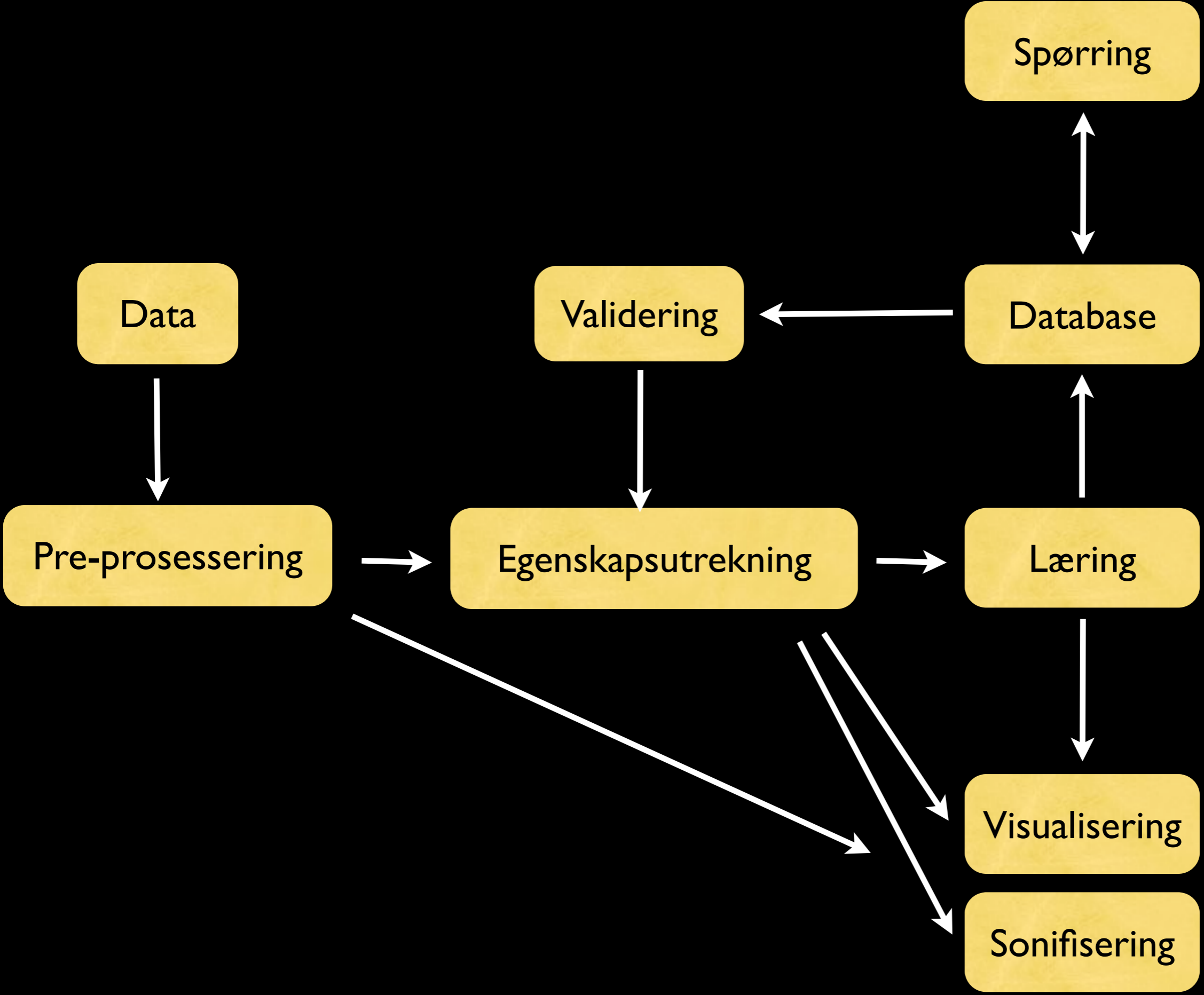


Maskinl ering

Alexander Refsum Jensenius



Supervised learning
Unsupervised learning
Semi-supervised learning
Reinforcement learning
Transduction
Evolution

Decision tree learning
Association rule learning
Artificial neural networks
Genetic programming
Inductive logic programming
Support vector machines
Clustering
Bayesian networks
Reinforcement learning

