Mean-Square Difference (PRD). CR is the ratio of the original data to compressed data without taking into account any factors such as bandwidth, sampling frequency, data size and selection of lead. It is given by:

$$CR = \frac{original\ file\ size}{compressed\ file\ size}$$

Percent Root-Mean-Square Difference (PRD) is a measure of error loss. This measure evaluates the distortion between the original and the reconstructed signal. PRD calculation is as follows:

$$PRD = \sqrt{\frac{\sum_{i=1}^{n}(ORG(i) - REC(i))^2}{\sum_{i=1}^{n}(ORG(i))^2}} \times 100\%$$

For different threshold values different number of singular value was taken and the resultant CR & PRD are given for ECG sample 100m form MIT -BIH Arrhythmia Database in Table 1.

Table 1 CR & PRD For Different No. Of Singular Values

No of Singular Values	Threshold=0.01		Threshold=0.005	
	CR	PRD(%)	CR	PRD(%)
6	*6.27*	*3.54*	*5.88*	*2.02*
5	*6.63*	*5.03*	*6.24*	*3.68*
4	*8.01*	*9.08*	*7.88*	*6.71*
3	*9.5*	*13.92*	*9.3*	*11.57*
2	*11.12*	*18.9*	*10.59*	*14.9*

The proposed method uses two different variables to change the CR & PRD values and a better CR can be achieved while keeping the PRD minimum. In [6] CR value is calculated changing bit rate where bit rate is kept constant throughout the whole process in this paper. For different samples of MIT-BIH Arrhythmia Database the proposed algorithm was tested and the results show significant correlation. The CR values for different samples are illustrated in figure-4. The result from

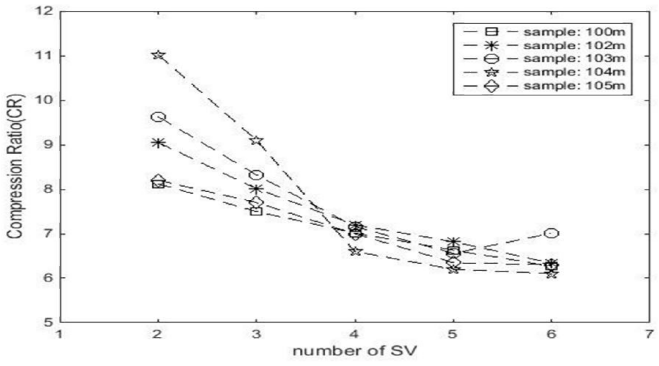

Figure 4 CR vs Number of SV

the simulation is then compared with other existing methods of ECG compression based on CR & PRD. Table-2 shows that the proposed method improves the CR significantly & further improvement can be achieved by increasing threshold value.

Table 2

Method	CR	PRD%
CORTES [7]	4.8	7
DPCM with entropy coding[8]	7.8	3.5
Fourier Descriptors[9]	7.4	7
Proposed method	11.12	18.9

IV. CONCLUSION

The paper proposes an algorithm with integration of two techniques to get high compression ratio, low PRD and two completely different variables (Threshold value & Number of Singular Value) to get the desired result. The reconstruction process includes using the position matrix and cubic spline interpolation which is simple and easy to perform. Using the algorithm on different samples of MIT-BIH database, it can be inferred that the algorithm gives similar performances despite the nature of the ECG signal.

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