

## **Cross Entropy Algorithm for Improved Soft Fusion-based Cooperative Spectrum Sensing in Cognitive Radio Networks**

**Abstract**— In cooperative spectrum sensing of cognitive radio based network, various methods of soft decision fusion (SDF) and hard decision fusion (HDF) schemes have been proposed to optimize the performance of detecting primary users so that they are well-protected from harmful cognitive radio access. In this paper, cross entropy (CE) based algorithm is proposed as an efficient technique for optimizing the weighting coefficients vector of an SDF-based cooperative spectrum sensing scheme. The proposed CE based algorithm is compared with existing deterministic methods as well as with an evolutionary-based genetic algorithm (GA) method. Simulation results show that the proposed CE scheme outperforms the other schemes in terms of the achievable fitness of primary users' detection probability, convergence, and stability.

### **CONCLUSION**

This paper presented a cross entropy (CE) optimization method as a promising candidate for optimizing the performance of cooperative spectrum sensing in CR networks. The performance of the CE-assisted method is compared with existing iterative, SDF and HDF schemes. The archived probability of detection by the CE-assisted method for a given probability of false alarm is higher than those achieved by any other scheme for the entire range of the ROC. The proposed CE-assisted scheme also exhibits faster convergence speed and more stable performance as compared to the benchmarking GA-assisted scheme making it a very suitable candidate for real-time applications.



## **SYSTEM REQUIREMENTS:**

### **HARDWARE REQUIREMENTS:**

- System : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Floppy Drive : 1.44 Mb.
- Monitor : 15 VGA Colour.
- Mouse : Logitech.
- Ram : 512 Mb.

### **SOFTWARE REQUIREMENTS:**

- Operating System : Windows
- Tool : Cygwin
- Front end : OTCL

## **REFERENCES**

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- [3] I. F. Akyildiz, W. Lee, M. C. Vuran and S. Mohanty, "Next generation/dynamic spectrum access/cognitive radio wireless networks: A survey," Computer Networks, vol. 50, no. 13, Sep. 2006, pp. 2127-2159.