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## Self Organizing Map

The Self-Organizing Map (SOM) is a neural network model. It generates a topology-preserving mapping from a high-dimensional input space to a lower dimensional (often two-dimensional) output space. The data thus structured & organized enables an easier interpretation of complex inherent structures & correlations in the data.

## Mnemonic SOM

For memorizing the orientation of a map, i.e. the location of different genres of music on the map, and for explaining where those genre clusters are located, a rectangular map might be sub-optimal. In this study we therefore used the so called Mnemonic SOM, which is based on using recognizable shapes in the form of countries, geometrical figures, etc.

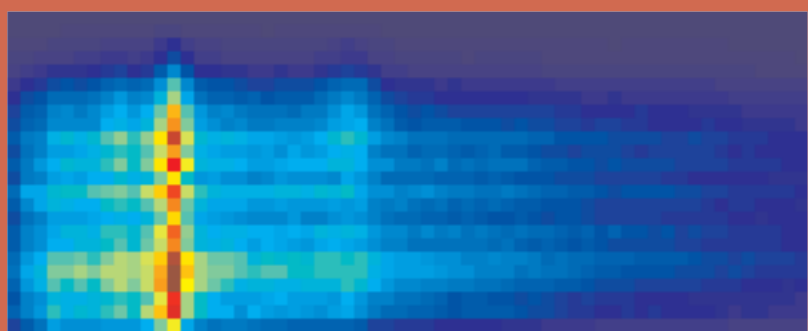
## Feature Extraction

Rhythm Patterns feature set (1440 dim.):

- Based only on the audio content of the music.
- Includes psycho-acoustic processing.
- Describes loudness amplitude modulation of 24 critical frequency bands.
- Discovers rhythmic & timbral features and thus recognizes different instrumentation.

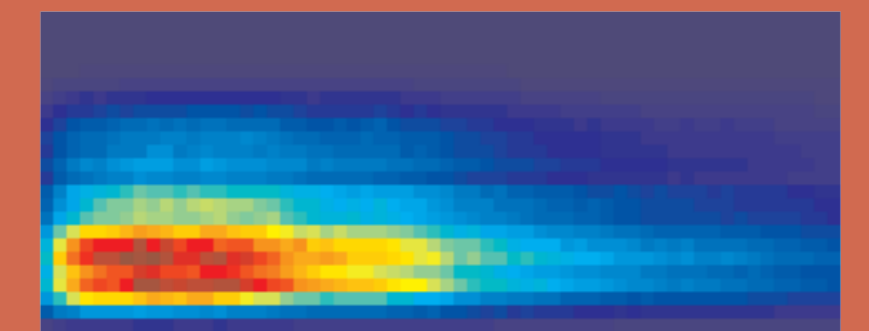
### Dances

- \* KV 335 March D major No. 2
- \* KV 189 March D major
- \* KV 215 March D major
- \* KV 176 16 Menuets - No. 12 in D
- \* KV 600 German Dance No. 2 in F
- \* KV 585 12 Menuets - No. 9 in B flat



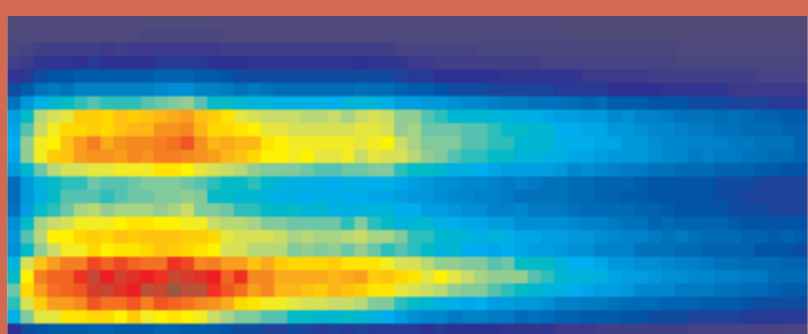
### Piano works

- \* KV 333 Piano Sonata 13 B flat major - Allegretto grazioso
- \* KV 533 Piano Sonata 15 F major - Rondeau, allegretto
- \* KV 279 Piano Sonata 1 C major - Allegro
- \* KV 281 Piano Sonata 3 B flat major - Rondeau, allegro
- \* KV 570 Piano Sonata 17 B flat major - Allegretto
- \* KV 309 Piano Sonata 7 C major - Allegro con spirito



