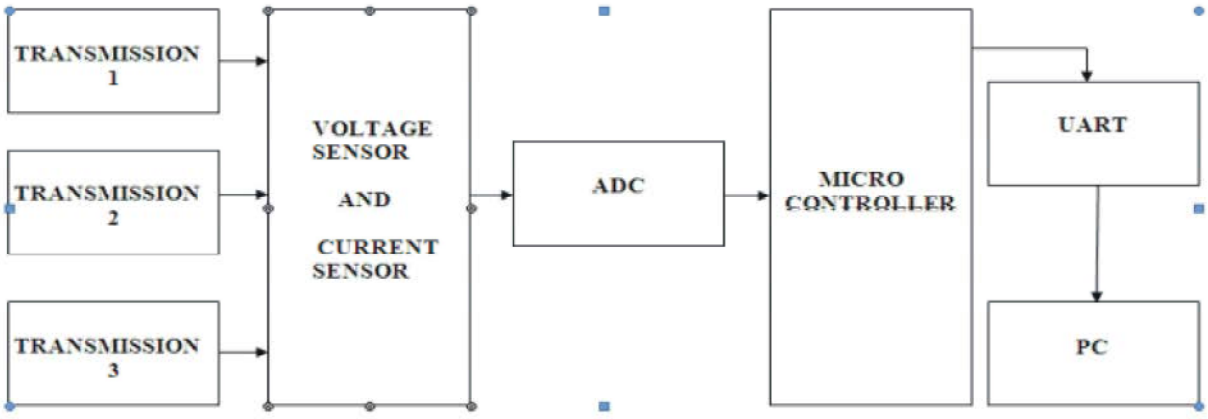
Abstract: This project addresses the topic of fault location in power networks with cable lines. In the era of smart grid the demand of intelligent measurement systems capable of providing quickly and with high accuracy the right location of faults in power networks is growing fast. Many proposals can be found in literature relevant to different approaches. Some commercial instrumentation is also available on the market for this purpose. Protection relays implementing this feature can either be found. They have been better analyzed in order to investigate over the reliability and the accuracy of such measurement system.

Key words: Fault location · Distributed measurement system · Accuracy · GPS · Power network · Underground cables · Measurement methods · GPRS · Transients

INTRODUCTION

Fault location is historically one of the most appealing topics for people working in Power Systems given that it involves several technical and scientific aspects, such as electromagnetic transient, material engineering, instrumentation and measurement, reliability, power electronic and so on. it is expected that one of the key challenges in the smart grid is a great increasing of the power network reliability and this requires, among other things, the cut of the outage time. This will also allow decreasing the power outage costs that, presently, amount to more than $ 100 billions per year for the US economy. To do this, more accurate fault location system are needed to find only the line where the fault has occurred. Then, the line must be manually explored to discover what and where went wrong. The new systems must combine smart algorithm for signal processing with accurate voltage and current sensors [1].

Block Diagram of System:



Corresponding Author: Anithasampath Kumar, Electrical amd Electronics Engineering, Bharath University, Chennai-73, India.

Description: In project a neural network approach to the detection of incipient fault on power distribution feeder transmission line and current and voltage sensor act as a neural network. voltage and current sensor sense the voltage and current respectively at transmitting end and receiving end both .it send the signal to the microcontroller by using ADC where signal are controlled and amplify by using oscillator and further transmit to the pc by using UART .if any fault occurred at any transmission line then it will show on pc otherwise it works as normally [2-3].

Equipments Required
Hardware Requirements:

- Microcontroller. (AT89S52)
- Current Sensor (0-5A)
- Voltage Sensor (0-5V)
- ADC (0808/0809)
- PC

SOFTWARE REQUIREMENTS*:*

- Keil Compiler
- Embedded C
- Visual Studio

Existing System: As a low cost alternative, power-line communications (PLC) is expected to facilitate the remote monitoring and control of building-integrated photovoltaic (BIPV) devices such as inverters, heat pumps and other photovoltaic specific loads. However, communications via power lines suffer from severe multipath distortion [1], attenuation, noise and interference. Given this phenomenon, estimation of the frequency response of the power-line channel is necessary for any reliable PLC system. In this sense, channel estimation aids in selecting suitable carrier frequencies for communicating over power lines, an important requirement for multi-carrier modulation schemes such as orthogonal frequency division multiplexing (OFDM). In this project [2], an efficient algorithm is proposed to evaluate the channel response of any point-to-point connection in an indoor power-line network.

Disadvantages:

- This system has been tested only with signals coming from simulation and the algorithm used to locate is fault requires not negligible computational effort, mainly for the amount of data to be processed.
- There is no working dealing with fault location system operating in real power networks.
- It is not reliable.

