

AUDIODATA AND SOFTWARE END USER LICENSE AGREEMENT

SCOPE

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By accessing or using the Database and/or Software Tools, the End User acknowledges that the End User has read, understood, and agrees to be bound by this License.

DEFINITIONS

"Database" means the TUT database described in the Appendix 1 composed of recordings of everyday audio scenes and their annotations, disclosed on a voluntary basis by the concerned persons. All data contained within Database have been collected and processed in accordance with the laws applicable in Finland.

"End User" means an individual or legal person using the Database and/or the Software Tools as a single user on an individual computer or as multi-user on several individual computers or workstations.

"Software Tools" means the software described in Appendix 1.

"Licensed Materials" means the Database and Software Tools.

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ACCESS

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End User will follow all export control laws and regulations relating to the Licensed Materials.

Appendix 1

LICENSED MATERIALS

Description of the Database

The Database includes the following and any other data that TUT makes available to End User under this License:

The data consists of 15 hours of binaural audio, recorded in 15 different everyday environments: lakeside beach, inside bus, city center, cafe/restaurant, inside car, forest path, grocery store, home, library, metro station, office, park, residential area, train and tram. There is approximately one hour recorded in each of these. There are a total of 250 recordings of average length 3.5 minutes. All locations for recordings are in Finland. The recordings contain sounds that are usually occurring in these environments: natural sounds (birds, wind, etc), traffic sounds and sounds related to human presence (footsteps, conversations, laughter, etc). In private areas (home, office), the recording was made with the approval of the recorded person(s).

The Database includes annotations of all audible events of the residential area and home environments: the start and end times of each sound event, and a description of the type of event.

Description of the Software Tools

The Software Tools include the following and any other software that TUT makes available to End User under this License:

A baseline classification and detection systems is provided along with the Database. The system implements two subsystems using shared code base: 1) baseline acoustic scene classification subsystem, and 2) sound event detection subsystem. The subsystems include training stage and testing stage with evaluation using cross-validation. In addition, implementation of performance metrics is provided.

The two subsystems are based on same acoustic feature extraction algorithm and classification algorithm (Gaussian Mixture model, GMM). Mel-frequency cepstral coefficients (MFCC) are used to represent the coarse shape of the power spectrum of the acoustic signals and the class-conditional densities of these features are modeled with Gaussian mixture models (GMM).

In the acoustic scene classification subsystem, the acoustic scene-conditional densities of MFCCs are modeled with GMMs. In the classification stage, the likelihood of test signal coming from each modeled scene class is evaluated and classification is done by maximum-likelihood classifier.

In the sound event detection subsystem, for each sound event class two GMM models are trained: one trained with acoustic material where sound event is active and one trained with acoustic material where sound event is inactive. In the detection stage, likelihood ratio between these two models is used to get active sound event for each processing frame.

Two parallel implementations of the baseline system are provided, one for Python platform and one for Matlab platform. The Python implementation is dependent on standard Python libraries and external libraries: numpy, scipy, scikit-learn, pyyaml, and librosa. The Matlab implementation is dependent on Matlab standard toolboxes and external toolboxes: DataHash, GetFullPath, YAMLMatlab, Rastamat, and Voicebox.