Estimate Power generation of invisible solar site using State estimation

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***Abstract*—**

***Index Terms*—**

I. Introduction

In this paper we used Bayesian, SVM techniques to detect invisible solar PV generation.

II. Literature reviews

III. Problem Formulation

A. Measurement devices, measured data and accuracy

To generate measurement data for testing prurposes, measurement error was added to tha actual measurements as shown in Equation 1.

$$Z = Z_a \pm + e_z \tag{1}$$

where Z_a is actual data and e_z is error added base on accuarcy of the measurement. In this study, bus measurement has 3% error. line measurement has 5% error.

These error are assumed to be modeled independent Gaussian random variable [2]. where where the error value is expected value from gaussian distribution. noise is guassian distribution,as shown in Equation 2

$$g(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}((x-\mu)/\sigma)^2} \tag{2}$$

1) State variable description:: voltage, current, power flow from measurements devices

B. Peform SE to find

1) LWS:

2) Branch current, load allocation based state estimation: is based on the weighted least square (WLS) approach [1]. the method solves the following WLS problem to obtain an estimate ofthe system operating point defined by the system state x:

$$\min_x J(x) = \sum_{i=1}^{m} w_i (z_i - h_i(x))^2 = \big[z - h(x)\big]^T W \big[z - h(x)\big] \tag{3}$$

where w_i and $h_i(x)$ represent the weight and the measurements function associated with measurement z_i, respectively.

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For the solution of this problem the conventional iterative method is adape by solving following normal equations at each iteration, to compute the update $x^{k+1} = x^k + \Delta x^k$

$$\big[G(x^k)\big]\Delta x^k = H^T(x^k) W \big[z - h(x^k)\big]$$

Where

$$G(x) = H^T(x) W H(x)$$

is the gain matrix and H is the jacobian of the measurement function $h(x)$.

C. load allocation

D. subsection name

IV. Test Cases and Results

V. Conclusion

Here is Conclusion.

Acknowledgment

References

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[2] A. Abur and A. G. Exposito, Power System State Estimation: Theory and Implementation. New York: Marcel Dekker, 2004.