Proposing System:

- The present project addresses the topic of fault location in power networks with cable lines. In the era of smart grid the demand of intelligent measurement systems capable of providing quickly and with high accuracy the right location of faults in power networks is growing fast [3]. Many proposals can be found in literature relevant to different approaches.
- Some commercial instrumentation is also available on the market for this purpose. Protection relays implementing this feature can either be found. This measurement is generally performed by using voltage and current signals at power frequency recorded at line terminals before and after the fault.
- Such a technique is typically employed in transmission lines, where the line length and the simple network topology allow achieving good accuracy [4]. This method is commonly preferred when the lines are shorter and, mainly, the network has a radial topology, as in the case of distribution systems [5]. These methods are based on the analysis of the high frequency Components of voltages and currents during the fault.

Programing Coding:

```
#include <REGX51.H>
void lcdinit();
void lcdcmd(unsigned char value);
void lcddat(unsigned char *value);
void delay(unsigned int itime);
unsigned char *k="safety systems";
unsigned int i,j;
sbit rs=P3^5;
sbit rw=P3^6;
sbit en=P3^7;

void main()
{
while(1)
{
lcdinit();
```

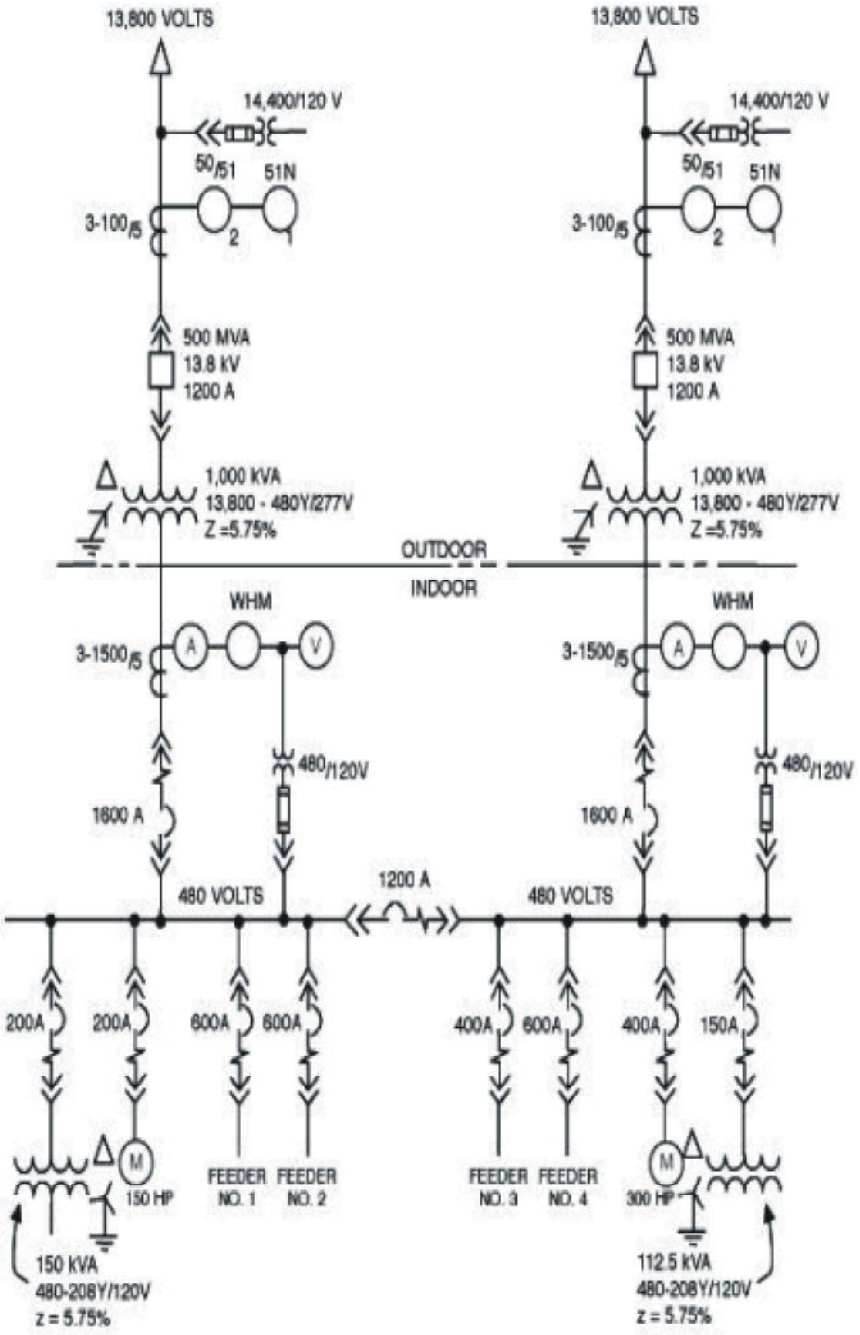
```
lcdcmd(0x80);
lcddat(k);
}
}

void lcdinit()
{
lcdcmd(0x38);
delay(20);
lcdcmd(0x0e);
delay(20);
lcdcmd(0x01);
delay(20);
lcdcmd(0x06);
delay(20);
}
void lcdcmd(unsigned char value)
{
rs=0;
rw=0;
P0=value;
en=1;
delay(1);
en=0;
}
void lcddat(unsigned char *value)
{

for(;*value;)
{
P0=*value++;

rs=1;
rw=0;
en=1;
delay(1);
en=0;
}
}

void delay(unsigned int itime)
{
for(i=0;i<itime;i++)
for(j=0;j<1275;j++);
}
#include <REGX51.H>
void serint(void);
void txs(unsigned char);
unsigned char *name="SATHISHYOGA";
void main()
{
serint() ;

while(1)
{
txs(name);
}
}

void serint(void)
{
TMOD=0X20;
SCON=0X50;
TH1=0XFD;
TR1=1;
}
void txs(unsigned char *val)
{
unsigned char a;
for(;*val;)
{
a=*val++;
SBUF=a;
while(TI==0);
TI=0;
}
}
```

