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Diminution of Noise in Radar Signal by using Adaptive Filter

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ABSTRACT: This paper demonstrates the FIR, Adaptive Filter which is applied to Radar signals to reduce the noise. Adaptive filter has the strong anti-noise ability; it can also achieve accurate Radar Signal in a very noisy environment. For removing noise and extracting signal, Adaptive Filter analysis is one of the most important methods. The de-noising application of the Adaptive Filter has been used in spectrum cleaning of the atmospheric radar signals. This paper demonstrates the algorithms of Adaptive Filter that is used in radar signal processing to reduce the noise. The simulation results indicate that Adaptive Filter has strong anti-noise ability for Radar.

Keywords: Adaptive Filter, de-noising, radar noise, SNR.

I. INTRODUCTION

Degradation can be reducing by using filtering method FIR, Adaptive filter. The target of a future Radar Signal enhancement algorithm should be a reduction of unwanted background noise. Each method has its own advantage and efficiency depend on the type of noise. In Radar, unwanted noise consume energy and deteriorates the target information of the signal there are a variety of method to reduce noise both analog and digital. Each method has its own advantages and efficiency is often dependent upon the type of noise. The noise suppression has application is virtually all field of communication (channel equalization, signal processing etc.) and other field In this paper our experiments on filtering technology; FIR filter, and adaptive filter. The output signal from the filter is compare with the desired signal which we want to obtained and find the best filter for noise reduction. After conclusion the adaptive filter is best than the FIR filter and adaptive filter to achieve the best performance of Radar Signal.

II. OVERVIEW OF FILTER

The FIR, Adaptive filter is used for noise reduction and result has been proposed by research. Following filter is:

A. FIR Filter

Finite impulse response in which impulse response h(t) does become exactly zero at time t>T for some finite T, thus being of finite duration. FIR filter can have linear phase characteristics. FIR filter can be discrete-time or continuous time and digital or analog. FIR requires no feedback. FIR Filter has many advantages over the other filter.

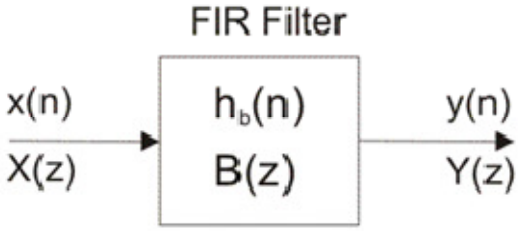

Fig. 1. FIR Filter.

B. Adaptive Filter

The efficiency of the adaptive filters mainly depends on the design technique used and the algorithm of adaptation. The adaptive filters can be analogical designs, digital or mixed which show their advantages and disadvantages. Figure Shown Block Diagram of Adaptive filter below in Fig. 3. Here *w* represents the coefficients of the adaptive filter tap weight vector, *x* (*n*) is the input vector samples, the tapped delay line D, is needed to make full use of the filter. The input signal enters from the left and passes through *N*-1 delays. The output of the tapped delay line (TDL) is an *N*-dimensional vector, made up of the input signal at the current time, the previous input signal, etc. the *y* (*n*) is the adaptive filter output, *d* (*n*) is the desired echoed signal and *e* (*n*) is the estimation error signal at time n.

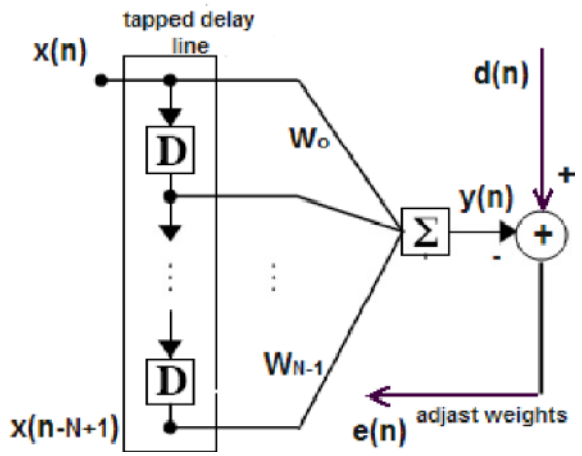

Fig. 2. Block Diagram of Adaptive filter.

