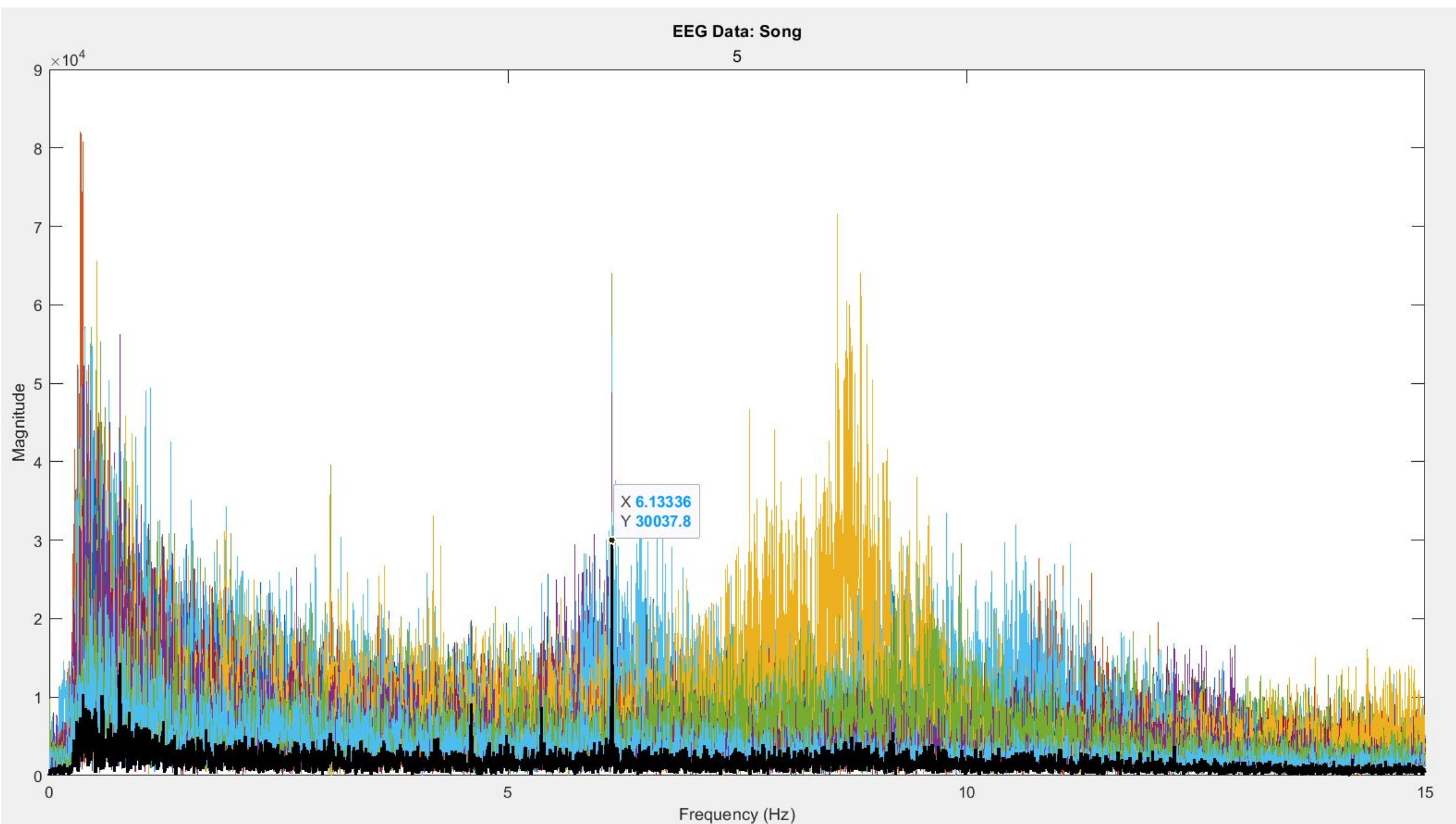


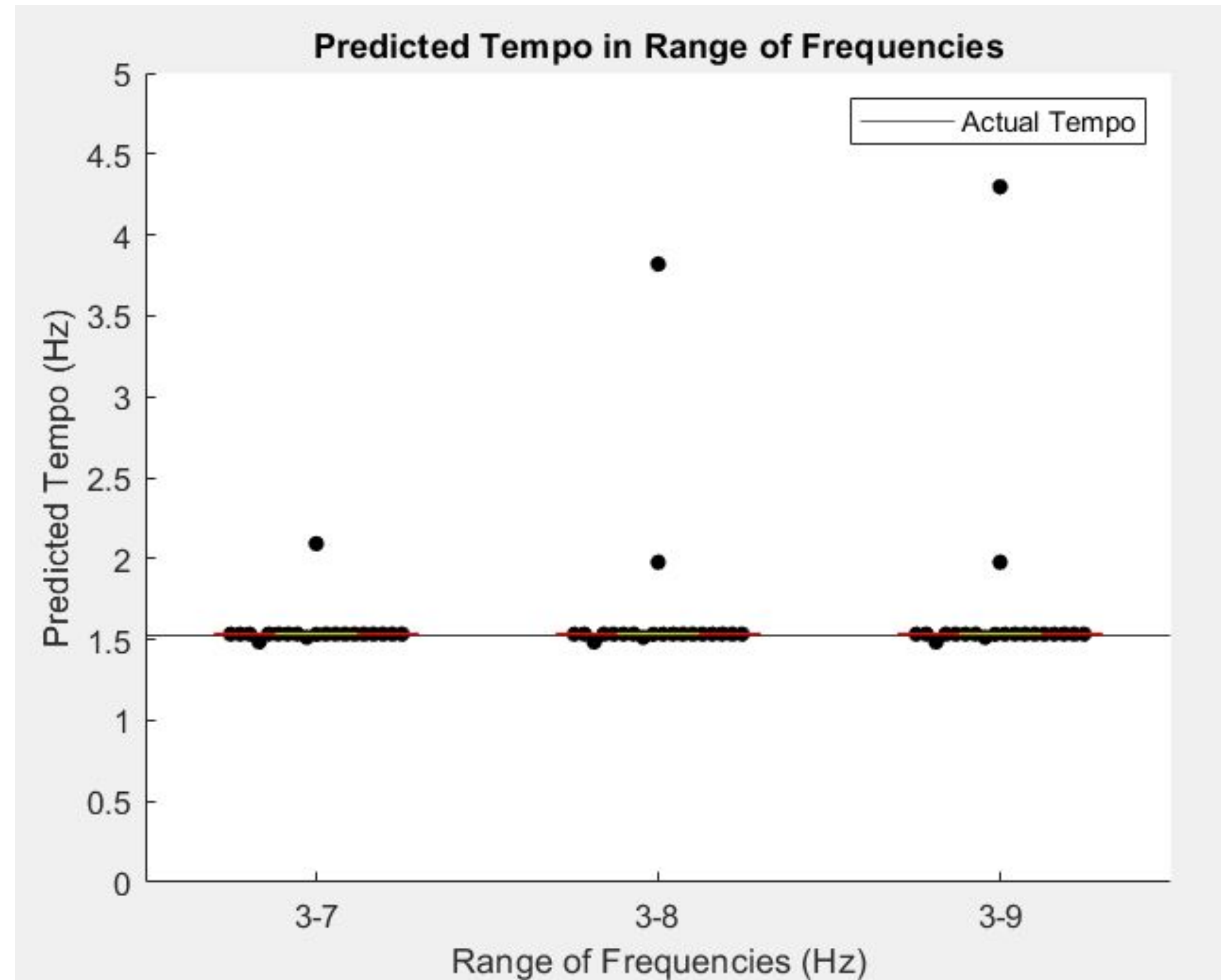


This study addresses the challenge of accurately predicting the tempo of a song using EEG data that was collected from participants while they listened to music. To tackle this problem, we developed an automated program in MATLAB focusing on identifying the largest magnitude peaks of each participant across three distinct frequency ranges. These peaks were then compared with the actual tempo of the song to create a framework for tempo prediction.

