

## Downloading sounds

I was able to download 20 sounds of each instrument below with the following parameters:

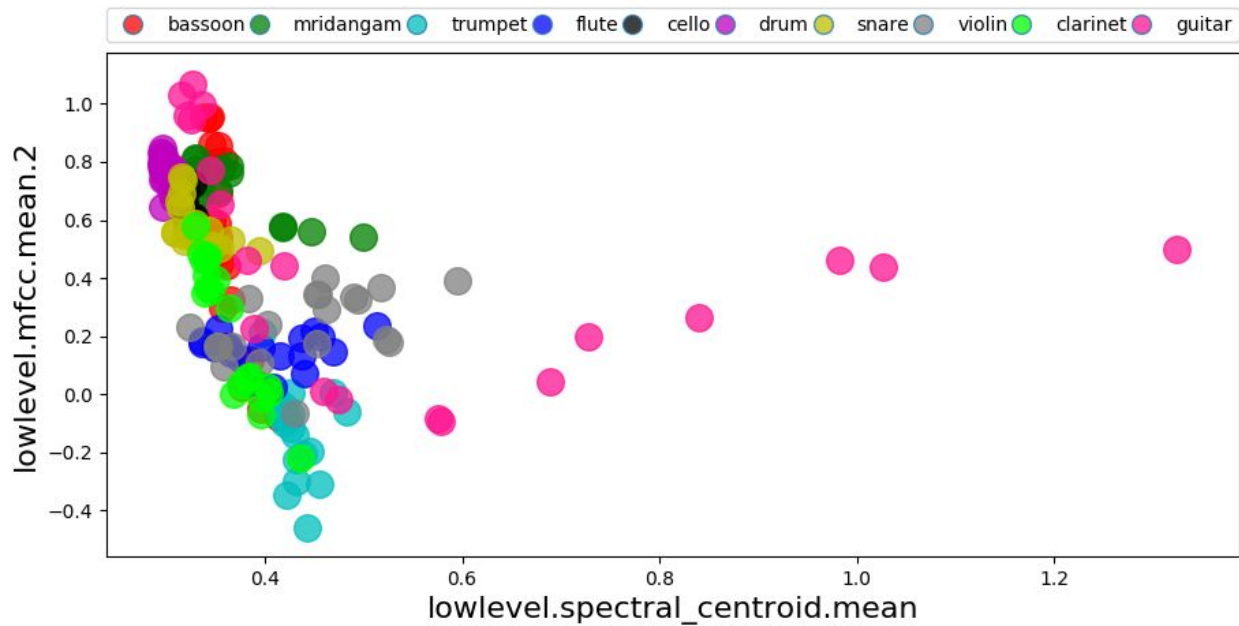
Instrument	Parameters
violin	tag='single-note' duration=(1,10)
guitar	
bassoon	
trumpet	
clarinet	
cello	
snare	
drum	
flute	
mridangam	tag='mridangam-stroke-dataset' duration=(1,10)

I wasn't able to find more than a couple of sounds for daluo, xiaoluo, and naobo, regardless of the query in freesound.