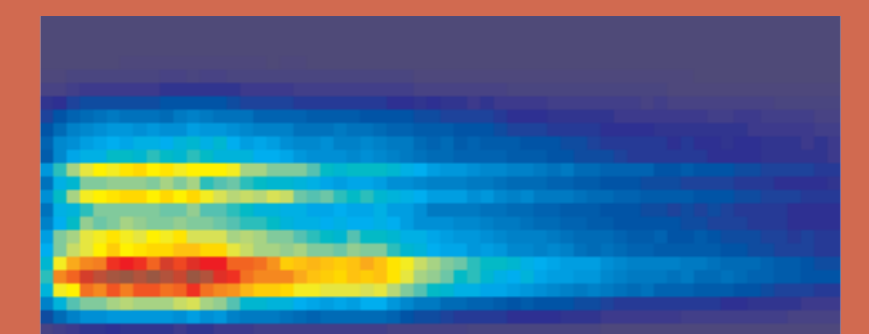
### String Ensembles

- \* KV 423 Duo for Violin & Viola G major - Allegro
- \* KV 387 String Quartet G major - Molto allegro
- \* KV 464 String Quartet A major - Allegro ma non troppo
- \* KV 589 String Quartet B flat major - Allegro
- \* KV 159 String Quartet B flat major - Andante
- \* KV 266 Trio for 2 Violins & Cello B flat major - Adagio



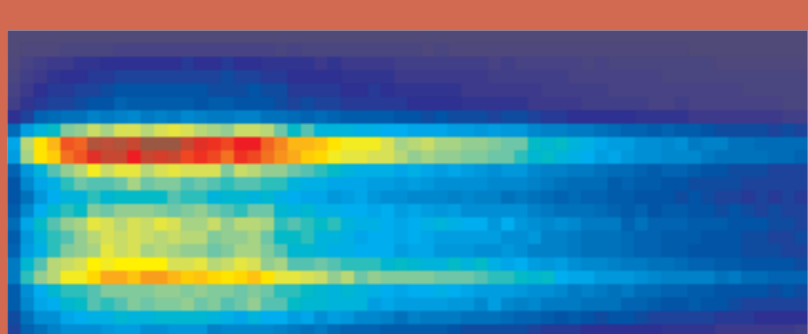
### Divertimenti

- \* KV 333 Piano Sonata 13 B flat major - Allegretto grazioso
- \* KV 533 Piano Sonata 15 F major - Rondeau, allegretto
- \* KV 279 Piano Sonata 1 C major - Allegro
- \* KV 281 Piano Sonata 3 B flat major - Rondeau, allegro
- \* KV 570 Piano Sonata 17 B flat major - Allegretto
- \* KV 309 Piano Sonata 7 C major - Allegro con spirito



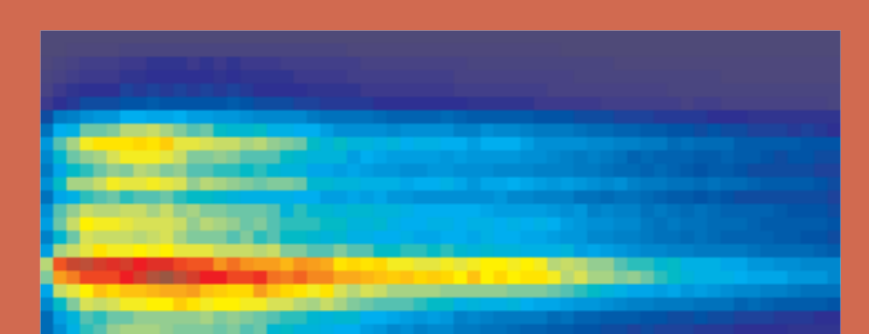
### Operas

- \* KV 492 Le Nozze Di Figaro - Tutto è disposto
- \* KV 492 Le Nozze Di Figaro - La vendetta, oh, la vendetta
- \* KV 208 Il Ré Pastore - Aria Voi che fausti ognor donate
- \* KV 196 La Finta Giardiniera - Aria Con un vezzo all'Italiana
- \* KV 196 La Finta Giardiniera - Aria A forza di martelli



### Sacred Works

- \* KV 262 Missa Longa C major
- \* KV 193 Dixit Dominus-Magnificat, C major
- \* KV 141 Te Deum Laudamus C major - Aeterna fac
- \* KV 117 Benedictus sit Deus C major - Jubilate
- \* KV 66 Missa C major Dominicus - Et in Spiritum Sanctum
- \* KV 192 Missa Brevis F major - Sanctus