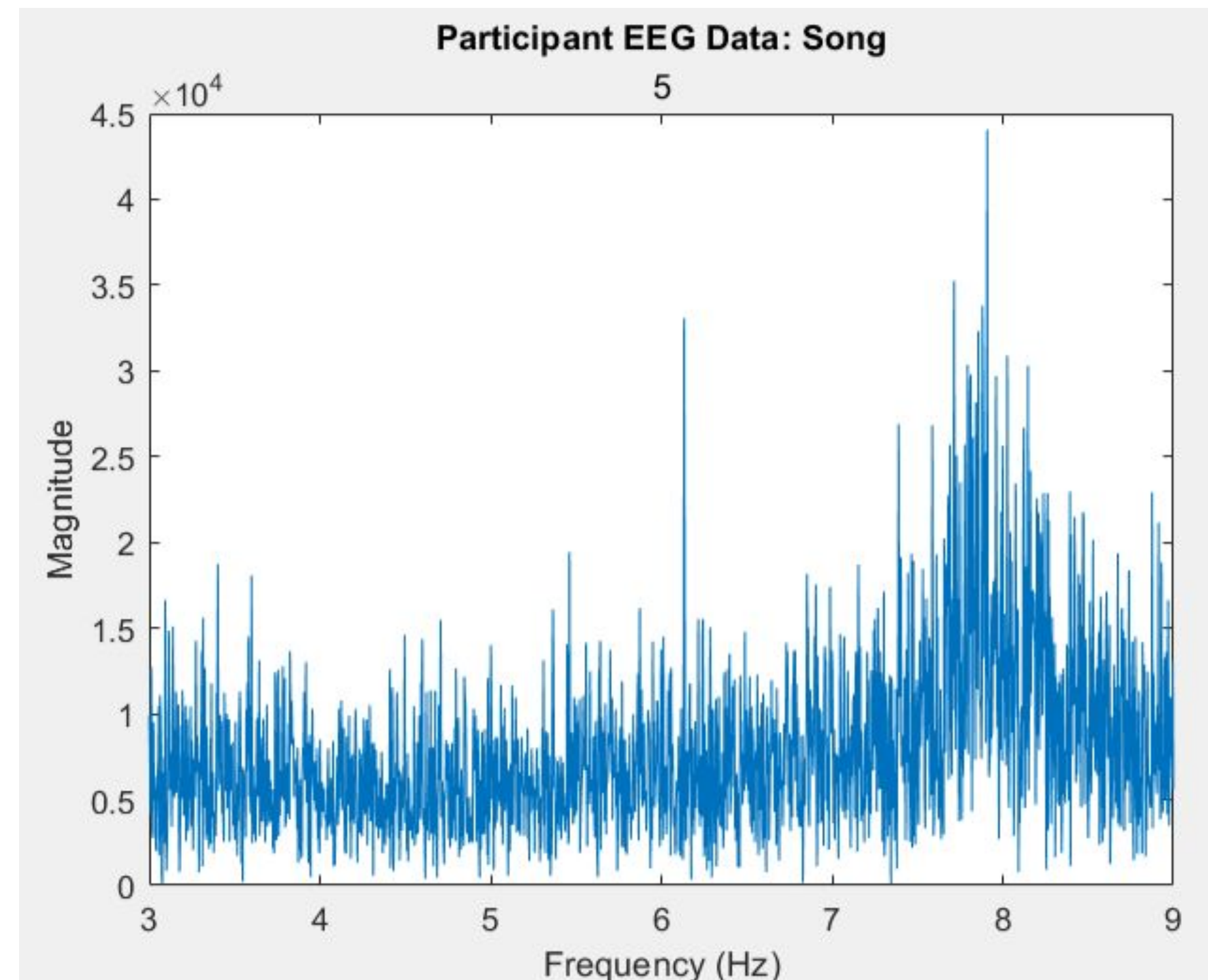
Using the EEG data collected from twenty participants across ten songs, we constructed categorical scatter plots overlaid on box plots. These charts illustrate the correlation between the actual tempo and the participants' largest peaks within the selected frequency ranges. Additionally, horizontal lines representing the actual tempo of the song was included, providing clear insight into the accuracy of the predictions. These findings offer valuable insight for estimating the tempo of a song, using EEG data, in music cognition research and related fields.



