

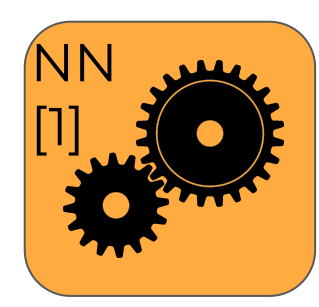
Concept-Based Techniques for “Musicologist-friendly” Explanations in a Deep Music Classifier

Francesco Foscarin*¹, Katharina Hoedt*¹, Verena Praher*¹, Arthur Flexer¹, Gerhard Widmer^{1,2}
{firstname}.{lastname}@jku.at

¹ Institute of Computational Perception, Johannes Kepler University Linz, Austria
² LIT AI Lab, Linz Institute of Technology, Austria
* equal contribution



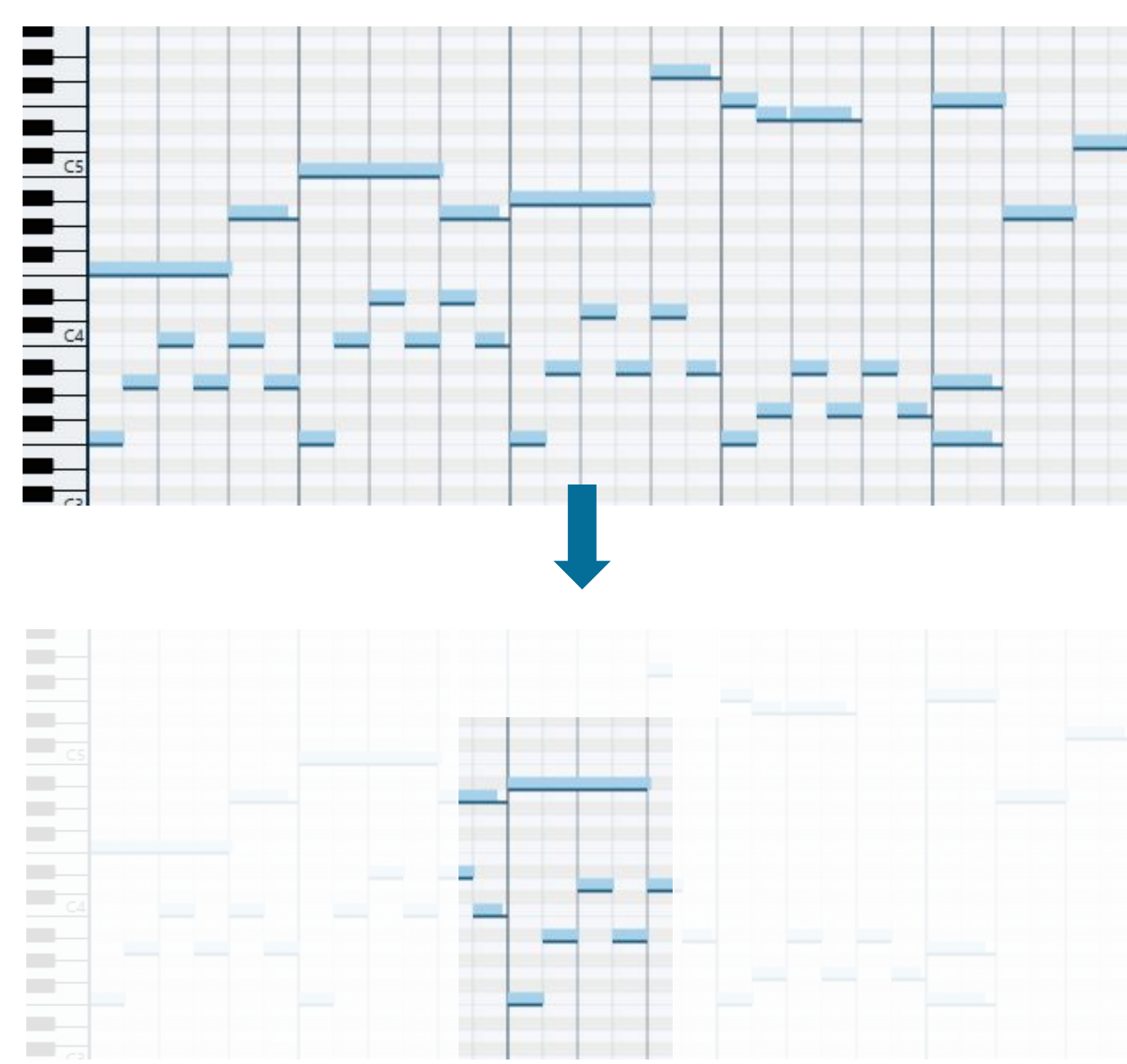
Why do we need explanations?



