Data Observatory: Projections

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How can we compare radio signals to something that is meaningful to us? The second *data observatory* organizes radio signals by 'projecting' their properties onto musical genres. First, I let the self-organizing map give me a topology of audio samples from the Free Music Archive (FMA).[1] Then I projected radio signals onto this organization. Radio signals 'land' in cells where the music sounds similar to a signal. Some cells do not attract any radio signals. The music archive is organized into eight specific genres, and they can cast shadows onto the organized space of radio in a similar way the topics of textual descriptions do in the previous study. Certain genres share more cells with radio than others (see Fig. 1).

1 FMA: A Dataset For Music Analysis Github repository: https://github.com/mdeff/fma (accessed 21.06.2022).

Figure 1: Study 02: Projections. Data observatory web-based interface. Radio signals projected onto a self-organizing map of Free Musical Archive. Highlighted cells (green) are representative of 'hip-hop' genre.

Courtesy of Selena Savić

Rhythmical characters emerge in the dataset: fast or slow-paced signals, narrow and wide. Signals that are grouped together according to their similarity to songs, demonstrate consistency in rhythmical and spectral components. This similarity is not arbitrary, and it strongly suggests the possibility to use this organization to identify unknown signals. Signals that pertain to video link transmissions, PAL broadcast[2] and an unknown satellite-like signal are grouped together in three neighbouring cells. It should be noted that some of this rhythmicity comes as an artefact of signal recording, limiting the reliability of sim-

2 PAL Broadcast entry on SIGID wiki: https://www.sigidwiki.com/wiki/PAL_Broadcast (accessed 21.06.2022).

ilarities to infer signal identity. The dataset would require cleaning to remove such false consistencies.

Figure 2: Study 02: Projections. Data observatory web-based interface. Radio signals projected onto a self-organizing map of Free Musical Archive. Cells that are representative of the 'experimental' genre are highlighted (blue).

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