FILTER BANKS AND METHODS FOR OPERATING FILTER BANKS

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HINTERGRUND

The two central functionalities of filter banks are; the decomposition of a signal into frequency sub-bands (analysis); and the reconstruction of the individual sub-bands into a complete signal (synthesis). These functionalities enable a plethora of applications within digital signal processing. Starting from medical applications, such as digital hearing aids/cochlear implants and the processing of electrocardiograms; moving to radar applications, such as advanced driver assistance systems, intruder detection, and automated lighting; and finally, within wired and wireless communication systems. Many of these applications require a large number of dedicated, often battery-operated, devices. Thus, making low power consumption and low material costs crucial factors when considering different implementations. Modulated filter banks (MFBs) are among the most popular types of filter banks, due to their low computational complexity. Lower computational complexity means lower power consumption and lower use of resources, i.e. less space used on the chip and longer battery lifetime. A specific subset of MFBs, known as discrete Fourier transform based MFBs, are very popular.

LÖSUNG

The invention consists of a novel implementation structure for discrete Fourier transform based MFBs leading to savings of up to approximately 50% in computational complexity¹, in their filtering part.

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ENTWICKLUNGSSTAND

Leitstruktur

CATEGORIES

//Analytik
VORTEILE

Suggested use cases include:

- Automotive radar
- Radar intruder alert and automated lighting
- QRS detection in wearable electrocardiogram devices
- Digital hearing aids and cochlear implants
- Wired and wireless communication systems