IIA Project: Audio Modem

Transmission: Impossible (Team 2)

Ben Domb | Sophie Langdon | Aman Vernekar

System overview

Encoder:
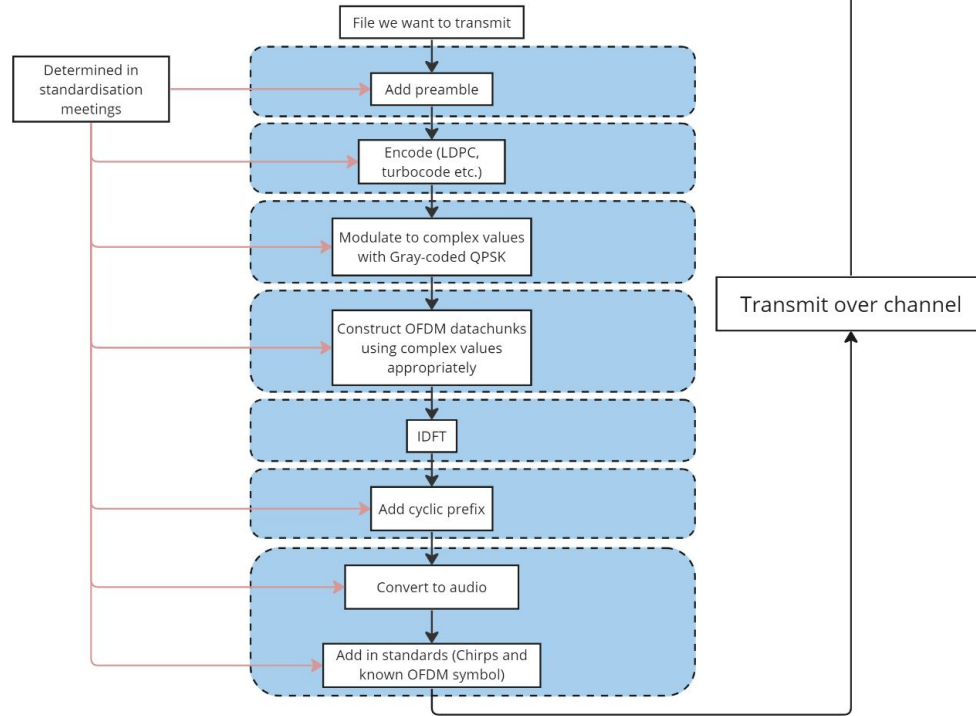
Decoder:

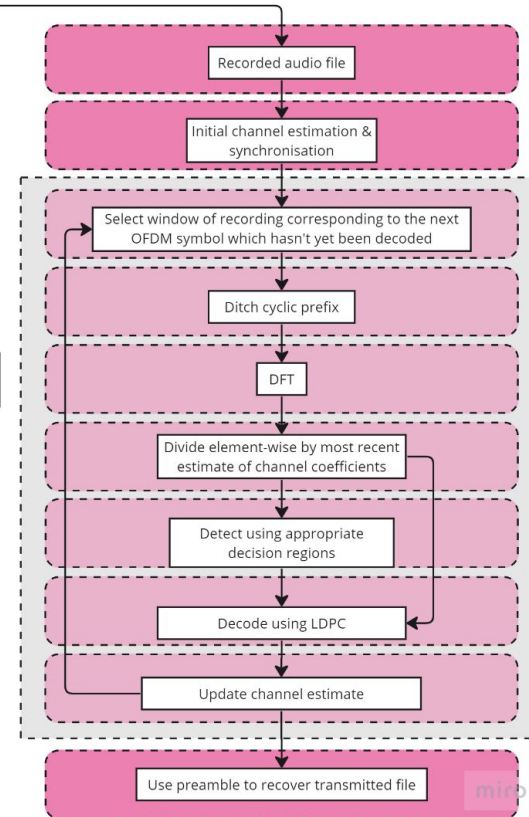Figure 1: A flowchart showing a system overview for the audio modem

