10.07.2019
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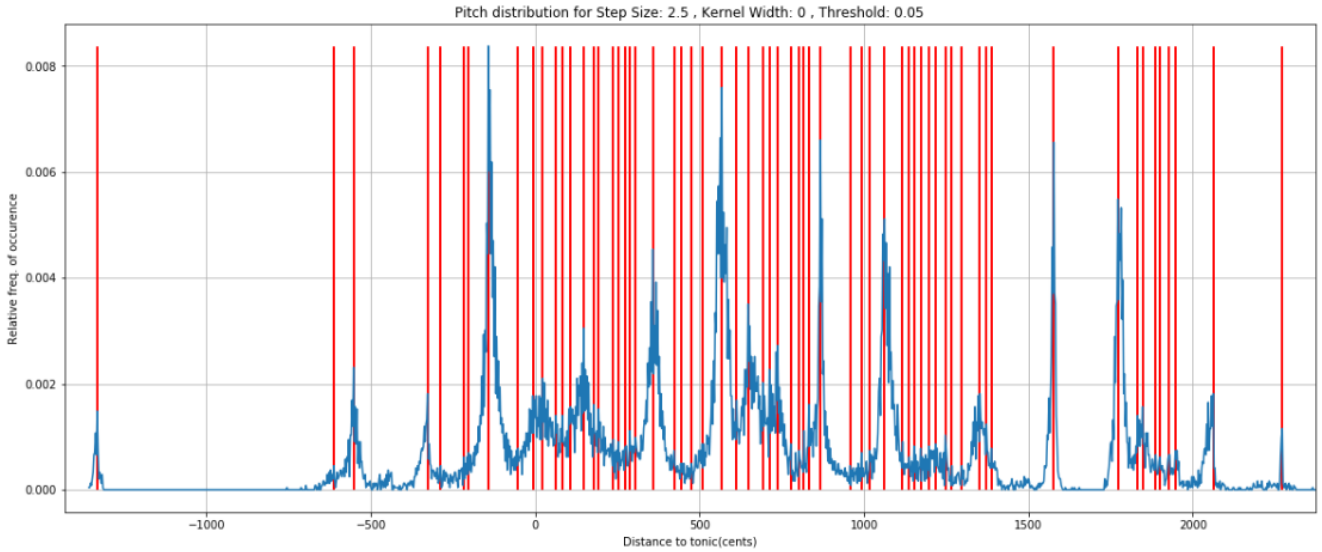
The pitch distribution computation from a pitch series and using the distribution for creating the pitch space are problematic for Turkish Makam Music.



As can be seen from the above graph, a peak picking algorithm with 5% threshold returns more perdeler than there are perdeler in a makam over 3 octaves . Some of the peaks here are false since:

- the parameters used in the pitch distribution extraction algorithm are not optimized
- the intervals in Turkish music are disregarded in peak picking.
- the recording is not monophonic (?),

Therefore, in order to accurately extract the pitch space from a pitch series, four parameters are of importance:

1. Step Size of the Pitch Distribution,
2. Kernel Width of the Pitch Distribution,
3. Threshold of the Peak Picking Algorithm,
4. Smallest distance between two tones in Turkish Music.

After plotting several combinations of step sizes and kernel widths, a step size of 2.5 and kernel width of 2.5 can be seen suitable because:

- increasing the kernel width smooths the distribution and this can result in the merging of two close but separate peaks. This can result in the loss of microtonality.
- Increasing the step size results in wider peaks and this can also be problematic for the loss of microtonality
- Moreover, some clear peaks in the distribution are not picked as we put a 5% threshold for peak picking. This can be seen from the graph above near the -500 cents. (I am not sure if this peak is a result of microtonality or not.)