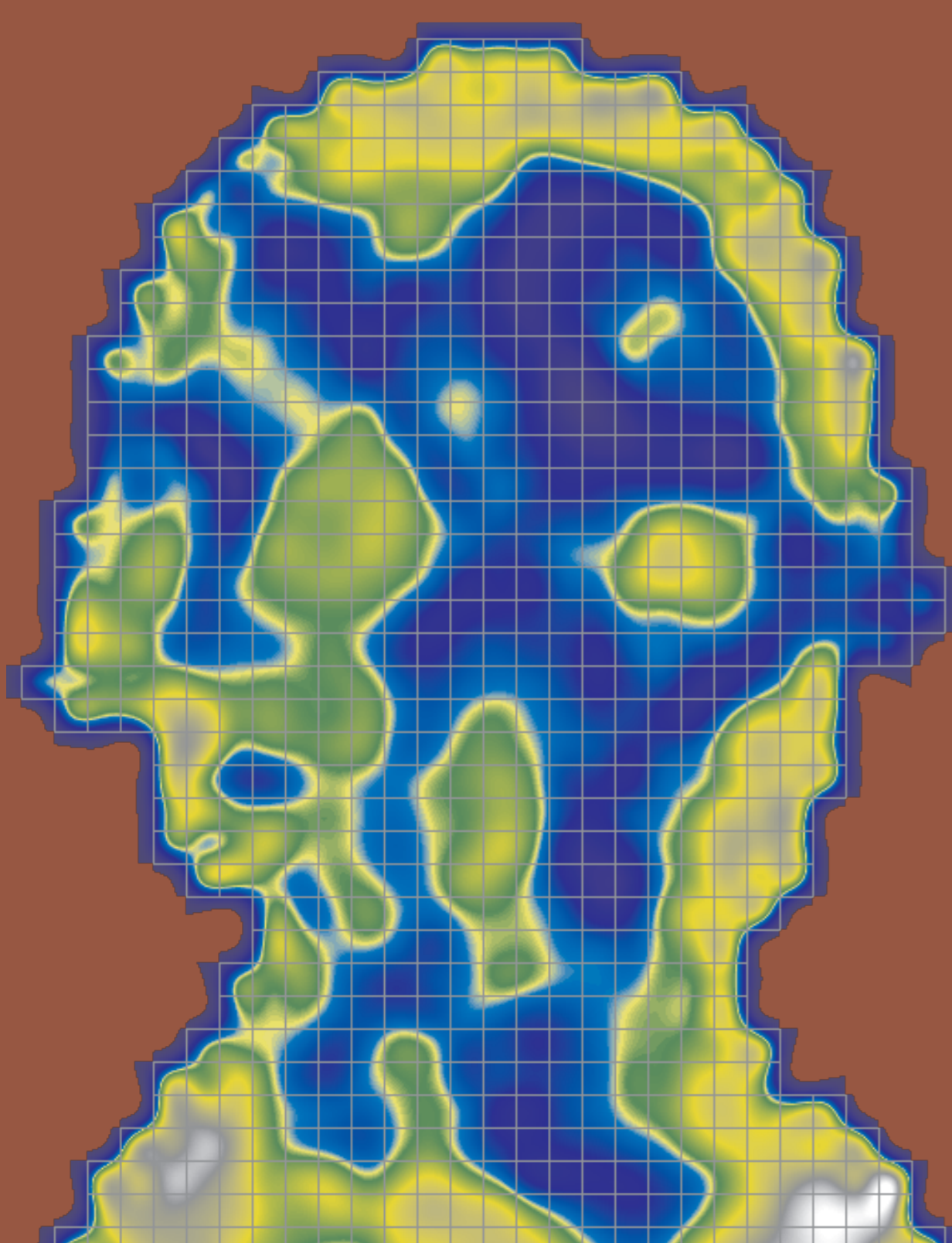


[www.ifs.tuwien.ac.at/mir/mozart](http://www.ifs.tuwien.ac.at/mir/mozart)

