Leveraging Machine Learning Techniques for the Detection, Clustering, and Classification of Dolphin Bioacoustics

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Introduction

Recent advancements in machine learning (ML) provide powerful tools for analyzing complex data, making it an ideal approach to study dolphin bioacoustics. This research utilizes state-of-the-art ML techniques to dissect the nuanced soundscapes of dolphin communications, aiming to detect, classify, and uncover patterns within these sounds. By employing a combination of supervised and unsupervised learning methods—including Convolutional Neural Networks (CNNs) for feature extraction and Support Vector Machines (SVMs) for classification—this study seeks to achieve unprecedented accuracy in identifying and categorizing dolphin vocalizations.

Transcription Codes Over Time

Methods

Data Collection and Preprocessing:
Data was collected in Ocean Park Hong Kong during in cooperative enrichment research with 4 male Indo-Pacific bottlenose dolphins (*Tursiops aduncus*).
The study commenced with the collection of an extensive array of dolphin vocalizations, captured using hydrophones deployed in a pool, accompanied by synchronous video recording data acquisition.

Machine Learning Analysis:
The core of our methodological approach involved two main phases of machine learning-supervised and unsupervised learning.
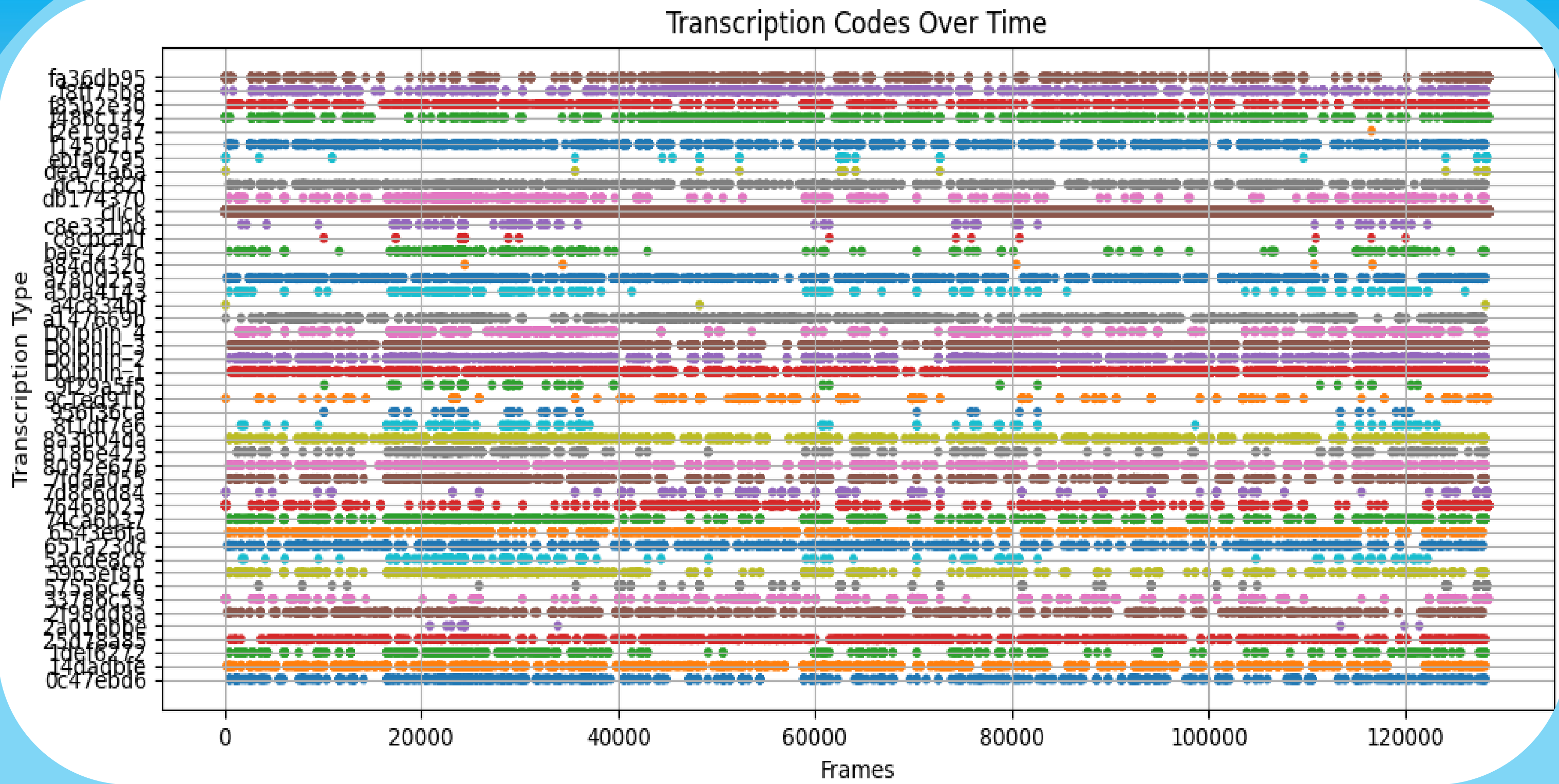

