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Automatic extraction of infant vocalizations from one year home audio recordings

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Main objectives

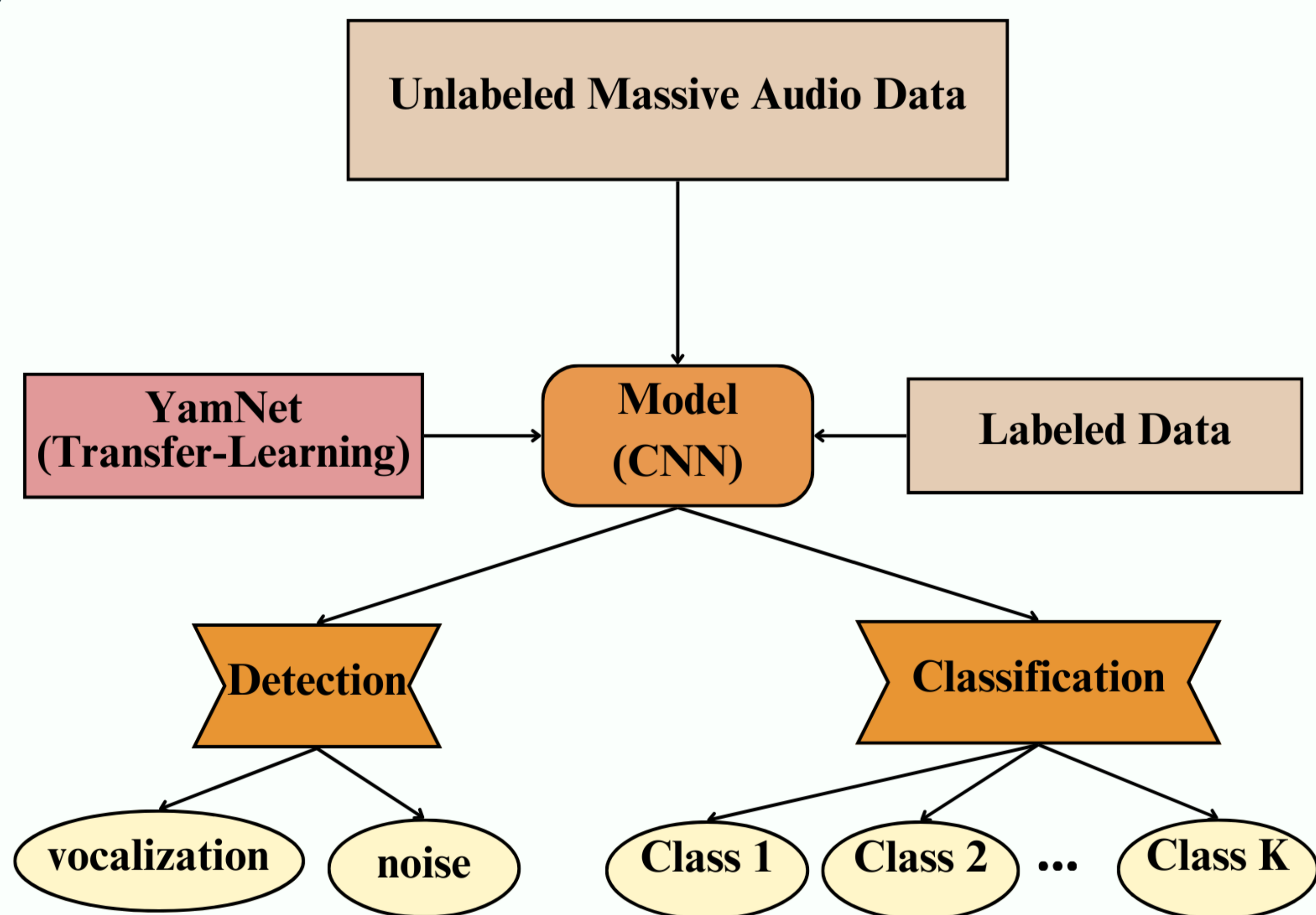
We propose an automatic data processing pipeline based on **deep neural network** that :

- **Extract vocalizations** from **large-scale natural audio recordings**
- **Classify** these **vocalizations**

