

Codes for data archiving, interchange, and analysis

Music 253/CS 275A
Stanford University

Distinguishing features

- Neither *time* nor *space* is a dominant consideration
- Focus is on **repurposable data**, interoperability
- Examples
 - *Archiving*: canonical format that facilitates interoperability
 - *Interchange*: canonical format that is easily interpreted by sending and receiving systems whose formats may be unknown
 - *Analysis*: flexible format that can be modified to suit a range of needs (can sometimes be distilled from richer format)

Distinguishing features

- Neither *time* nor *space* is a dominant consideration
- *Environment* may be extensive; focus on interoperability
- Examples
 - *Archiving*: EsAC (monophonic), MuseData (polyphonic)
 - *Interchange*: MusicXML, MEI
 - *Analysis*: Humdrum Toolkit (main format = *kern*)

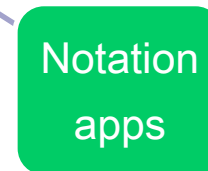
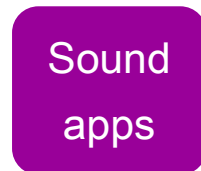
EsAC network model (1982-1994)

Folk music research

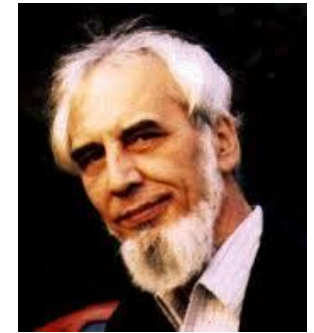
Developed in Essen, DE, by Helmut Schaffrath from the [Kiel/DVA archive](#) and other sources

esac-data.org

Often transcribed
by hand



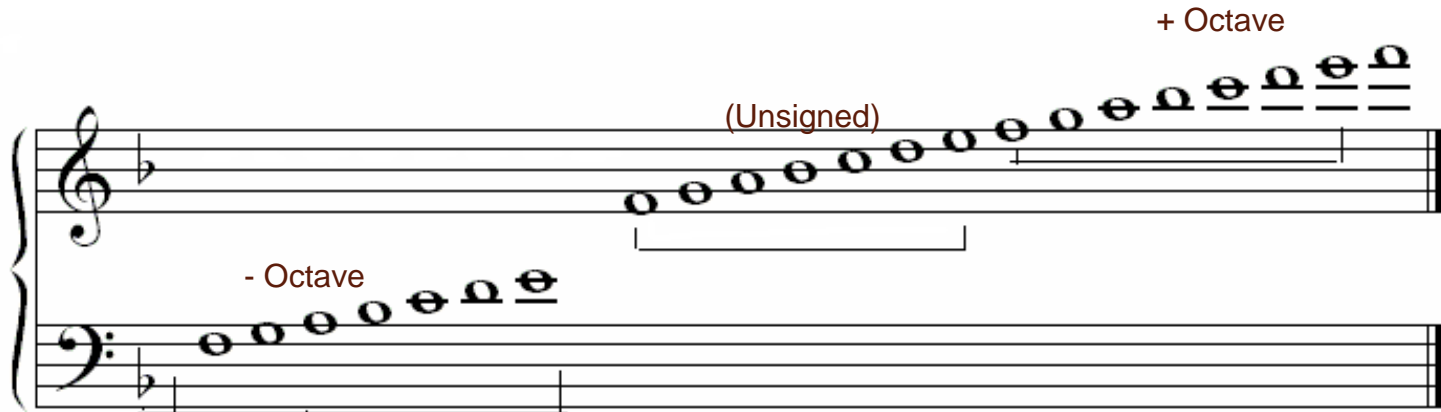
Mainly assigned to students



Above: H. Schaffrath (1942-1994)
L: Ewa Dahlig

Often simplified,
No text underlay

Essen Associative Code (EsAC)



□ Music rep. in general


- Pitch name
- Pitch inflection
- Octave name or number

□ EsAC specifics

- Pitch = number
- Inflection = symbol
- Octave = symbol

See <http://www.esac-data.org>

EsAC code vs other codes



ESAC: +1 +3 +5 +3++1_+5 +3 +2 +1 +6_ +4 +2 +1 7 +3 +2 +5 +4 +2#_+3_

a JIANPU: 1 3 5 3 1 5 3 2 4 6 4 2 1 7 3 2 5 4 #2 3

b DARMS1: 26E 28E 30E 28E 33Q 30E 28E (etc.)

c DARMS2: 6E 8E 10E 8E 13Q 10E 8E (etc.)

d SCORE: c5/e/w/ g/e/c6/g5/e/w/ d/f/ a/ f/ d/ w (etc.)
ex4/ q/ex4/....

e MTeX: \a 5\a 7 : \a9\a7\v12\a9\a7\% (etc.)

