

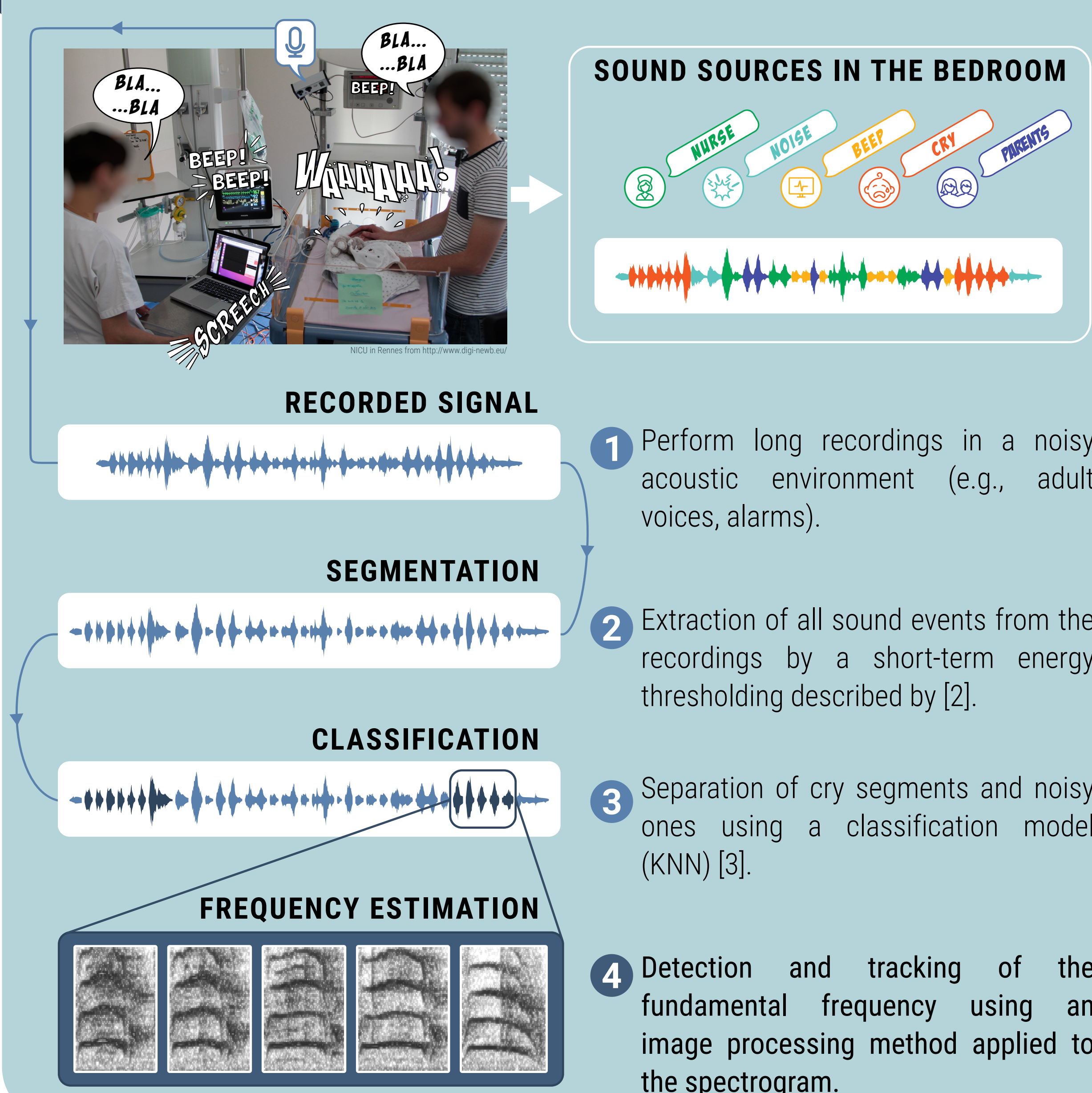
## BACKGROUND

Newborn cries have been widely studied in the literature and have been proven to be relevant for the detection of pathologies and for the assessment of the neurobehavioral development [1]. However, to date, solutions to automatize this analysis in care routine remain to be proposed.