Advantages

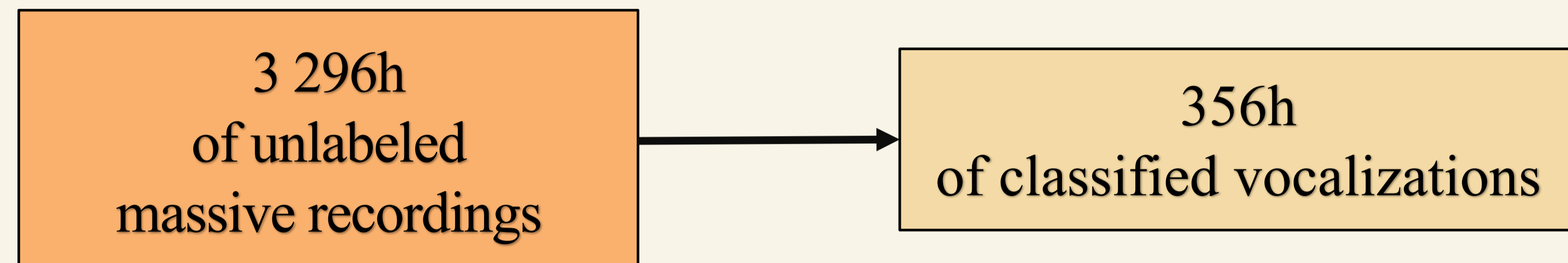
- **Automatic** rather than manual processing
- Do not require a **large amount** of labelled data
- **Robust** against noise

1) Algorithm: [1]



2) Data:

- 13 babies recorded in their first year of life



3) Performance: [1]

Detection:

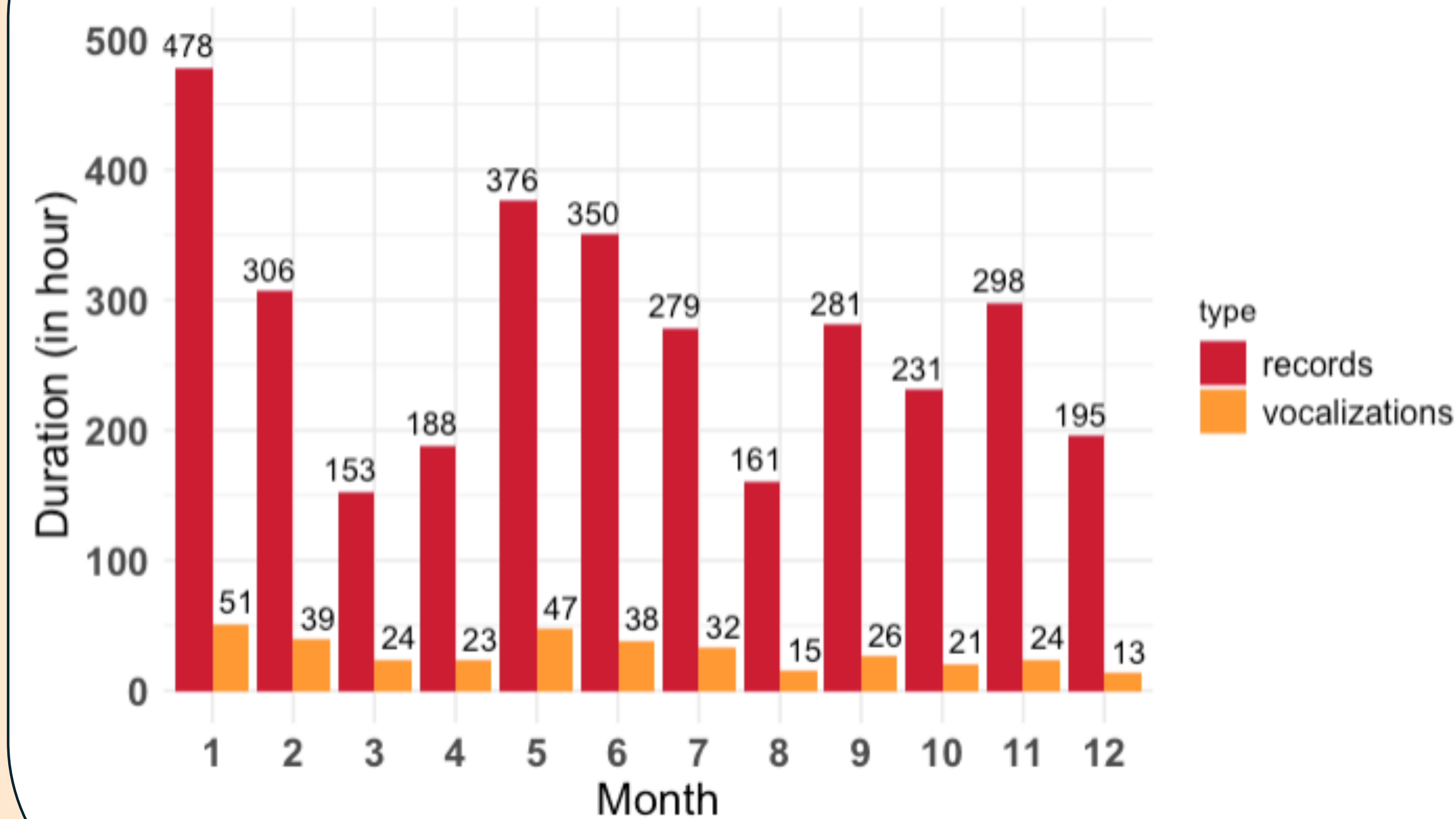
True Class	Predicted Class	
	Vocalization	Noise
Vocalization	100	0
Noise	0	100

