Celestial Symphony: MIDI Sonification of Multiparametric Supernova Data Into a Euphonious Composition

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Astrophysicists seek methods of effectively conveying complex concepts to non-scientific audiences. Sonification, or the conversion of information into audio, improves the accessibility of the universe and enhances pattern recognition, data retention, and error detection. However, most studies sonify single events and sound musically discordant. This project sonifies multiparametric supernova data from Palomar Observatory into a pleasing and precise composition, exploring innovative mediums to improve scientific communication and funding. Data from 8000+ supernovae collected by the Zwicky Transient Facility were manipulated within Python. Each parameter was equated to a musical characteristic (e.g. supernova luminosity to volume) and normalized while maintaining proportionalities. The values were exported as MIDI files into Garageband, where each supernova type was assigned an instrument. Rhythm, harmony, ambience soundscapes, and mixing were finally added to transform the piece into a euphonious composition. The composition meets the scientific objective as the data is distinguishable, with modifications supporting the patterns and features. It also meets the musical objectives as it resembles lo-fi and ambient music, which are pleasing and functional, and emulates the sound of space as defined by sci-fi soundtracks. The project successfully sonifies modern research's most comprehensive supernova data to advance studies. By conveying accessible, recognizable, and comprehensible information, this sonification may broaden both artistic and scientific audiences. Future research should apply this technology to data publications in various astrophysical fields, elevating music's relevance in science and fostering a greater conceptual understanding of the universe.

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