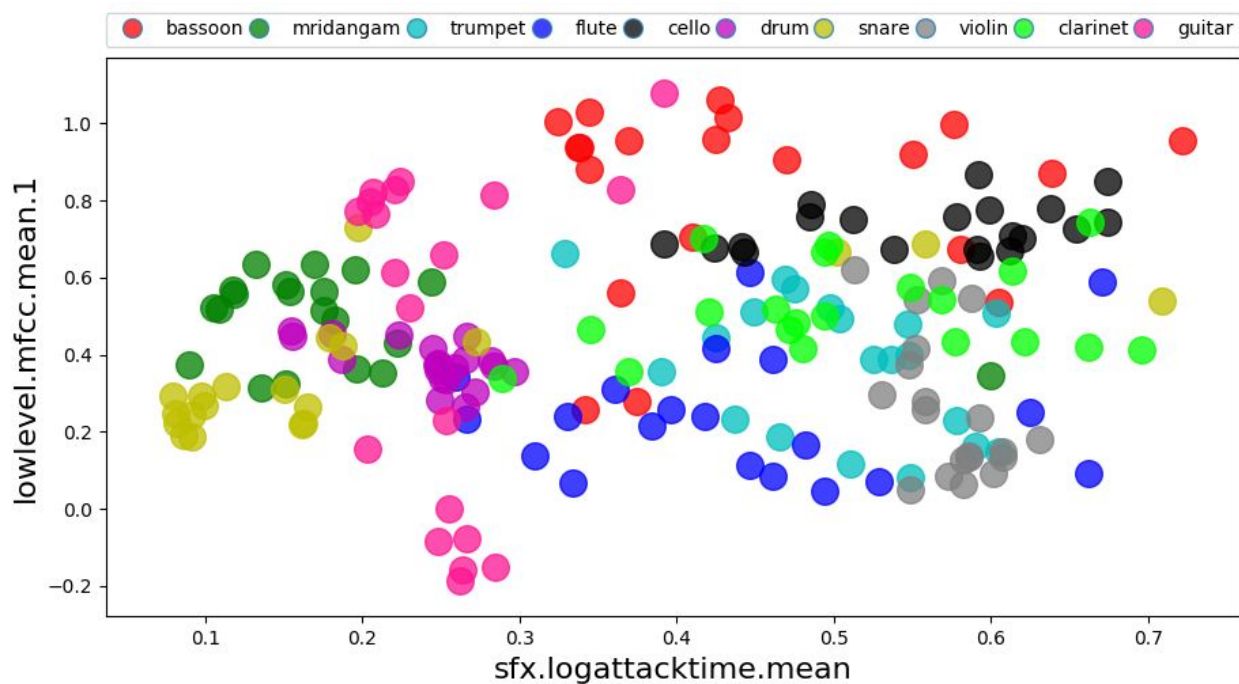
The URLs to the sounds are in the last section of the document.

## Baseline clustering performance

First, using a loop, I plotted all the possible combinations of descriptors to get a rough idea of which could be the best to choose. As expected, none of them did a particularly good grouping. Here is an example of a combination that performed particularly poor (even if the colorful plot is beautiful!):



Here's one that was better, at least for some instruments (snare, mridangam, violin):



One interesting thing to note is that **some classes of sounds were frequently plotted in the same vicinity** with different combinations of descriptors. For example, snare, mridangam, guitar, and drum (all percussion) were close to each other; trump, flute, clarinet, and (surprise) violin (mostly wind) were also around the same area. So, even if not perfect, the plot gives a good idea of which instruments sound similar.

On to the k-means clustering, I used the descriptors from the plot above (mffc.mean.1 and logattacktime) and I got an **accuracy of 54.5%**; the instruments that were misclassified were the ones in the groups I mentioned in the previous paragraph. Then, with another relative good pair of descriptors, logattacktime and dissonance, I got an accuracy of 52.5%

## Sounds URLs

<https://freesound.org/search/?q=372669>  
<https://freesound.org/search/?q=372681>  
<https://freesound.org/search/?q=372670>  
<https://freesound.org/search/?q=372689>  
<https://freesound.org/search/?q=372684>  
<https://freesound.org/search/?q=372683>  
<https://freesound.org/search/?q=372680>  
<https://freesound.org/search/?q=372691>  
<https://freesound.org/search/?q=372672>  
<https://freesound.org/search/?q=372679>  
<https://freesound.org/search/?q=372668>  
<https://freesound.org/search/?q=372682>  
<https://freesound.org/search/?q=372676>  
<https://freesound.org/search/?q=372667>  
<https://freesound.org/search/?q=372666>  
<https://freesound.org/search/?q=372685>  
<https://freesound.org/search/?q=372664>  
<https://freesound.org/search/?q=372677>  
<https://freesound.org/search/?q=372678>  
<https://freesound.org/search/?q=372665>  
<https://freesound.org/search/?q=230399>  
<https://freesound.org/search/?q=230299>  
<https://freesound.org/search/?q=230752>  
<https://freesound.org/search/?q=230261>  
<https://freesound.org/search/?q=230262>  
<https://freesound.org/search/?q=225356>  
<https://freesound.org/search/?q=230266>  
<https://freesound.org/search/?q=230263>  
<https://freesound.org/search/?q=230248>  
<https://freesound.org/search/?q=225358>  
<https://freesound.org/search/?q=228218>  
<https://freesound.org/search/?q=230735>  
<https://freesound.org/search/?q=228836>  
<https://freesound.org/search/?q=230228>  
<https://freesound.org/search/?q=228924>