### OBJECTIVE

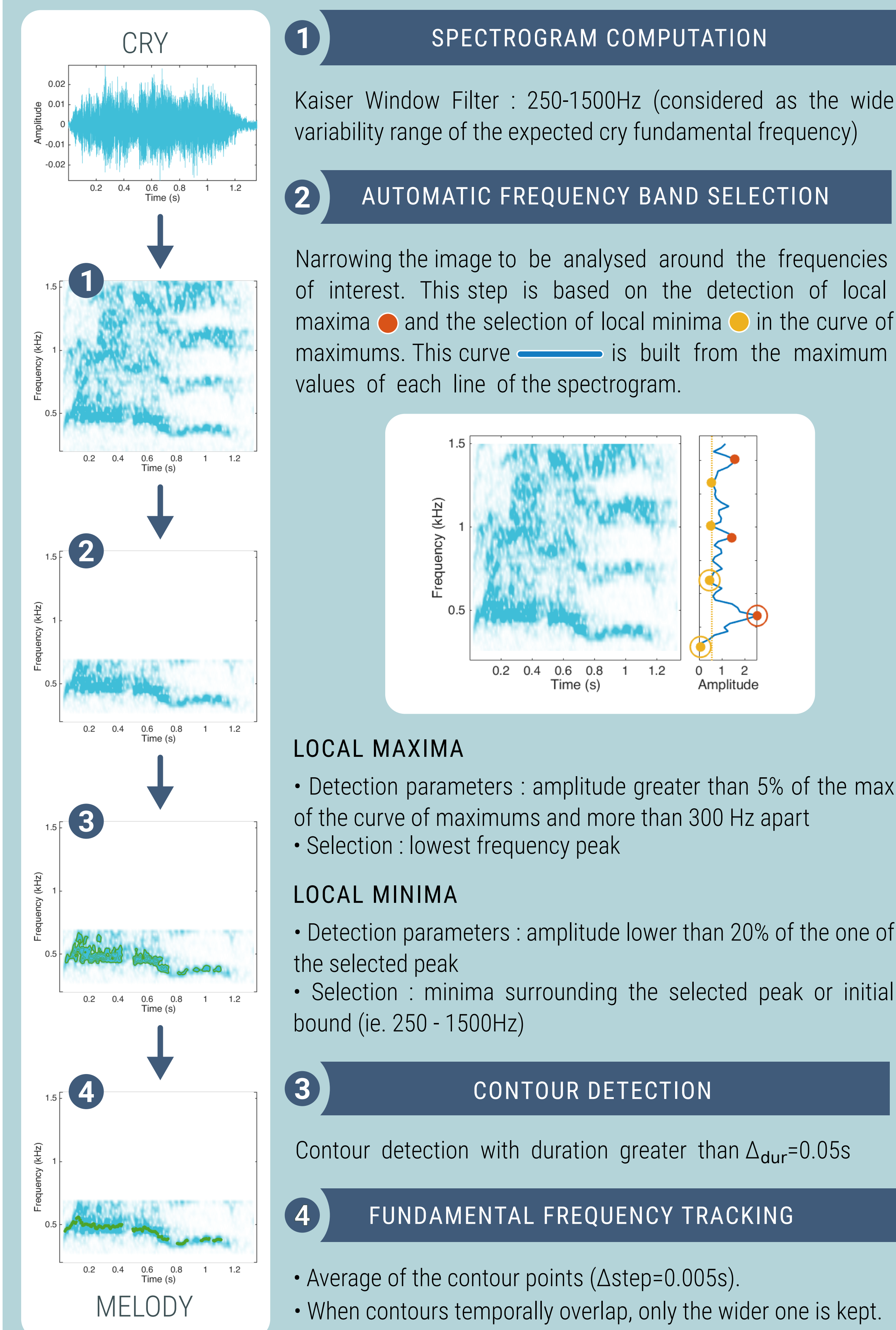
To automatically estimate newborn cries fundamental frequency and its evolution along a cry (also called melody), using an image processing method applied to the spectrogram.