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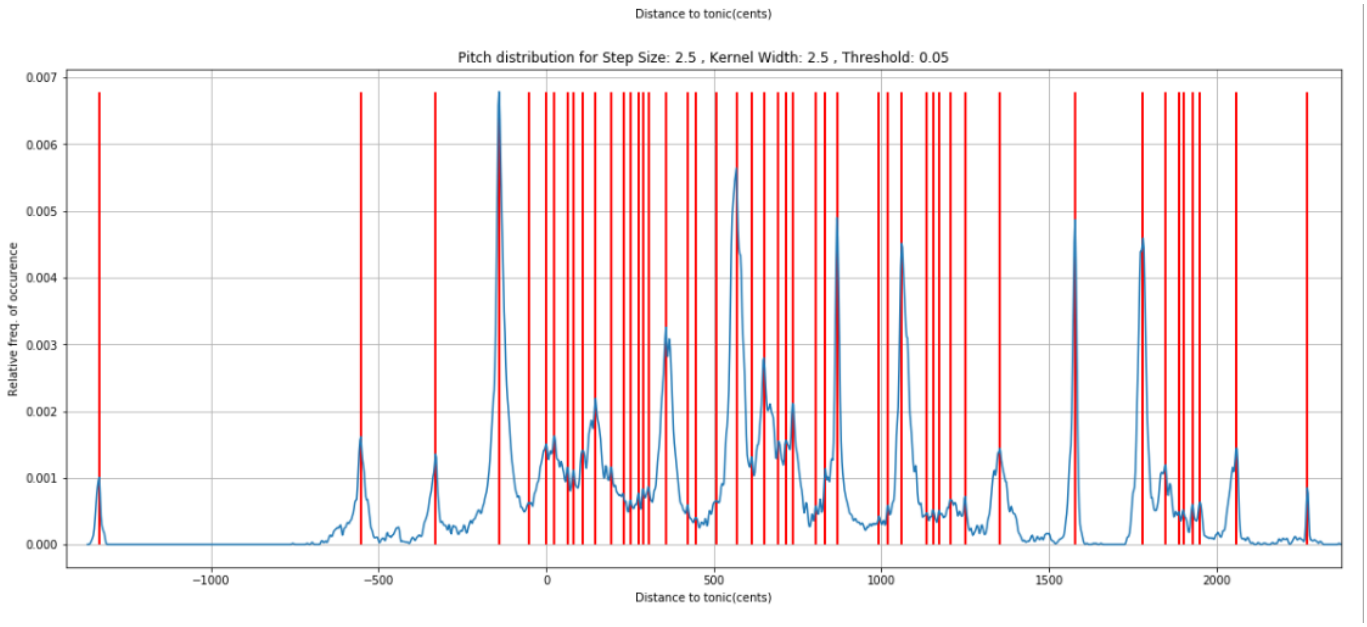
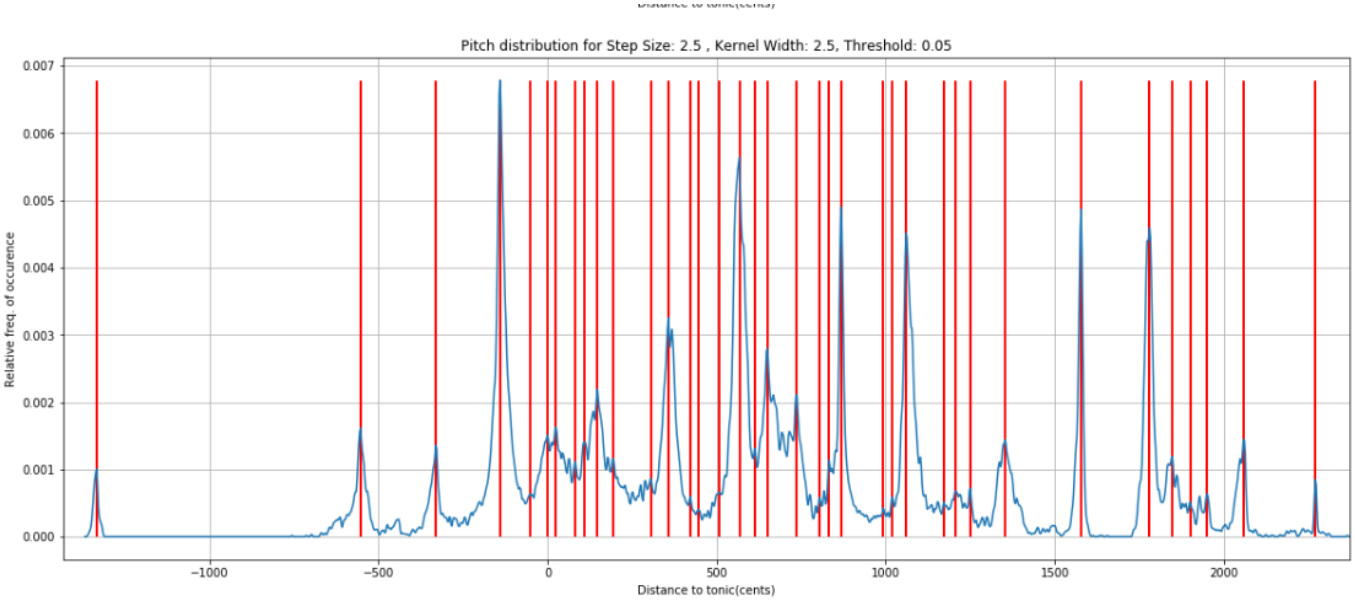


