

# Turkish Journal of Electrical Engineering & Computer Sciences

Turkish Journal

of

Electrical Engineering &  
Computer Sciences

Cardiac Passive Acoustic Localization: Cardiopal

Yıldırım Bahadırlar, Halil Özcan Gülçür  
Boğaziçi University, Biomedical Engineering Institute,  
80815 Bebek, İstanbul-TURKEY  
e-mail: bahadirl@boun.edu.tr, gulcur@boun.edu.tr

 [Keywords](#)  
 [Authors](#)



[elektrik@tubitak.gov.tr](mailto:elektrik@tubitak.gov.tr)

[Scientific Journals Home Page](#)

**Abstract:** A novel non-invasive system is proposed as an adjunct diagnostic tool for cardiac disorders, which is based on processing of the heart sounds acquired using a specially designed 2-D passive acoustic array. In addition to the acoustic array, the system consists of a personal computer, specially developed instrumentation and interface hardware and an adaptive array processing scheme. A signal model is constructed in accordance with the basic assumptions made for very near-field low frequency sources. The multiple signal characterization (MUSIC) method together with the model is used for the localization of assumed point sources in the heart. Locations of the sources are estimated by applying 2-D searches. The effectiveness of the system is demonstrated with extensive recordings at different SNR levels on the phantoms constructed using small sound sources. The system is also tested on human subjects. Different "images" corresponding to the various phases of the heart beat are obtained. It is explained that extraction of 3-D "images" is also possible with the same array data by evaluating a distance parameter relating the sources to the origin of the array.

---

Turk. J. Elec. Eng. & Comp. Sci., 6, (1998), 243-260.

Full text: [pdf](#)

Other articles published in the same issue: [Turk. J. Elec. Eng. & Comp. Sci.,vol.6,iss.3.](#)