Soundscape-based music and creative AI: Insights and promises

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Research question

How creative AI can benefit soundscape-based music within the Sensing the Forest (StF) project?

Sensing the Forest

StF aims to raise awareness among forest visitors, artists, scientists, and the general public about the connection between forests and climate change.

Our vision is to emphasise listening as a method to engage with the forest ecosystem.

Creative AI and soundscape-based music

Soundscape-based music is the art of making music through the use of environmental sound recordings, according to the *ElectroAcoustic Resource Site project* (EARS).

Promising applications of creative AI include:

- Sound recording & analysis tasks
- Music performance tasks
- Sound composition tasks

Sound recording & analisis

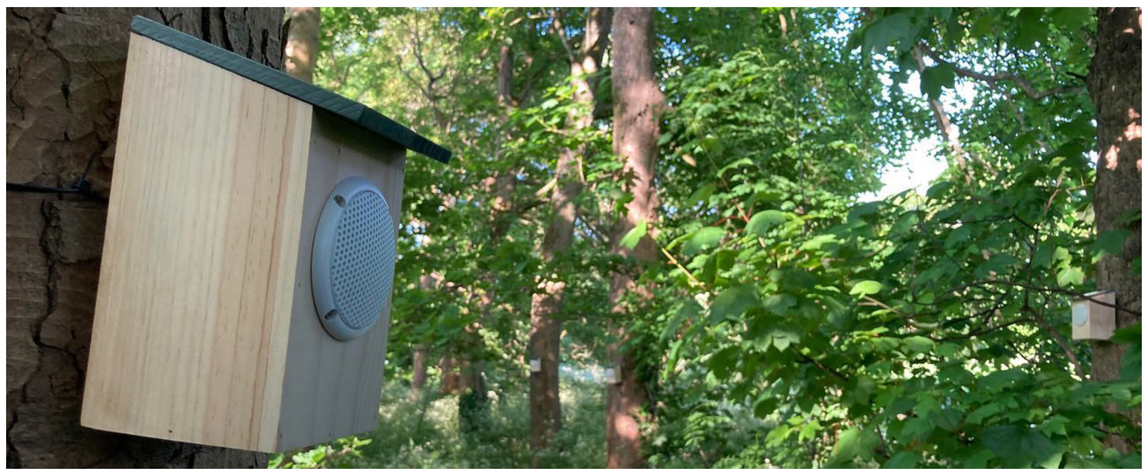
AI-enhanced bespoke DIY technologies for streaming and analysing live soundscapes

Recording: Two DIY solar-powered, off-grid audio streamers powered by Raspberry Pi are installed in the Alice Holt Forest operating as listening/recording stations.

- Can AI help us remove human voices that occasionally can be heard or recorded without control?
- What embedded AI systems could be suitable?

Analysis: Two datasets of automatic recordings are captured according to solar time and uploaded to *Freesound*.

- Ecoacoustics: How can we use AI-based sound analysis to identify potential patterns related to climate change?
- Acoustic diversity indices (ADI): How can we combine deep learning and ADI to automatically discover patterns in soundscape data?



Bird boxes repurposed as speakers used in the *Dendrophone*, a sound installation by Peter Batchelor.

Music performance

Live coding with natural sounds

Live coding is an artistic and cultural practice of music performance. *MIRLCa* is a live-coding tool that queries sounds from *Freesound*.

- Can we re-enact the two datasets through live perofrmance at the intersection of art and science?
- How can we explore phenological patterns related to climate change in both datasets using live coding?
- Are the sounds of any species diminishing? Do environmental noises dominate? Are there other acoustic markers tied to climate shifts?

Sound composition

Processing sound events

Sonification can be defined as the translation of data into sound, according to *The Sonification Handbook*.

We have a customised *data logger* that measures air temperature, relative humidity, wind speed, photosynthetically active radiation, net radiation and carbon dioxide concentration.

Peter Batchelor's *Dendrophone* is a sound installation that focuses on the sonification of humidity (dry/wet sounds), sunlight energy (smooth vs juddering sounds) and carbon dioxide levels (breathing patterns).

- In what ways can we map environmental data to sound?
- How can AI help us decide what variables to use and what type of sounds can be mapped?

StF code repositories:

StF website:

UK AI Research Symposium (UKAIRS '25), 8-9 September 2025, Newcastle, UK
This research receives funding from the UKRI Arts and Humanities Research Council (AH/X011585/2)