Synchronisation

1. Initial estimation using the matched filter
2. Re-synchronisation using the cyclic shift property
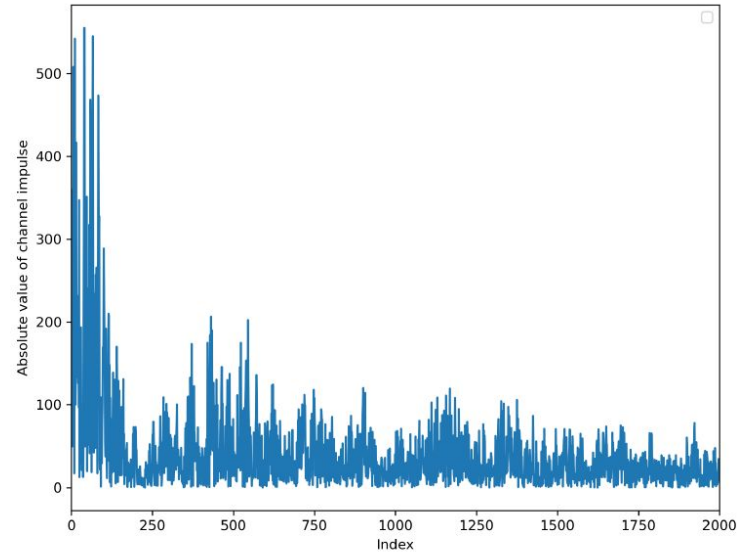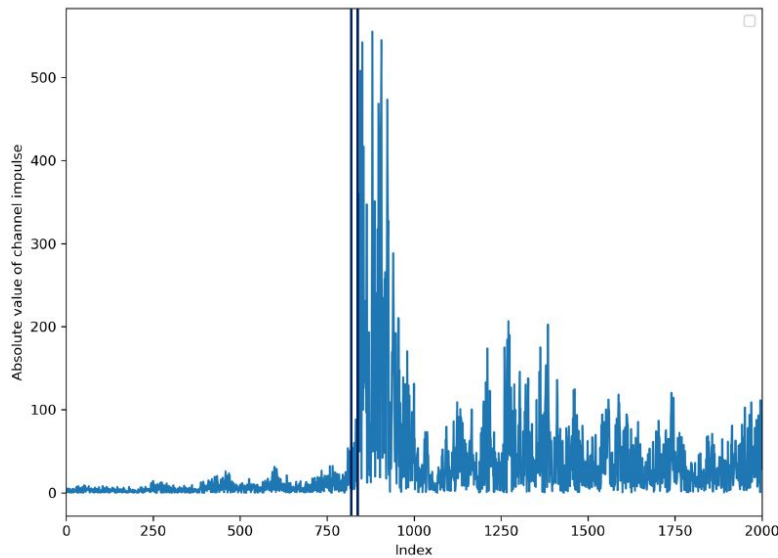
Synchronisation

Figure 2: Representation of 10%-90% re-synchronisation method, showing before (left) and after (right). Black vertical lines indicate 10% and 90% points in the graph on the left