The aim of an adaptive filter is to calculate the difference between the desired signal and the adaptive filter output, *e* (*n*). This error signal is fed back into the adaptive filter and its coefficients are changed algorithmically in order to minimize a function of this difference, known as the mean square error function. In the case of noise cancellation, the optimal output of the adaptive filter is equal in value to the unwanted echoed signal. When the adaptive filter output is equal to desired signal the error signal goes to zero. In this situation the noise signal would be completely cancelled [2,8,11].

III. SIMULATION

The de-noising of the received radar signal is simulated in the presence of white Gaussian noise. The effect of signal parameter changes on the algorithm has been investigated. These parameters include the SNR of the signal. The SNR is defined as the ratio of the signal power to the noise power in the entire period.

The receiver receives the return from the targets in the present of AWGN. We recover our transmitted signal from the received signal using the FIR and Adaptive filter for Radar. The recovery signal is almost similar to transmitted signal.

The method is based upon the filter technology. FIR and Adaptive filter Technology is used for noise Diminution. Result shown in fig. this fig shown the signal vs. time wave after noise cancellation are drawn for FIR and Adaptive filter

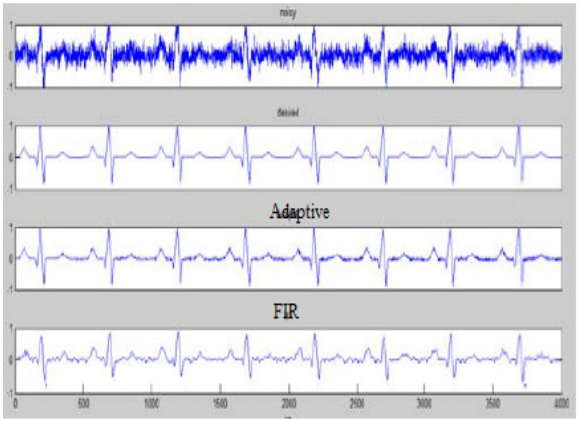

Fig. 3. Result of Adaptive and FIR Filter.

IV. CONCLUSION

Our Conclusion that tha Adaptive Filter is More effectie than FIR Filter as their response can be seen in the figure. Adaptive noise cancellation provide low output noise and its low signal distortion as campare to FIR filter.

REFERENCES

[1]. Moonen, and Peroudeler," An Introduction to Adaptive Signal Processing", McGraw- Hill, second edition, 2000.

[2]. M, Hutson, "Acoustic echo cancellation using DSP", The School of Information Technology and Electrical Engineering, The University of Queensland, November 2003.

[3]. Widrow and Stearns, "Adaptive Signal Processing", Englewood Cliffs, NJ: Prentice Hall,1985.

[4]. Homer, J., Adaptive Echo Cancellation in Telecommunications. Ph.D. thesis, University of Newcastle , Newcastle, 1994.

[5]. Chang Choo, "An Embedded Adaptive Filtering System on FPGA" Department of Electrical Engineering, San Jose State University, San Jose, CA 95198-0084, USA, 2007.

[6]. Robert Dony, et. al., "An FPGA Implementation of the LMS Adaptive Filter for Audio Processing", In Proceedings of the 12th Annual IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM04), pages 324- 335, 2006.

[7]. U. Maser, L. Banbse, "Digital Signal Processing with Field Programmable Gate Arrays", International Signal Processing Conference, March 28, 2006, Dallas Texas.

[8]. Farhang-Boroujeny, B., "Adaptive Filters, Theory and Applications". John Wiley and Sons, New York, 1999.
[9]. Bellanger, Maurice G., " Adaptive Digital Filters", 2nd edition. Marcel Dekker Inc., New York, 2001.
[10].Morris, Lu, "Adaptive Echo Cancellation", Ieee Signal Processing Magazine, March 1999.
[11]. "Neural network toolbox", Matlab 7.22, 2006.
[12]. Sibal, Sison, "Data acquisition of low- frequency data using a sound card", Instrumentation, Robotics, and Control Laboratory, University of the Philippines, 2004.
[13]. Hashmi, Butt, "Muti-channal data acquisition for implementation of real-time signal processing algorithm", *Computer Engineering, Lahore University, Pakistan,* 2005.