Song 5 - Collective EEG data of each participant



Song 5 - Results within the selected frequencies



Song 5 - Participant 3's EEG data in the range of 3-9 Hertz

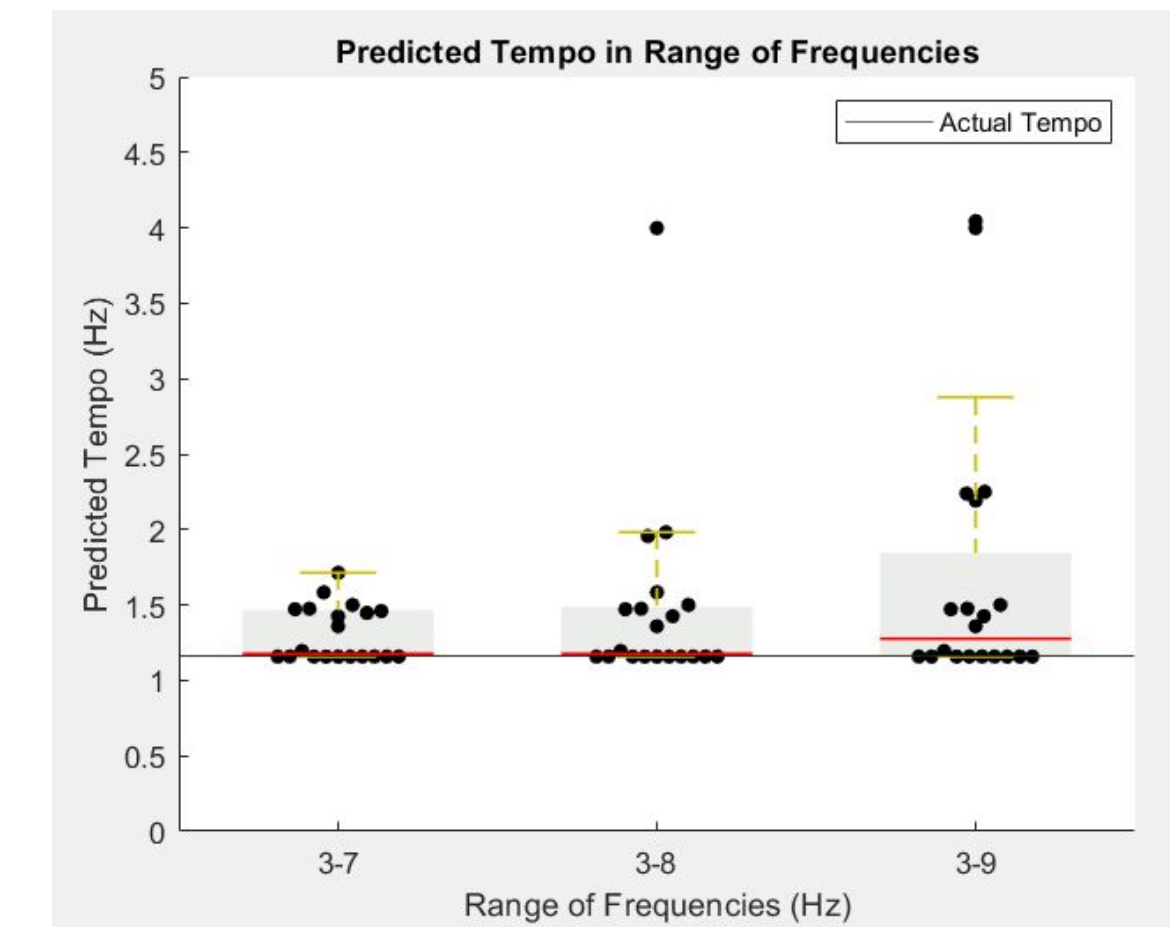
Best Range of Hertz for Music Tempo Estimation:

Hiromi Kageyama, Garrett Archer

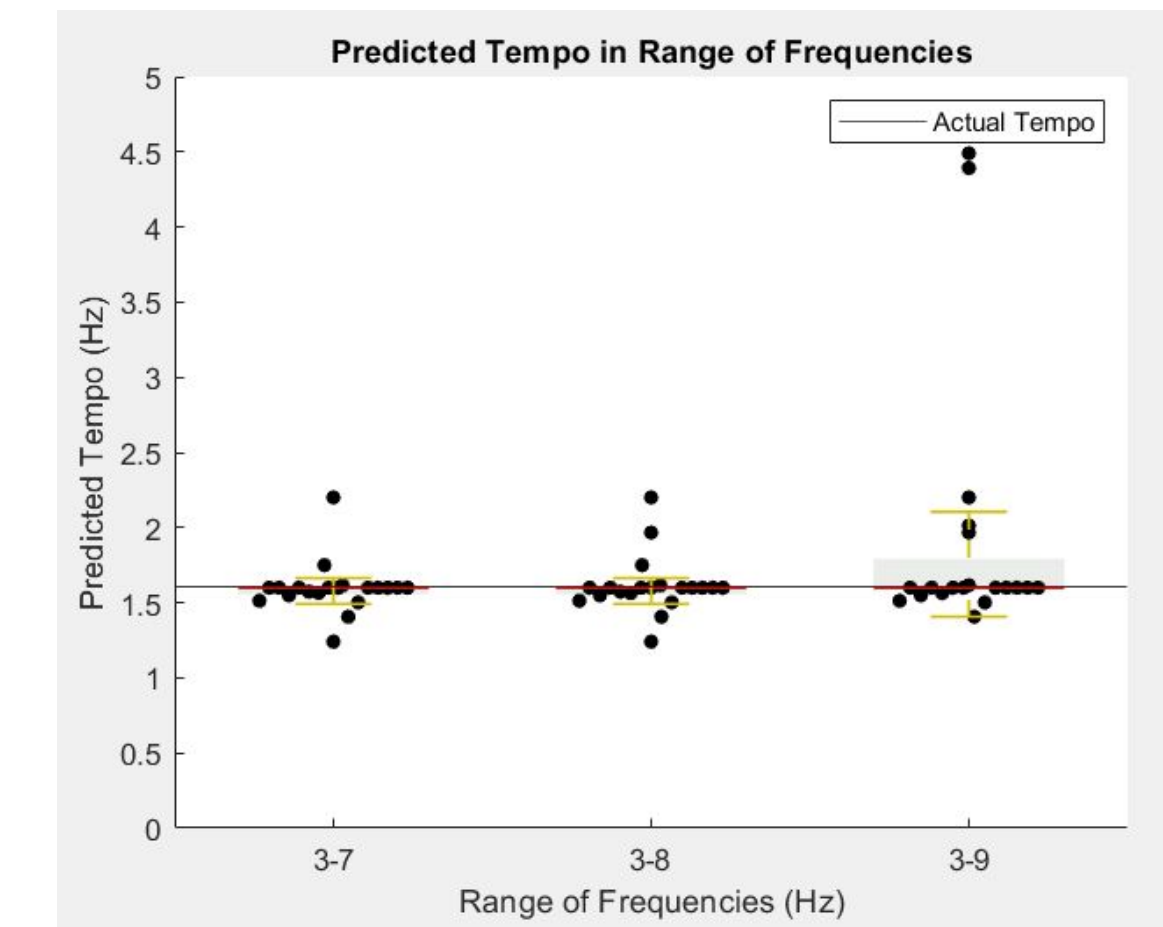
Department of Computer Science and Engineering

Project Advisors: Dr. Blair Kaneshiro,
Dr. Masoumeh Heidari Kapourchali

04/26/2024



Song 2 - Results within the selected frequencies



Song 6 - Results within the selected frequencies

#	Song Title	Artist	Tempo (BPM)	Tempo (Hz)	min:sec
1	First Fires	Bonobo	55.97	0.9328	4:38
2	Oino	LA Priest	69.44	1.1574	4:31
3	Tiptoes	Daedelus	74.26	1.2376	4:36
4	Careless Love	Croquet Club	82.42	1.3736	4:54
5	Lebanese Blonde	Thievery Corporation	91.46	1.5244	4:49
6	Canopée	Polo & Pan	96.15	1.6026	4:36
7	Doing Yoga	Kazy Lambist	108.70	1.8116	4:52
8	Until the Sun Needs to Rise	Rüfüs du Sol	120.00	2.0000	4:52
9	Silent Shout	The Knife	128.21	2.1368	4:54
10	The Last Thing You Should Do	David Bowie	150.00	2.5000	4:58

Table 1 - Information about each song

Acknowledgements

We want to thank our project advisors for providing the necessary data and guidance throughout this project. They are the main reason we were able to learn how to code in MatLab and progress in our research.