## OVERVIEW



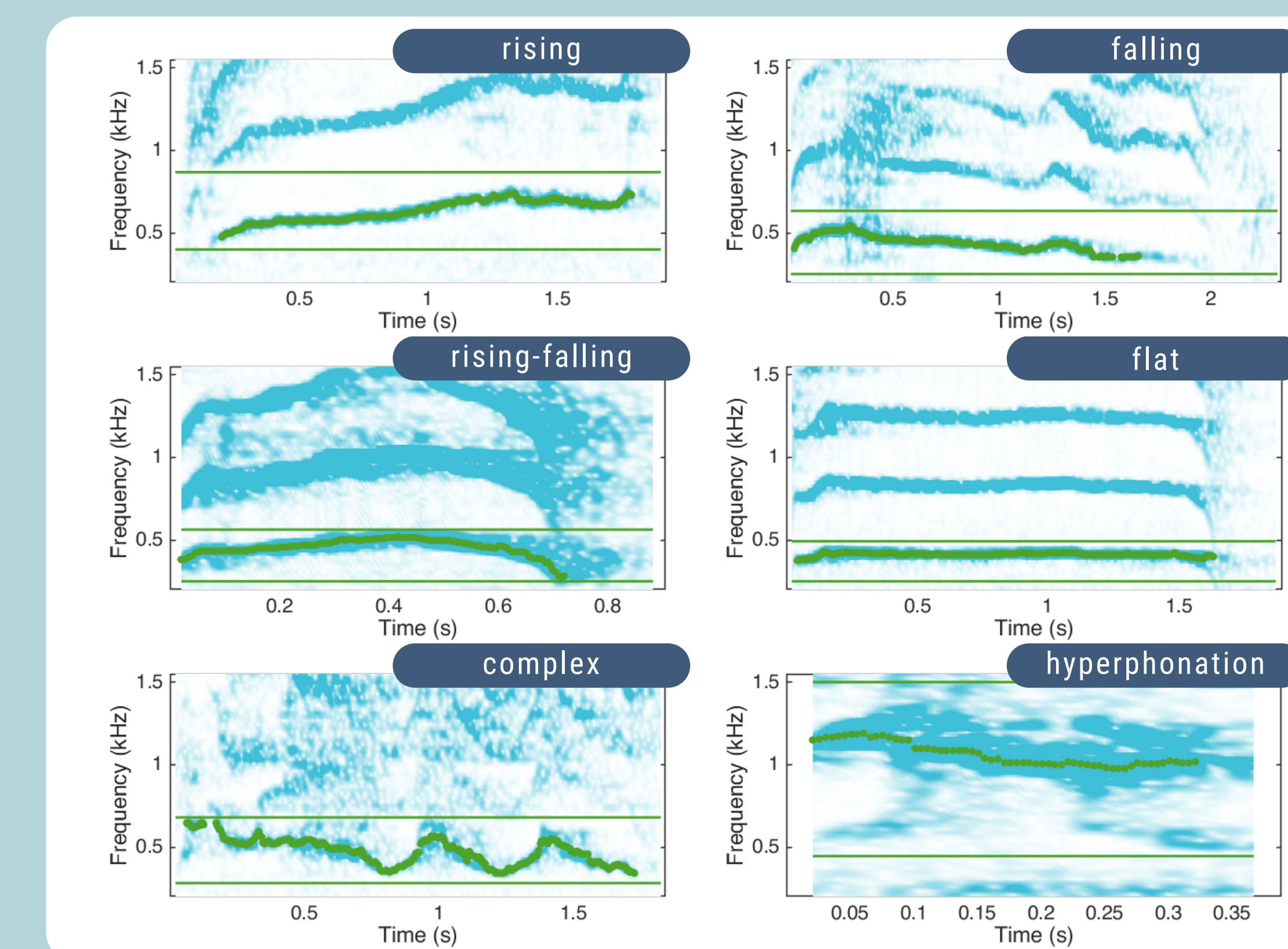
## METHOD

The estimation of the fundamental frequency of the audio segments considered as crying at the classification stage is based on 4 steps and uses a method based on spectrogram computation.



## RESULTS

Fundamental frequency tracking ●●●●● for five different melody shapes and for a hyperphonation cry. Horizontal lines — shows the frequency bands automatically detected, delimiting the area of research for the contour detection. The band is correctly located over the interesting area, not only for each type of cry but also for the hyperphonation cry, allowing a good tracking of the fundamental frequency



## CONCLUSION

Such a strategy has never been encountered in the processing of newborn cries. Nevertheless, the results showed that it can process all types of cries. Clinical study over a dataset of 20 hours with 14 babies allowed to automatically extract and estimate the fundamental frequency of almost 1890 cries [4]. However, a check with synthetic cries remains to be done to validate the method.

## REFERENCES

- [1] S. Cabon et al, *Physiol. Meas.* 40:02TR02, 2019.
- [2] S. Orlandi et al, *J BSPC*, 8:799-810, 2013.
- [3] S. Cabon, PhD thesis Univ Rennes 1, 2019.
- [4] B. Met-Montot et al, *EUSIPCO*, 1185-1189, 2020 .

## ACKNOWLEDGEMENTS

Results incorporated in this publication received funding from the European Union's Horizon 2020 research and innovation program under grant agreement N° 689260 (Digi-NewB project).