Survey on perceptual beat evaluation using GMM regression in Data Mining

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Abstract

This paper used in estimation algorithm, for two essential data mining task. i.e classification&regression. it learning to occur the difficult error as octave error,the whole learning process is estimation of perceptual tempo.where the data labels are respect to the propagation on similarity graph constructed based on the feature representation. This paper experiment consider lastFM in 2011.the frame work of 3 musical attributes: (i) the variation of energy,(ii) of harmonic changes,(iii) of spectral balance and short-term-event-repetitions.GMM regression outperforms of attributes provided by state-of-art tempo estimation algorithm. Regression outperforms largely SVM-Regression. Using both,SVM&GMM regression.

Key words

Perceptual tempo, tempo class, GMM-Regression, SVM Regression

1.Introduction

There is still many studies tempo is a basic element and useful descriptive parameter of music and has been the focus of many systems for automatic music information retrievel.i.e.,automatic tempo, perceptual tempo refers to listener's tempo perception as fast,moderator slow,when he listens to a piece of music with fairly overall tempo. For example, the experiment of Moelants and McKinney highlighted the fact that people can perceive different tempi for a single track. Therefore, they propose to represent the tempoof a track as a histogram of its various perceived tempi1.Recently, Levy did a large-scale experiment within the framework of Last-FM. In this experiment, 4000 tracks have been annotated using a crowd-sourcing method. Users were asked to select a speed for each track in a 3-point scale (\slow", \in between", \fast", \hard to say"), they were then
asked to compare the track with a second track in terms of perception of speed, _nally they were asked to tap along to provide a estimation tempo of the track.

1.1 Related work

A detailed overview of related to work the estimation of tempo or the octave error. these are highlights the difference.the methods first differ by goals and methodologies:estimation of an octave correction factor to be applied to a previous estimation of tempo class(slow,medium,fast),estimation of tempo perceptual,class to be used the tempo estimation algorithm.they also differ from the machine learning method.

1.2 proposal and paper organization

Previous work mostly feature energy based, a large bag-of-features or timbre-features, a set of assumptions related to start the perception of tempo. we create a related each of these assumptions audio feature. that we assume the perception of tempo is related to the rate of variation of four musical attributes: the rate of variation of harmonic content, the rate of variation of energy, the rate of short-term-event-repetitions and the rate of variation of spectral

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balance. Track to assume the rapid short-term repetitions will be perceived as fast even if the tempo of the sequencer was set to slow orrapid spectral-balance changes.

A model find the relationship between the perceptual tempo class,the perceptual tempo and feature four set. a GMM Regression train these model to relationship between the spectral enveiop and pitch. This is done using a regression over the values of the most-likely components of the GMM.

Studies most on octave-errors do not make use of a perceptual definition of the"reference" tempo. There has often been one or two annotators. reference tempo (as the ones provided with the \song" or \ballroom" test-set) only defined by Therefore, it does not necessarily corre- spond to a shared perception of the tempo. As opposed to these studies, we rely here on the results of the large-scale ex-periment on perceptual tempo made by Last-FM. Fromthese results, we select only tracks for which the perception. SVM- classification and GMM-regression.

2. Review of literature

S. Calinon, F. Guenter, and A. Billard. On learning,representing and generalizing a task in a humanoid robot[1].this architecture through a series of experiment,a human demonstrator teaches a simple manipulatory tasks in human robot. This provides measure the spatio-temporal correlations the different modalities collected the robot which canbe used to determine the performance.then generalized used the Gaussian mixture regression.finally,we example the imitiation matric and use this generalize skill to different contexts.

C.-C. Chang and C.-J. Lin. Libsvm: a library for support vector machines[2],study of this paper goal is easily apply svm ,to their application. All implement details of used in livsvm,but solving svm optimizing problems theoretical convergence multiclass classification probability estimates and parameter selection.

J. Foote. Visualizing music and audio using self-similarity[3],this paper approach the time structure of music and audio. Similarity between any two instants of audio recording in 2d represention,identification of structural and rhythmic characteristics. ex: popular and classical music.application include in content based analysis and segmentation as well as tempo and structure extraction.

