

# Detection and Correction of Adverse Effects of Room Acoustics using Machine Learning for Integrated Audio Devices

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## Abstract:

Over the past 15 years, home-audio hardware has trended away from separate amplifier and speaker units towards integrated all-in-one units such as soundbars and wireless speakers. Amplifier-receiver units often calibrate for adverse room conditions by using a microphone connected to the unit located at the position of the listener. This is necessary because these amplifiers are compatible with several different speaker units with different response characteristics making it impossible to predict the sound experience at the listener's position. Today, integrated units have hardware that is standardized by the manufacturer in a standardized configuration, but calibration still often requires a microphone at the listener's position. This paper attempts to solve this problem using a machine-learning algorithm and an integrated microphone within the speaker unit to predict the speaker response at the listener location and correct it using digital filtering.