Mozart trio (EsAC with 5 data translations

<http://esac-data.org/>

<http://kern.humdrum.org/search?s=t&keyword=essen&type=Text>

EsAC: Essen Folksong Collection

- Monophonic music (8500 songs)
- Purposes
 - Archiving
 - Comparing versions
 - Teaching
 - Sound output

The image shows three staves of musical notation. The first staff is in 3/4 time and contains a melody with a key signature of one sharp (F#). Below the first staff is a box containing the rhythmic notation: +1 +3 +5 +3 ++1_ +5 +3 +2 +4 +6_ +4+2 +1 7 +3 +2 +5 +4 +2#_ +3_ . The second and third staves are in 3/4 time and contain a melody with a key signature of one flat (Bb). Below the second staff is a box containing the rhythmic notation: 1_ 3_ 5_ 3_ +1_ 5_ 6_ 5_ +1_ 5_ 6_ 5_ 5_ 4_ 3_ 3_ 2_ 0_ . Below the third staff is a box containing the rhythmic notation: 1_ 3_ 5_ 3_ +1_ 6_ 5_ 3_ 3_ 5_ 4_ 2_ 5_ 5_ 3_ .

Pitch and duration uncoupled

EsAC: Essen Folksong Collection

□ Monophonic music (8500 songs)

□ Purposes

- Archiving
- Comparing versions
- Teaching
- Sound output

□ Contributions

- Earliest model of computer analysis (Leppig, 1987)

Three staves of musical notation in 3/4 time. The first staff has a treble clef and a key signature of one sharp (F#). Below the notes are numerical annotations: +1 +3 +5 +3 ++1_ +5 +3 +2 +4 +6_ +4 +2 +1 7 +3 +2 +5 +4 +2#_ +3_ . The second and third staves have similar annotations: 1_ 3_ 5_ 3_ +1_ 5_ 6_ 5_ +1_ 5_ 6_ 5_ 5_ 4_ 3_ 3_ 2_ 0_ and 1_ 3_ 5_ 3_ +1_ 6_ 5_ 3_ 3_ 5_ 4_ 2_ 5_ 5_ 3_ .

Pitch and duration uncoupled

First lines Mozart

Mozart B0397 E0699A

R: nearest matches for Mozart trio

Sample EsAC record

Schloss in Oesterreich Es ligt ein schlos in Ostereich,

F [BALLADE

CUT [Schloss in Oesterreich

Es ligt ein schlos in Ostereich,]

CNR [das ist gar wol erbawet]

REG [Mitteleuropa, Deutschland]

SRC [1, S. 250

1549 gedruckt in Nuernberg]

KEY [Q0024A 08 F FREI]

MEL [1_ 1_2_3_4_ 5_3_1_0_

1_ 3_4_5_1_ 1_-7-6-7_1_-6_ -5_0_

5_ 5_5_6_.56_ 5_4_3_0_

6_ 5_2_3_1_ -7_1_2_3_ 212_ 1_ //] >>

FCT [Ballade, Gefangenschaft, Hinrichtung, Tod, Vergeltung]

CMT [Kleinere Melodievarianten aus anderen Quellen abgedruckt.

Refrainartiges Anhaengsel an der letzten Zeile.]



EsAC: Essen Folksong Collection

- Contributions
 - Earliest model of computer analysis (Leppig, 1987)

□ Similarity ratings

R: nearest matches for
Mozart trio

First lines Mozart

Mozart 

B0397 

E0699A 

The image displays three musical staves in treble clef with a key signature of one sharp (F#) and a 3/4 time signature. The first staff is labeled 'Mozart' and shows the first line of a piece. The second staff is labeled 'B0397' and the third is labeled 'E0699A'. Both B0397 and E0699A show a high degree of similarity to the Mozart piece, with nearly identical melodic lines.

EsAC: Essen Folksong Collection

- Similarity ratings
- Prioritizing features of motion
 - Contour
 - Direction
 - Intervallic movement
 - Durational change
 - Melodic structure

R: nearest matches for
Mozart trio

First lines Mozart

Mozart 

B0397 

E0699A 

The image displays three musical staves in treble clef with a key signature of one sharp (F#). The top staff is labeled 'Mozart' and 'First lines Mozart', showing a melody in 3/4 time. The middle staff is labeled 'B0397' and the bottom staff is labeled 'E0699A'. Both B0397 and E0699A show a melody that closely matches the contour and intervallic movement of the Mozart piece, illustrating the concept of nearest matches.