Resultat

Pattern recognition

Classification

Similarity

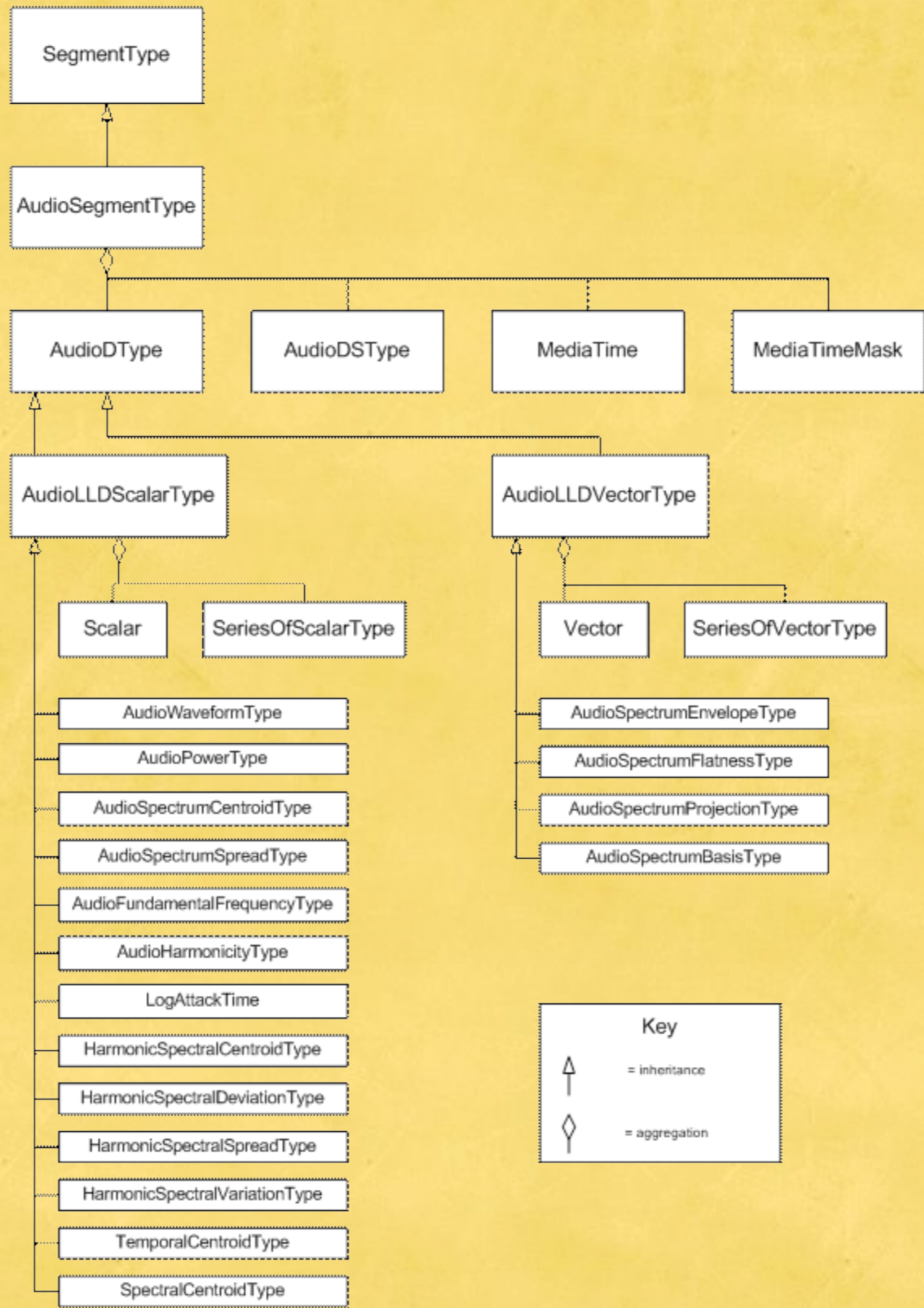
Prediction

...

MPEG-7

17 descriptors:

- **Basic:** Instantaneous waveform and power values
- **Basic spectral:** Log-frequency power spectrum and spectral features (for e.g. spectral centroid, spectral spread, spectral flatness)
- **Signal parameters:** fundamental frequency and harmonicity of signals
- **Temporal Timbral:** Log attack time and temporal centroid
- **Spectral Timbral:** specialized spectral features in a linear frequency space...
- **Spectral basis representations:** a number of features used in conjunction for sound recognition for projections into a low-dimensional space.





MUSIC
DNA

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the evolution of music continues



MusicDNA™ Box

intelligent rich media delivery

MusicDNA™ Box is a smart media extension of standard audio code delivering a total digital music entertainment experience.



MusicDNA™ – the future of music

The next fundamental transition in digital music will be based on *richer metadata* and true metadata *portability*, improving the *consumer music experience* and providing significant new revenue opportunities for the entire music industry. **MusicDNA™** represents a significant step in the evolution of the digital music experience.

With **MusicDNA™**, BACH is delivering a new metadata future for digital music that is open, compatible, rich, and portable, seamlessly implemented via the open MPEG-7 format.

Statistikk

Mean: the average along frames

Std: the standard deviation along frames

Slope: the linear slope of the trend along frames, i.e. the derivative of the line that would best fit the curve.

PeriodFreq: the frequency (in Hz.) of the maximal periodicity detected in the frame-by-frame evolution of the values, estimated through the computation of the autocorrelation sequence.

