



## **NEURAL NETWORK-BASED SINGLE SENSOR SOUND LOCALIZATION USING A MOBILE ROBOT**

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**ABSTRACT**—This paper presents a system for sound localization using a single microphone attached to a small mobile robot. Amplitude and spectral information from sound signals are used to localize sound source position. Sound sources are localized using an artificial neural network, which transforms the signal features and their corresponding recording coordinates into a source position. The inputs to the neural network consist of microphone coordinates and features from the sound signal recorded at different positions during a scan as the robot moves through the environment. The outputs provide distances of the source position referenced to an origin in the environment. Experiments were conducted with a band limited white noise source with signal sampling frequencies of 11.25 Kilohertz in a reverberant laboratory. The experiment was limited to near field effects of sound signals. The structure of the neural network was found to influence the accuracy of source localization.

**Key Words:** Neural Networks, Sound Localization, Mobile Robots, Soft Computing