Mozart? Beethoven?

Why?

‘Standard’ Explainers...



How do we talk about music?

Alberti Bass

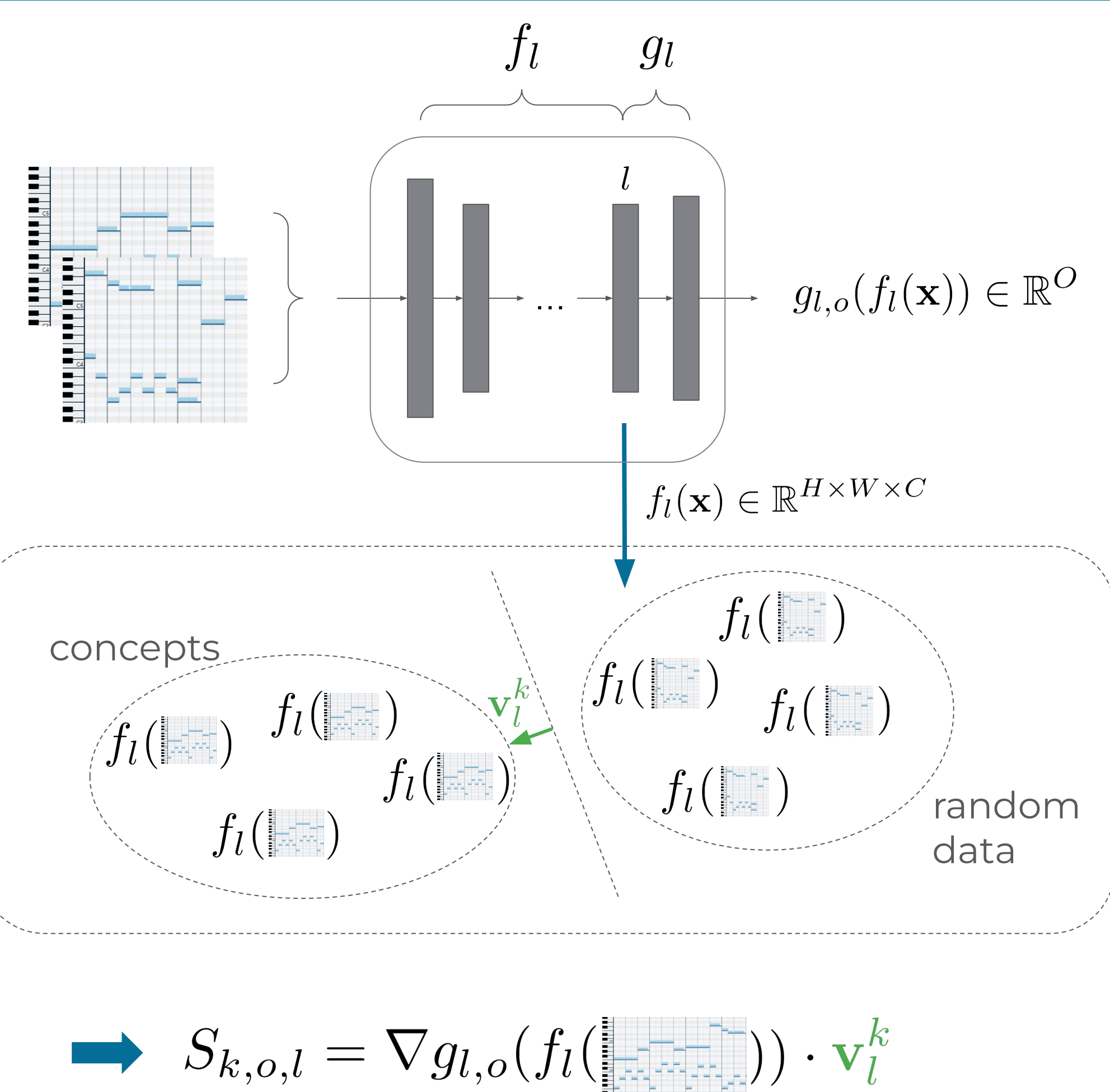
Melody with jumps

Difficult to play

Staccato

Contrapuntal Texture

TCAV [2]