Advantages:

- The information provided by the fault locator can be used for isolating the faulted line section by acting on the remote controlled switchgears [6].
- The new systems must combine smart algorithm for signal processing with accurate Voltage and current sensors.
- Results from this project show that fault locator implementing timing–based techniques can be positively used for faults and transients locations in medium voltage cable lines.

RESULT

- To detection of fault in power distribution line we use three type of test open circuit test [7], short circuit test and wheat stone bridge test.
- To demonstrate this we use three wire which act as power line and two other wire [8]. scada software we use to show at which distribution line fault occurred. black and yellow wire act as open circuit. When ever open circuit occurred then increase voltage and frequency and fall current in the faultaed phase.



- Black and orange wire are act as short circuit. When ever it occurred increase in current and fall in voltage and frequency [9].
- When we short black and yellow wire then short circuit occurred at distribution line 3.
- When we short brown and yellow wire then short circuit occurred at distribution line 2.
- When we short red and yellow wire then short circuit occurred at distribution line 1.
- When we short orange and yellow then it will measure voltage and flux ratio [10].

CONCLUSION

The hardware and software design of an embedded monitoring system for real time applications is presented in this paper. Vibration signals have been analyzed to detect the mechanical faults. The implementations of

analysis technique in time and frequency domain are given. The proposed system imbalance detection technique is verified with different level of severity.

The present project addresses the topic of fault location in power networks with cable lines. The presence of fault in power transmission is found using 3 types of tests, Open circuit test, Short circuit test, Resistance test. To demonstrate the fault in power lines or data lines. we use 3 wires connected to the microcontroller.

By using this project we easily detect the fault where It is occurred and rectify it as soon as. Due to this project the detection of fault can be located at 3 transmission at a time by using open circuit test and short circuit test .if fault occurred at transmission line 1 then it easily detect and show on computer and remain two lines are working normally .if no any fault occurred at any transmission line then it will show that no fault. The future of this project is that the loss will be reduced and easily detected and we can easily operate 3 transmission line at a time hence our cost will be also reduce.

REFERENCES

1. Sachdev, M.S. and R. Agarwal, 1988. A technique for estimating transmission line fault locations from digital impedance relay measurements, IEEE Trans. on Power Delivery, 3(1): 121-129.
2. Srinivasan, K., A. St. Jacques, 1989. A new fault location algorithm for radial transmission lines with loads, IEEE Trans. on Power Delivery, 4(3): 1676-1682.
3. Ancell, G.B. and N.C. Pahalawatha, 1994. Maximum likelihood estimation of fault location on transmission lines using travelling waves", IEEE Trans. on Power Delivery, 9(2): 680-689.
4. Magnago, F.H. and A. Abur, 1998. Fault location using wavelets, IEEE Trans. on Power Delivery, 13(4): 1475-1480.
5. Thomas, D.W.P., R.E. Batty, C. Christopoulos and A. Wang, 1998. A novel transmission-line voltage measuring method, IEEE Trans. On Instrumentation and Measurement, 47(5): 1265-1270.
6. Jayalakshmi, V. and N.O. Gunasekar, 2013. Implementation of discrete PWM control scheme on Dynamic Voltage Restorer for the mitigation of voltage sag /swell, 2013 International Conference on Energy Efficient Technologies for Sustainability, ICEETS, pp: 1036-1040.
7. Uma Mageswaran, S. and N.O. Guna Sekhar, 2013. Reactive power contribution of multiple STATCOM using particle swarm optimization", International Journal of Engineering and Technology, 5(1): 122-126.
8. Arumugam, S. and S. Ramareddy, 2012. Simulation comparison of class D/ Class E inverter fed induction heating", Journal of Electrical Engineering, 12(2): 71-76.
9. Nagarajan, C. and M. Madheswaran, 2012. Experimental study and steady state stability analysis of CLL-T series parallel resonant converter with fuzzy controller using state space analysis, Iranian Journal of Electrical and Electronic Engineering, 8(3): 259-267.
10. Ramkumar Prabhu, M., V. Reji and A. Sivabalan, 2012. Improved radiation and bandwidth of triangular and star patch antenna, Research Journal of Applied Sciences, Engineering and Technology, 4(12): 1740-1748.