Scan QR code for more information on our work

Conclusion

This study has demonstrated the robust potential of machine learning techniques to enhance the analysis and understanding of dolphin bioacoustics. Through meticulous data collection and innovative application of both supervised and unsupervised learning models.

Results

Clicks Per Minute (Integrated into 60-second Bins)
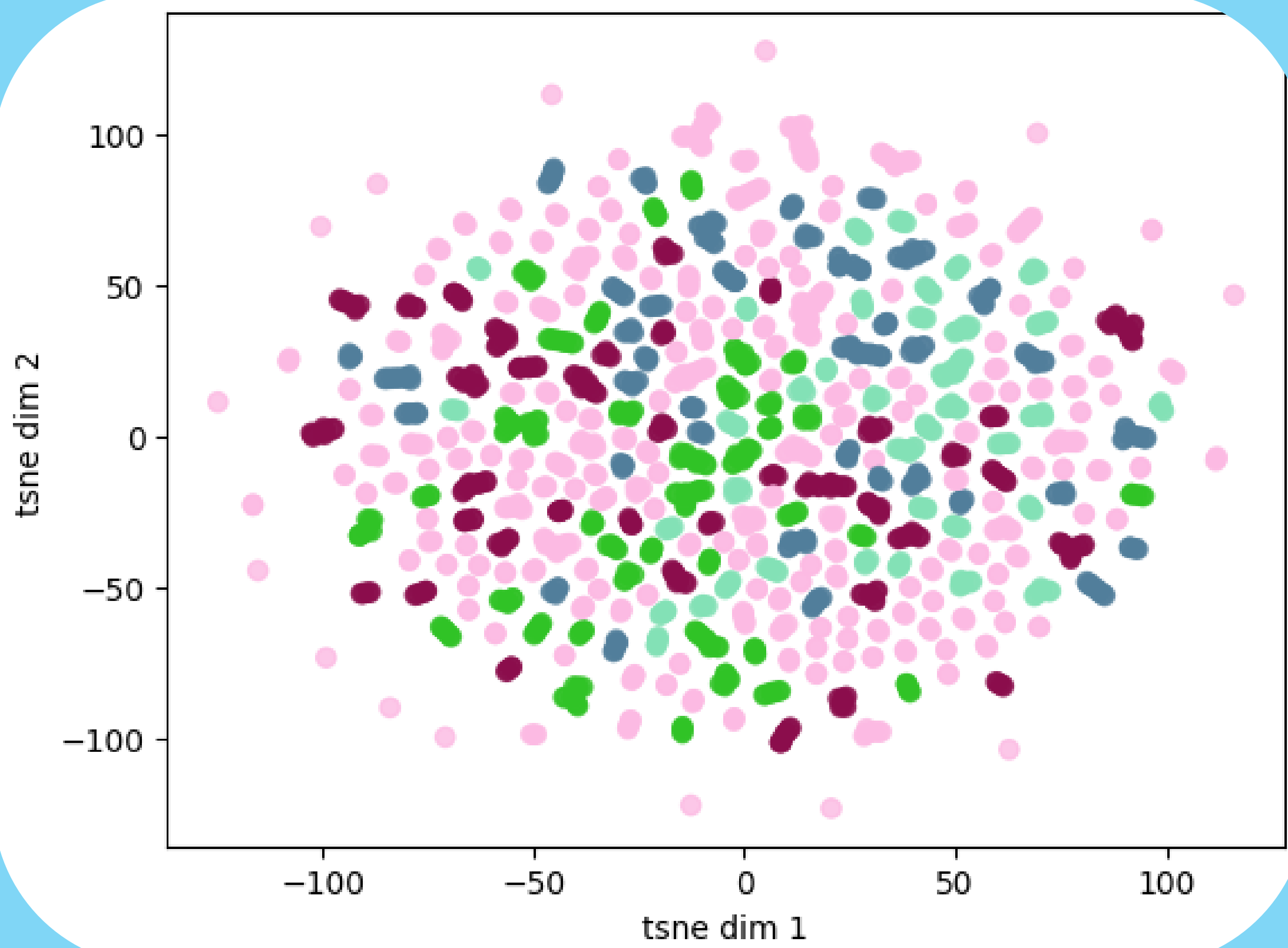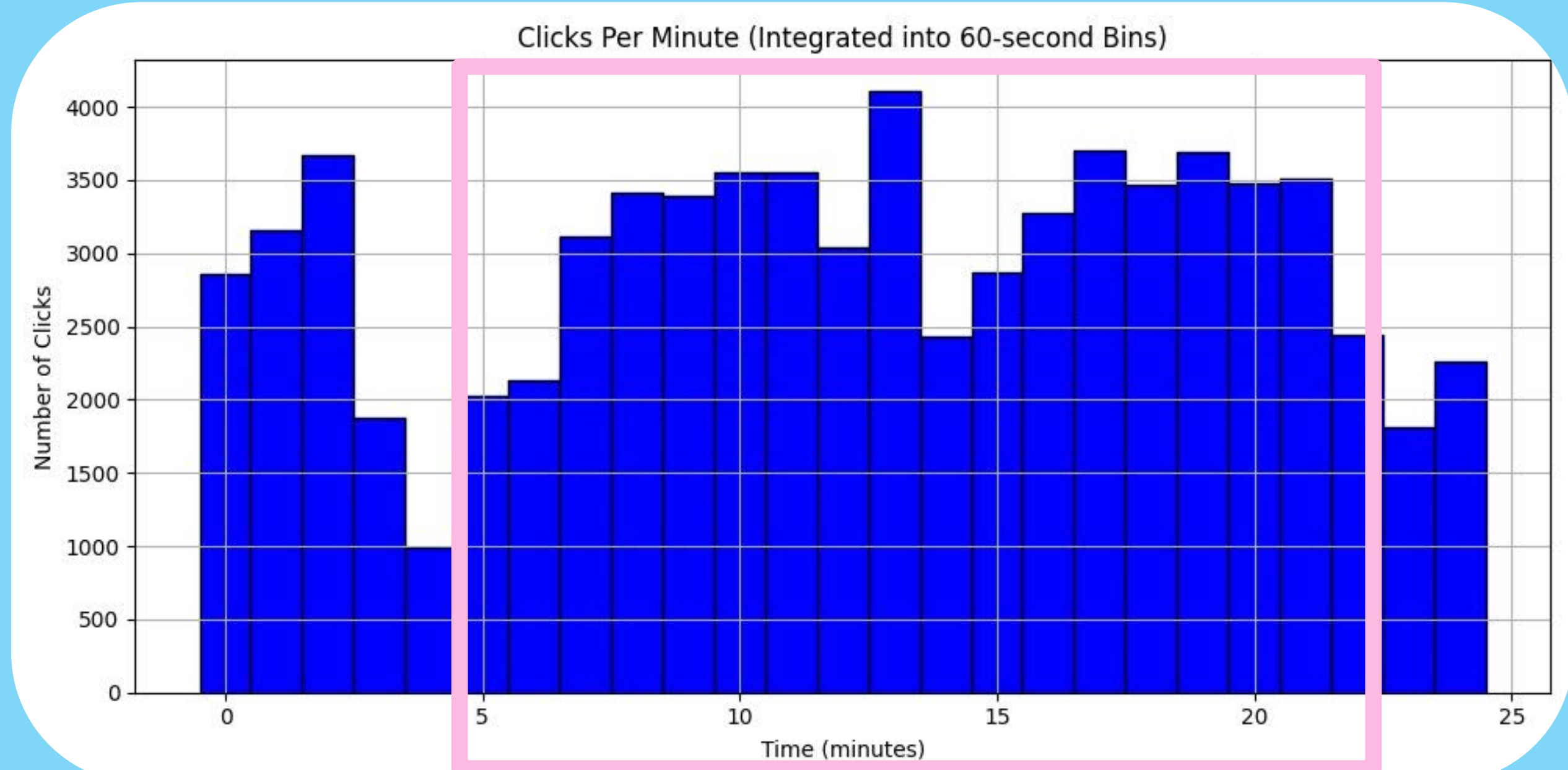
t-distributed stochastic neighbor embedding

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