Classification:

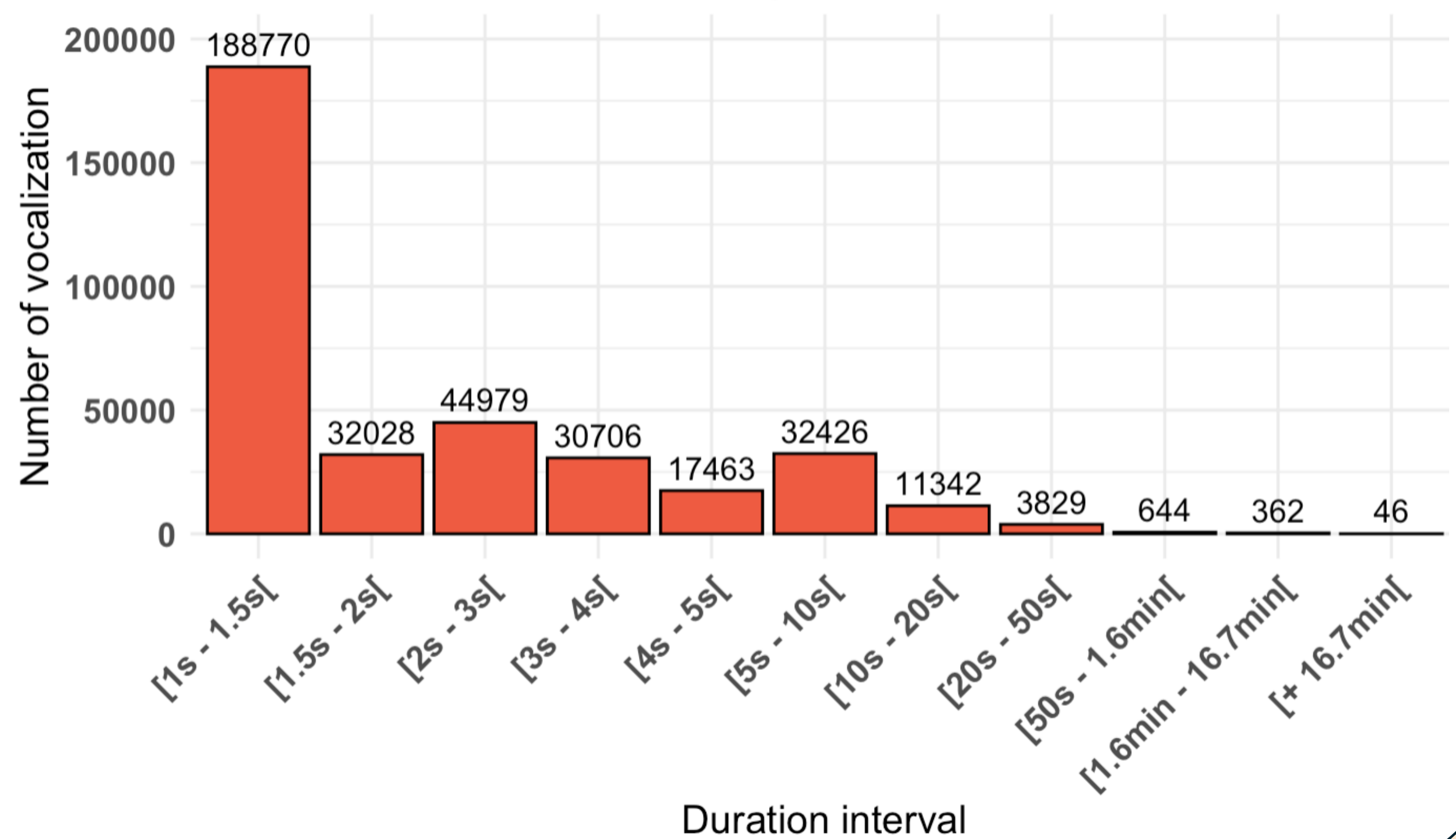
True Class	Predicted Class				
	Canonical	Crying	Junk	Laughing	No-Canonical
Canonical	46	16	11	10	18
Crying	15	44	11	13	17
Junk	19	6	51	9	15
Laughing	13	17	19	36	15
No-Canonical	20	19	24	9	29

4) Descriptive statistics:

Sum of records and vocalizations by month for all babies



Distribution of vocalizations by duration



Conclusion:

- In the **detection task**, the algorithm correctly discriminate between noise and vocalizations

Limitations:

- **Presence** of unlikely **long vocalizations**
- Ongoing improvements are necessary to improve the precision of the **detection task** and **classification task**.

References:

[1] Bonafos et al., (2023) Detecting human and non-human vocal productions in large scale audio recordings. [arXiv:2302.07640](https://arxiv.org/abs/2302.07640)