Synchronisation

1. Initial estimation using the matched filter
2. Re-synchronisation using the cyclic shift property
3. Direct optimisation with known OFDM symbol(s)
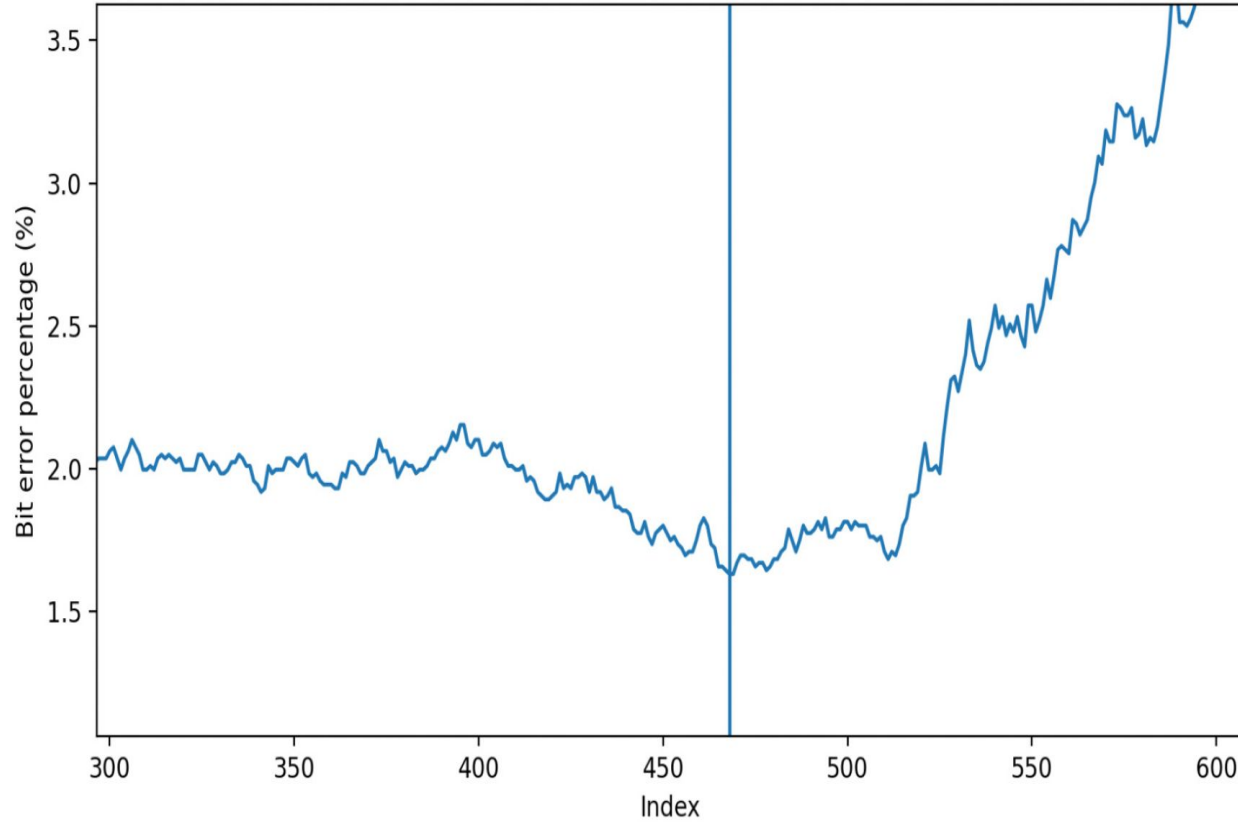4. Hybrid approach

Synchronisation

Figure 3: Bit error rates calculated for different synchronisation estimates. The vertical line is at the minimum