Step by Step

Supervised

1. Collect (concept) datasets
2. Compute **CAVs** v_l^k
3. Compute Conceptual Sensitivities $S_{k,o,l}$
4. Accumulate to TCAV score:

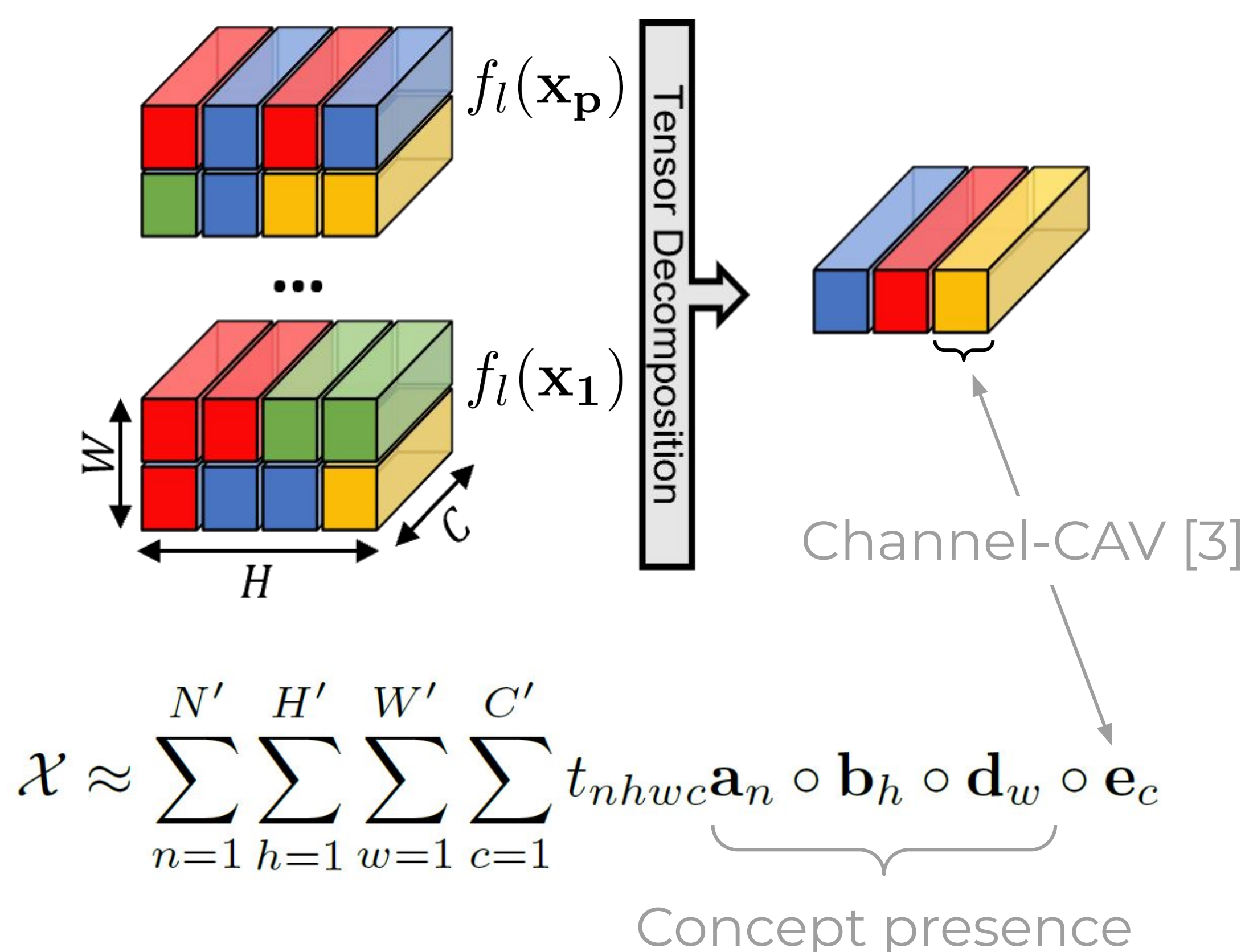
$$TCAV = \frac{|\{x \in X_o : S_{k,o,l}(x) > 0\}|}{|X_o|}$$

But: we still do **not** know what system relies on
We could have to try out countless concepts!