PeriodAmp: the normalized amplitude of that main periodicity, i.e., such that the autocorrelation at zero lag is identically 1.0.

PeriodEntropy: the Shannon entropy of the autocorrelation function (cf. mirentropy).

Standardavvik

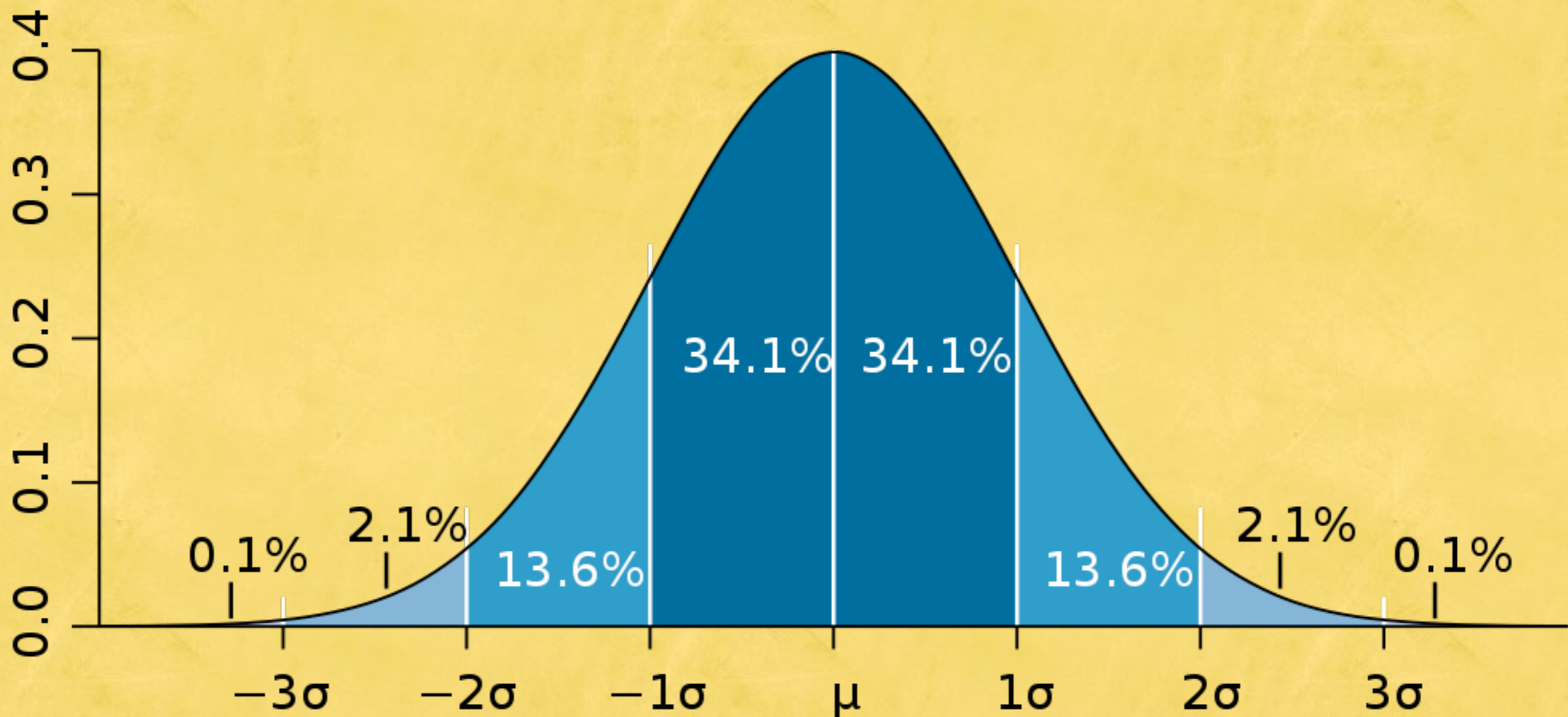
$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu)^2}$$

2, 4, 4, 4, 5, 5, 7, 9

$$\frac{2 + 4 + 4 + 4 + 5 + 5 + 7 + 9}{8} = 5$$

$$\begin{array}{ll} (2 - 5)^2 = (-3)^2 = 9 & (5 - 5)^2 = 0^2 = 0 \\ (4 - 5)^2 = (-1)^2 = 1 & (5 - 5)^2 = 0^2 = 0 \\ (4 - 5)^2 = (-1)^2 = 1 & (7 - 5)^2 = 2^2 = 4 \\ (4 - 5)^2 = (-1)^2 = 1 & (9 - 5)^2 = 4^2 = 16 \end{array}$$

$$\sqrt{\frac{9 + 1 + 1 + 1 + 0 + 0 + 4 + 16}{8}} = 2$$



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