As can be seen from the above graph, a step size of 2.5 and a kernel width of 2.5 can pick all the apparent peaks. However, some of the adjacent peaks here are closer than 22,64 cents that is equivalent to 1 Hc. This is problematic since the smallest interval in Turkish Music is 1 Hc.

To combat this problem, a method called *komaValidator()* is defined which calculates the cents differences between each peak and in case of a difference smaller than a provided lower bound, it picks the larger peak. The algorithm iterates by user defined amounts. The result of the komaValidator for the above pitch distribution is given below.



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When we compare the two in close up,

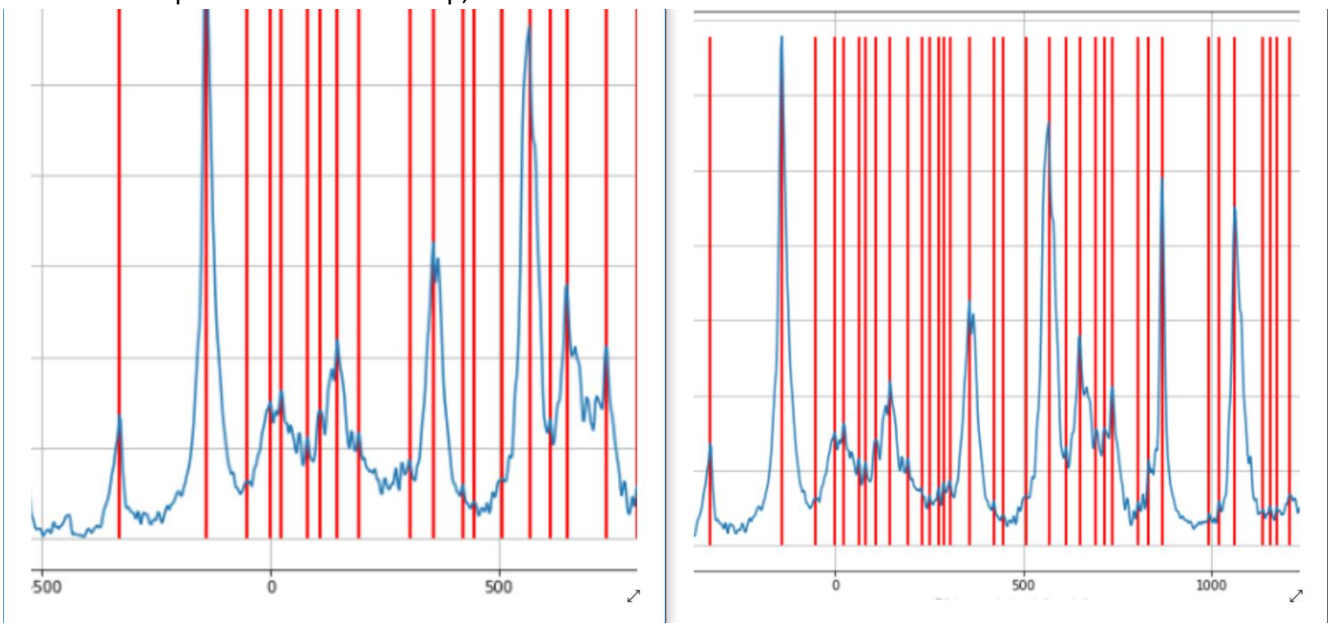
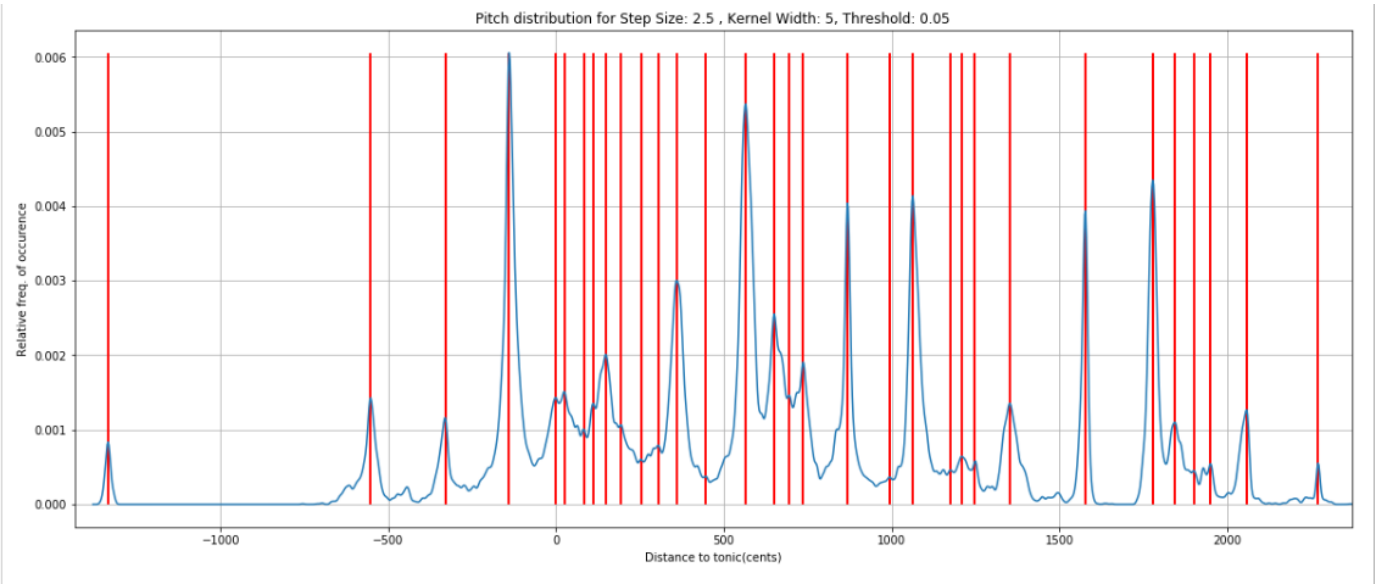


Figure 1 Koma Validated (left) vs non Validated (right)

Still, some peaks that are selected for koma validated distribution can be false.

Finally, a koma validated, with a step size of 2.5 and a kernel width of 5 pitch distribution is given below for comparison.



Question:

Overall, my question is, which peaks are true and which peaks are false, and how can I check the validity? I will use these perdeler while naming them in the pitchSace for the recordingsData.json.

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