NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

School of Computer Science and Engineering
College of Engineering

Music Visualisation

A New Approach to Timbre Visualisation

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Project Objectives:

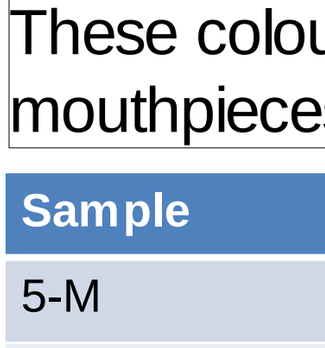
This project aims to create a standard conversion for instrument timbre to colour. Timbre is one of the most esoteric qualities of sound and lacks an existing means of quantification, instead typically being described with subjective words such as "bright", "warm", "dark" or "mellow". Timbre can be extracted from the spectral characteristics of an audio input. It was observed that a faster attack time is associated more with yellow, and a higher spectral centroid is associated more with red. These audio characteristics were extracted from an audio input, run though a k-nearest neighbours algorithm, and compared with the closest benchmark to produce a resulting colour representing the timbre of the audio. The following four colour modification approaches were used.

Visualisation 1	Visualisation 2	Visualisation 3	Visualisation 4
Pre-selected colour			Colour map
Spectral centroid			
	Spectral centroid and attack		
Attack			
Linear		Exponential	

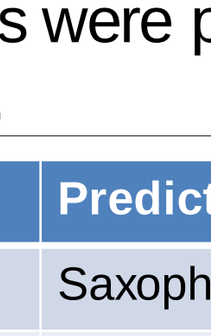
These colours were produced from the same excerpt played on different saxophone mouthpieces.

Sample	Prediction	Visualised 1	Visualised 2	Visualised 3	Visualised 4
5-M	Saxophone				
5-RD	Saxophone				
6-M	Saxophone				
7-M	Saxophone				
C-R	Saxophone				
M-R	Saxophone				
M-RD	Saxophone				

Mouthpieces: 5, 6, 7, C, M

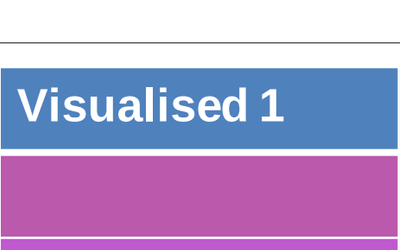


Hard Rubber



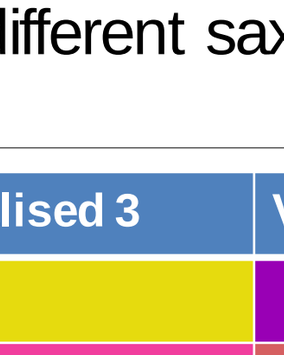
Classic

Metal

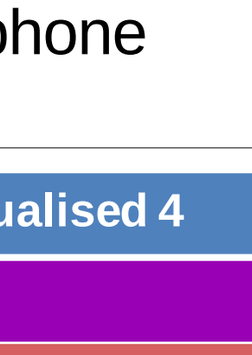


Ligatures; M, R, RD

Metal



Leather



Dark Leather