G. Peeters. Template-based estimation of time-varying tempo[4],this paper automatic estimation of tempo overtime detecting tempo level for percussive and non percussive audio. The front-end of oursystems reassigned spectural energy flux for the detection of musical events.this flex are estimated by proposed combination of discrete fourier transform and frequency mapped autocorrelation function.this most likely beat ,meter and tatum over time are then estimated jointely using proposed meter /beat subdivision templates and a Vitter bi decoding algorithm.used during the ismir2004 tempo induction contest.

G. Peeters. Spectral and temporal periodicity representations of rhythm for the automatic classi_cation of music audio signal[5]. In this paper, the temporal periodicity and spectral representations that can be used to describe the characteristics of the rhythm of a music audio signal. A continuous-valued energy-function representing the onset positions over time is first extracted from the audio signal. From this function we compute at each time a vector represents the characteristics of the local rhythm. Four feature sets are studied for this vector. They are derived from the amplitude of the discrete Fourier transform (DFT), the auto-correlation function (ACF), the product of the DFT and the ACF interpolated on a hybrid lag/frequency axis and the concatenated DFT and ACF coefficients. Then the vectors are sampled at some specific frequencies, represent various ratios of the local tempo. The ability of these periodicity representations to describe the rhythm characteristics of an audio item is evaluated through a classification task. In this, we test the use of the periodicity representations alone, combined with tempo information and combined with a proposed set of rhythm

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features. The evaluation is performed using annotated and estimated tempo. We show that using such simple periodicity representations allows achieving high recognition rates at least comparable to previously published results.

3. Background

Data mining is the practice of examining large pre- existing databases in order to generate new information. Data Mining involves the performance following such as extract, transform, and load transaction data onto the data warehouse system, Provide data access to business analysts and information technology professionals, Store and manage the data in the multidimensional database system, Analyze the data by application software, and Present the data in a useful format.

4.Methodology

4.1Support Vector Machine can be applied not only to classification problems but also to the case of regression. Still it contains all the main features that characterize maximum margin algorithm: a non-linear function is leaned by linear learning machine mapping into high dimensional kernel induced feature space. The capacity of the system is controlled by parameters that do not depend on the dimensionality of feature space.

4.2 GMM-Regression can be describe in generalized method of movement(GMM)estimation of non-linear and linearmodels with application in finance and economic;Consider the linear regression model

$yt = z0t\delta0 + \varepsilon t,\ t = 1, \ldots, n$

5.Conclusion

In this paper we studied the perceptual tempo estimation using four assumption the rate of variations of musical attributes related and prediction using GMM- Regression.that using there of assumption(rate of variation of the energy,the harmonic changes and short-term-event-repetitions) allows perceptual tempo at 75%,i.e.better using a state-of-the-art tempo estimation algorithem . this task,GMM-Regression largely outperforms SVM-Regression.output show that the SVM-Classification forms GMM-Regression.

6.References

[1] S. Calinon, F. Guenter, and A. Billard. On learning,representing and generalizing a task in a humanoid robot.IEEE Transactions on Systems, Man and Cybernetics, Part B, 37(2):286-298, 2007.

[2] C.-C. Chang and C.-J. Lin. Libsvm: a library for support vector machines. ACM Trans. on Intelligent Systems and Technology, 2(27):1-27, 2011.

[3] J. Foote. Visualizing music and audio using self-similarity.In Proc. of ACM Int. Conf. on Multimedia, pages 77-80,Orlando, Florida, USA, 1999.

[4] G. Peeters. Template-based estimation of time-varying tempo. EURASIP Journal on Applied Signal Processing,2007(1):158{158, 2007. doi:10.1155/2007/67215.

[5]G. Peeters. Spectral and temporal periodicity representations of rhythm for the automatic classification of music audio signal. IEEE Trans. on Audio, Speech and
Language Processing, 19(5):1242{1252, July 2011.

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