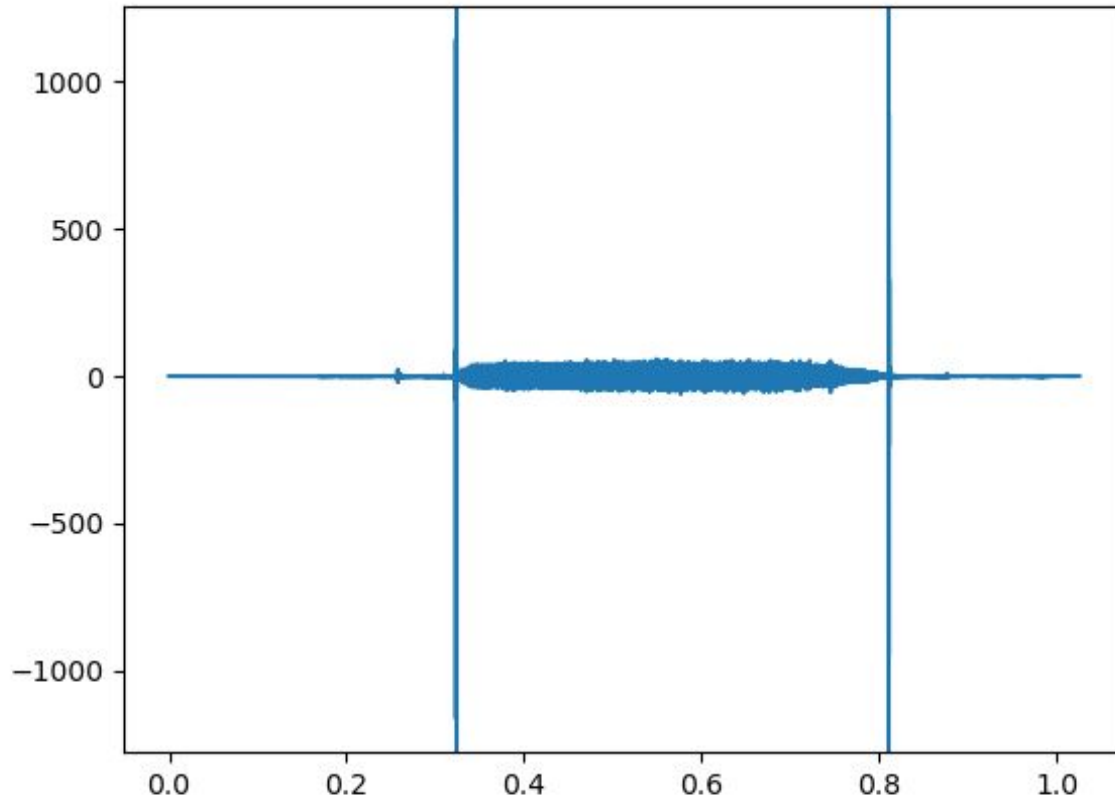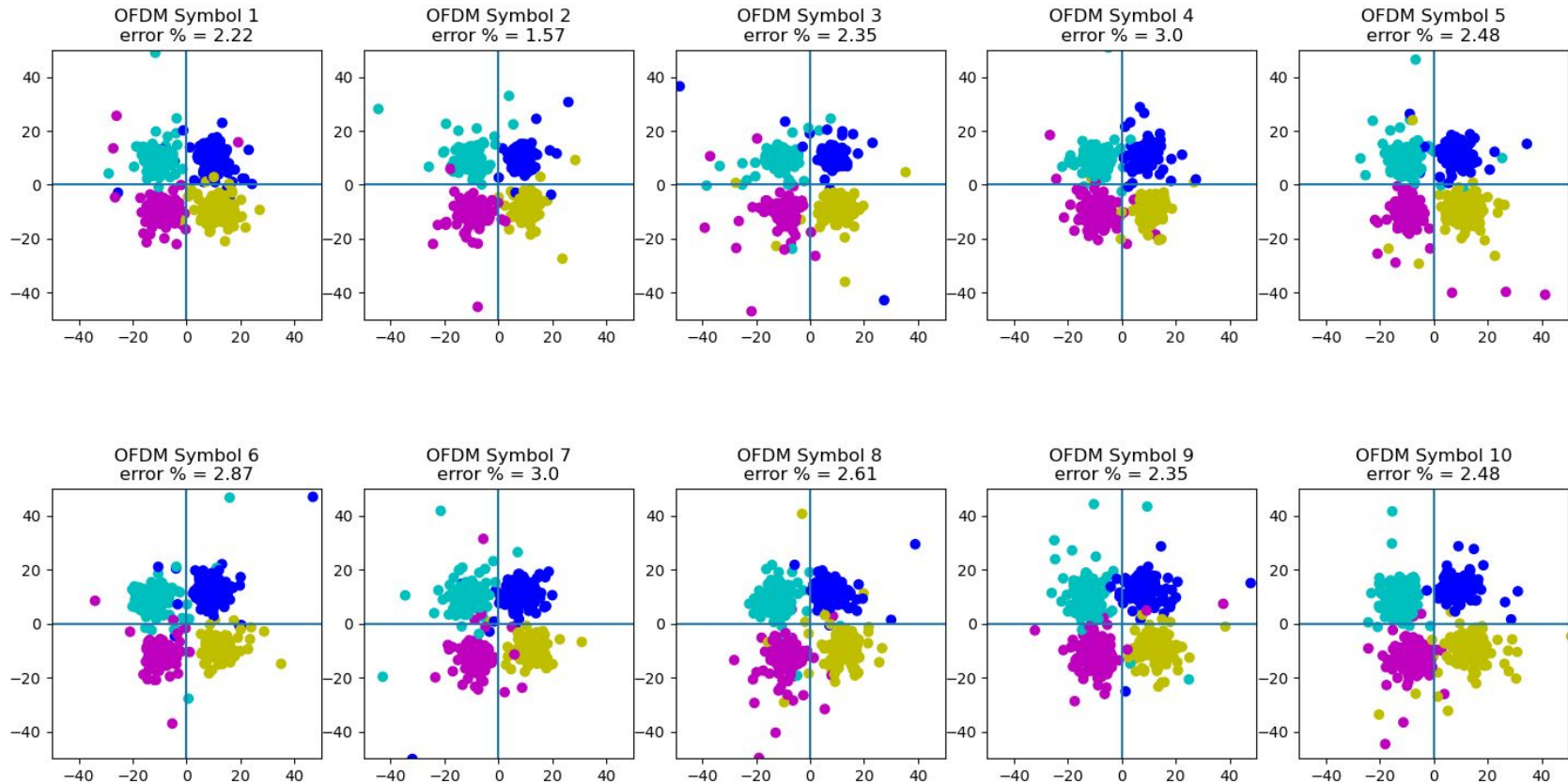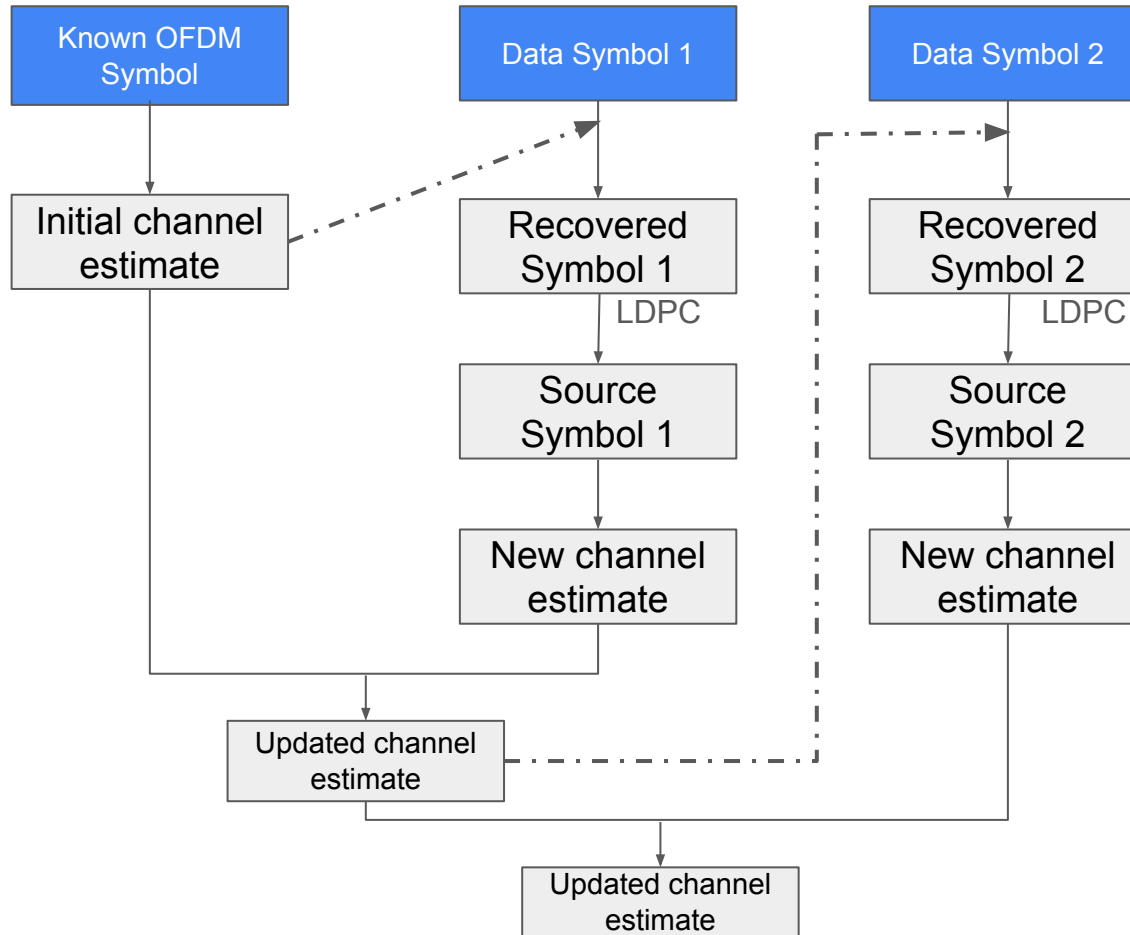# Recording length using two chirps

Figure 4: Using start and end chirps for detecting length of data

Static channel estimation

Dynamic channel estimation & phase compensation

Results

0% Error!

- Phone to laptop: 6KB, 12 seconds
- Speaker to laptop: 57KB, 1:20 minutes