<https://freesound.org/search/?q=230748>  
<https://freesound.org/search/?q=228837>  
<https://freesound.org/search/?q=230264>  
<https://freesound.org/search/?q=226632>  
<https://freesound.org/search/?q=230265>  
<https://freesound.org/search/?q=357360>  
<https://freesound.org/search/?q=357391>  
<https://freesound.org/search/?q=357336>  
<https://freesound.org/search/?q=357387>  
<https://freesound.org/search/?q=357361>  
<https://freesound.org/search/?q=357390>  
<https://freesound.org/search/?q=357388>  
<https://freesound.org/search/?q=357380>  
<https://freesound.org/search/?q=357365>  
<https://freesound.org/search/?q=357344>  
<https://freesound.org/search/?q=357389>  
<https://freesound.org/search/?q=357385>  
<https://freesound.org/search/?q=357363>  
<https://freesound.org/search/?q=357383>  
<https://freesound.org/search/?q=357351>  
<https://freesound.org/search/?q=357377>  
<https://freesound.org/search/?q=357386>  
<https://freesound.org/search/?q=357378>  
<https://freesound.org/search/?q=357364>  
<https://freesound.org/search/?q=357384>  
<https://freesound.org/search/?q=427566>  
<https://freesound.org/search/?q=427567>  
<https://freesound.org/search/?q=354435>  
<https://freesound.org/search/?q=354391>  
<https://freesound.org/search/?q=354397>  
<https://freesound.org/search/?q=354354>  
<https://freesound.org/search/?q=354433>  
<https://freesound.org/search/?q=354434>  
<https://freesound.org/search/?q=328727>  
<https://freesound.org/search/?q=354392>  
<https://freesound.org/search/?q=354375>  
<https://freesound.org/search/?q=354400>  
<https://freesound.org/search/?q=354367>  
<https://freesound.org/search/?q=354403>  
<https://freesound.org/search/?q=354440>  
<https://freesound.org/search/?q=354398>  
<https://freesound.org/search/?q=354387>  
<https://freesound.org/search/?q=354439>

<https://freesound.org/search/?q=354360>  
<https://freesound.org/search/?q=354413>  
<https://freesound.org/search/?q=246843>  
<https://freesound.org/search/?q=246827>  
<https://freesound.org/search/?q=257749>  
<https://freesound.org/search/?q=246837>  
<https://freesound.org/search/?q=246840>  
<https://freesound.org/search/?q=246830>  
<https://freesound.org/search/?q=246841>  
<https://freesound.org/search/?q=246844>  
<https://freesound.org/search/?q=246828>  
<https://freesound.org/search/?q=246842>  
<https://freesound.org/search/?q=246831>  
<https://freesound.org/search/?q=246826>  
<https://freesound.org/search/?q=246834>  
<https://freesound.org/search/?q=246838>  
<https://freesound.org/search/?q=246836>  
<https://freesound.org/search/?q=246845>  
<https://freesound.org/search/?q=257996>  
<https://freesound.org/search/?q=246829>  
<https://freesound.org/search/?q=246839>  
<https://freesound.org/search/?q=246832>  
<https://freesound.org/search/?q=375255>  
<https://freesound.org/search/?q=375261>  
<https://freesound.org/search/?q=375262>  
<https://freesound.org/search/?q=375249>  
<https://freesound.org/search/?q=375259>  
<https://freesound.org/search/?q=375254>  
<https://freesound.org/search/?q=375279>  
<https://freesound.org/search/?q=375252>  
<https://freesound.org/search/?q=375275>  
<https://freesound.org/search/?q=375257>  
<https://freesound.org/search/?q=375258>  
<https://freesound.org/search/?q=375277>  
<https://freesound.org/search/?q=375276>  
<https://freesound.org/search/?q=375250>  
<https://freesound.org/search/?q=375256>  
<https://freesound.org/search/?q=375251>  
<https://freesound.org/search/?q=375280>  
<https://freesound.org/search/?q=375260>  
<https://freesound.org/search/?q=375278>  
<https://freesound.org/search/?q=375253>  
<https://freesound.org/search/?q=373488>