What does this classifier use?

	Alberti bass	Difficult-to-play	Contrap. texture
Bach	+	-	+
Scarlatti			
Haydn	+	-	
Mozart	+	-	+
Beethoven	+		
Schubert			-
Chopin	-		-
Schumann		+	
Liszt	-	+	-
Brahms	+		
Debussy	-		-
Scriabin	-	+	
Rachmaninoff	-	+	

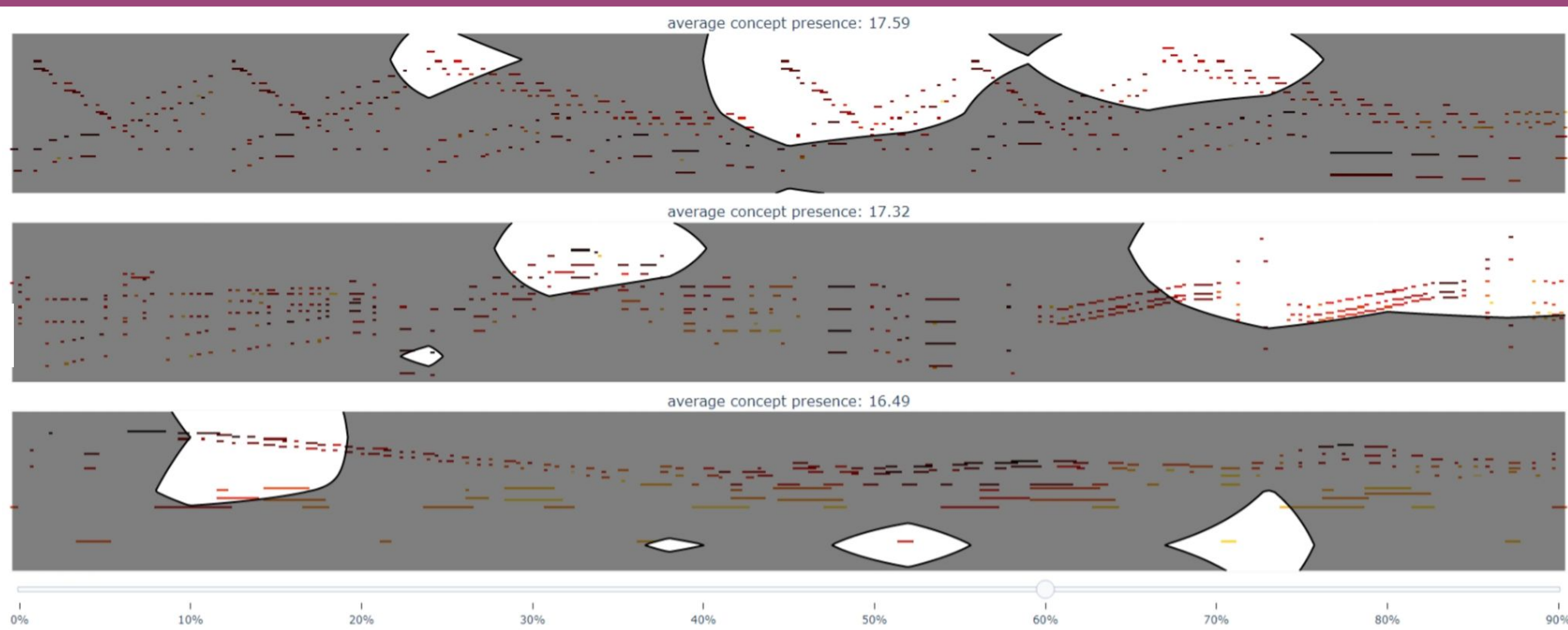
Non-Negative Tensor Decomposition



C' concepts produced.

Human interpretation of concepts (Bach vs Chopin)

Unsupervised



Excerpts with highest concept presence (for one of the produced concepts).