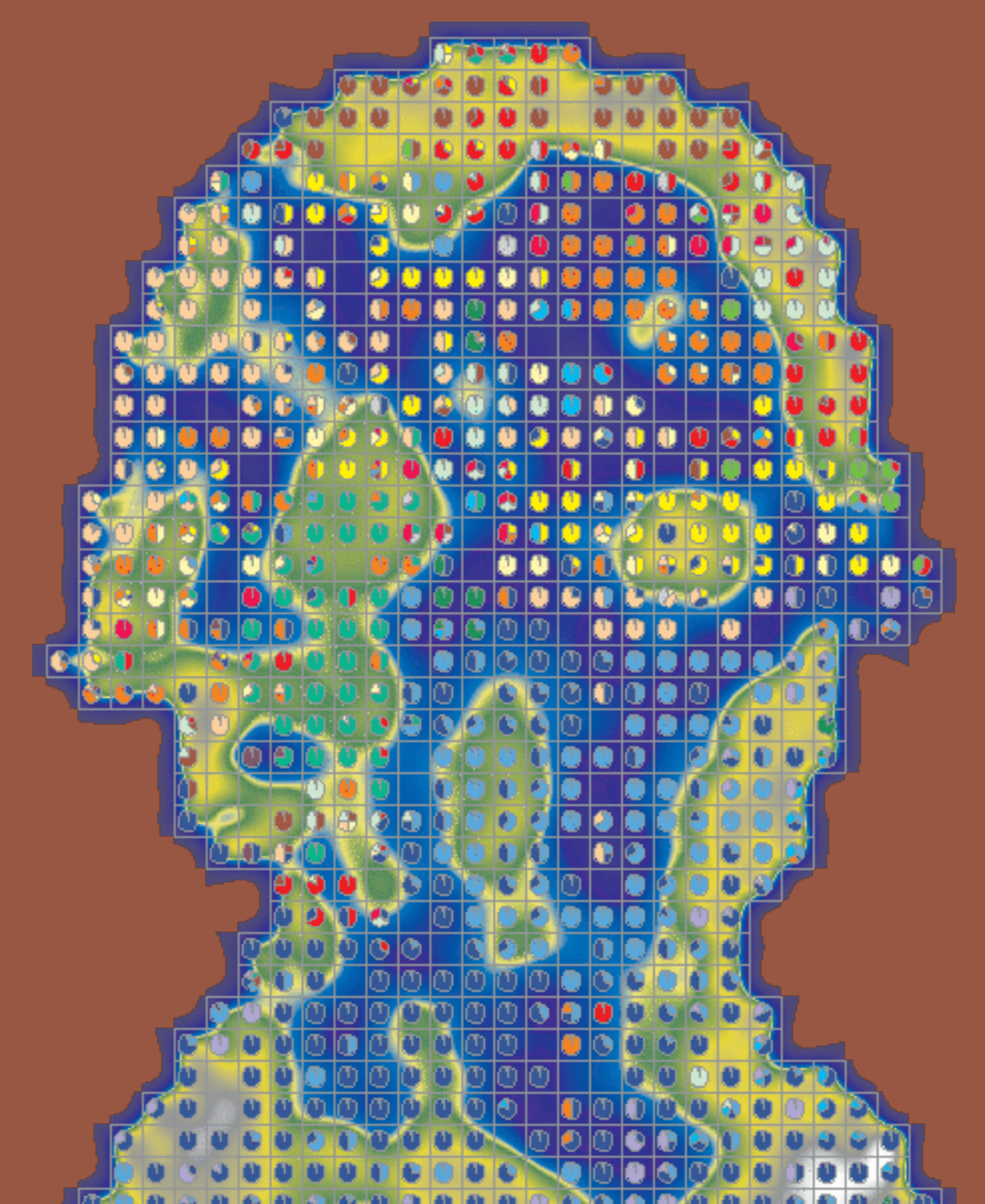
## Data Collection

- Homogenous music collection
- Complete works of the composer Wolfgang Amadeus Mozart.
- 2.442 tracks of different genres as Operas, Symphonies & Sonatas.
- Manually classified into 17 categories
- class information used to enhance the provided visualizations.

Symphonies	Concertos
String Ensembles	Keyboard Works
Sacred Works	Operas
Serenades	Divertimenti
Dances	Canons
Songs	Concert Arias
Church Sonatas	Flute Quartets & Sonatas
Horn, Oboe, Clarinet Ensembles	Violin Sonatas
Piano Ensembles	



Smoothed Data Histograms



Smoothed Data Histograms & classes