<https://freesound.org/search/?q=373472>  
<https://freesound.org/search/?q=375421>  
<https://freesound.org/search/?q=373487>  
<https://freesound.org/search/?q=373482>  
<https://freesound.org/search/?q=375395>  
<https://freesound.org/search/?q=373480>  
<https://freesound.org/search/?q=373473>  
<https://freesound.org/search/?q=373471>  
<https://freesound.org/search/?q=373479>  
<https://freesound.org/search/?q=373474>  
<https://freesound.org/search/?q=373481>  
<https://freesound.org/search/?q=373478>  
<https://freesound.org/search/?q=373484>  
<https://freesound.org/search/?q=373489>  
<https://freesound.org/search/?q=373483>  
<https://freesound.org/search/?q=375439>  
<https://freesound.org/search/?q=373475>  
<https://freesound.org/search/?q=373477>  
<https://freesound.org/search/?q=373470>  
<https://freesound.org/search/?q=355791>  
<https://freesound.org/search/?q=355831>  
<https://freesound.org/search/?q=355824>  
<https://freesound.org/search/?q=355786>  
<https://freesound.org/search/?q=355822>  
<https://freesound.org/search/?q=355807>  
<https://freesound.org/search/?q=355812>  
<https://freesound.org/search/?q=355878>  
<https://freesound.org/search/?q=355893>  
<https://freesound.org/search/?q=355830>  
<https://freesound.org/search/?q=355828>  
<https://freesound.org/search/?q=355896>  
<https://freesound.org/search/?q=355821>  
<https://freesound.org/search/?q=355827>  
<https://freesound.org/search/?q=355813>  
<https://freesound.org/search/?q=355777>  
<https://freesound.org/search/?q=355825>  
<https://freesound.org/search/?q=355897>  
<https://freesound.org/search/?q=355800>  
<https://freesound.org/search/?q=355899>  
<https://freesound.org/search/?q=249079>  
<https://freesound.org/search/?q=249093>  
<https://freesound.org/search/?q=249077>  
<https://freesound.org/search/?q=249089>

<https://freesound.org/search/?q=249090>  
<https://freesound.org/search/?q=249069>  
<https://freesound.org/search/?q=249099>  
<https://freesound.org/search/?q=249068>  
<https://freesound.org/search/?q=249076>  
<https://freesound.org/search/?q=249080>  
<https://freesound.org/search/?q=249070>  
<https://freesound.org/search/?q=249088>  
<https://freesound.org/search/?q=249092>  
<https://freesound.org/search/?q=249094>  
<https://freesound.org/search/?q=249075>  
<https://freesound.org/search/?q=249081>  
<https://freesound.org/search/?q=249091>  
<https://freesound.org/search/?q=249082>  
<https://freesound.org/search/?q=249078>  
<https://freesound.org/search/?q=249087>  
<https://freesound.org/search/?q=399471>  
<https://freesound.org/search/?q=399486>  
<https://freesound.org/search/?q=399468>  
<https://freesound.org/search/?q=52048>  
<https://freesound.org/search/?q=399478>  
<https://freesound.org/search/?q=399472>  
<https://freesound.org/search/?q=399470>  
<https://freesound.org/search/?q=399466>  
<https://freesound.org/search/?q=399490>  
<https://freesound.org/search/?q=399473>  
<https://freesound.org/search/?q=399483>  
<https://freesound.org/search/?q=110455>  
<https://freesound.org/search/?q=399481>  
<https://freesound.org/search/?q=91199>  
<https://freesound.org/search/?q=399469>  
<https://freesound.org/search/?q=399467>  
<https://freesound.org/search/?q=399484>  
<https://freesound.org/search/?q=399474>  
<https://freesound.org/search/?q=399479>  
<https://freesound.org/search/?q=399475>