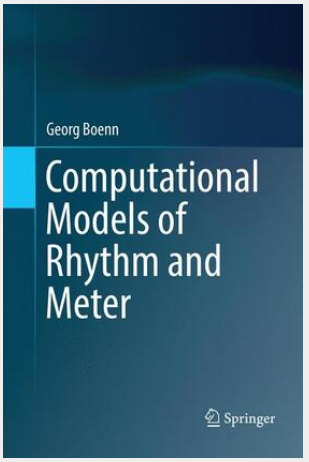
Boenn

Computational Models of Rhythm and Meter



This book presents the latest computational models of rhythm and meter that are based on number theory, combinatorics and pattern matching. Two computational models of rhythm and meter are evaluated: The first one explores a relatively new field in Mathematics, namely Combinatorics on Words, specifically Christoffel Words and the Burrows-Wheeler Transform, together with integer partitions. The second model uses filtered Farey Sequences in combination with specific weights that are assigned to inter-onset ratios. This work is assessed within the context of the current state of the art of tempo tracking and computational music transcription. Furthermore, the author discusses various representations of musical rhythm, which lead to the development of a new shorthand notation that will be useful for musicologists and composers. Computational Models of Rhythm and Meter also contains numerous investigations into the timing structures of human rhythm and metre perception carried out within the last decade. Our solution to the transcription problem has been tested using a wide range of musical styles, and in particular using two recordings of J.S. Bach's Goldberg Variations by Glenn Gould. The technology is capable of modelling musical rhythm and meter by using Farey Sequences, and by detecting duration classes in a windowed analysis, which also detects the underlying tempo. The outcomes represent human performances of music as accurate as possible within Western score notation.

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