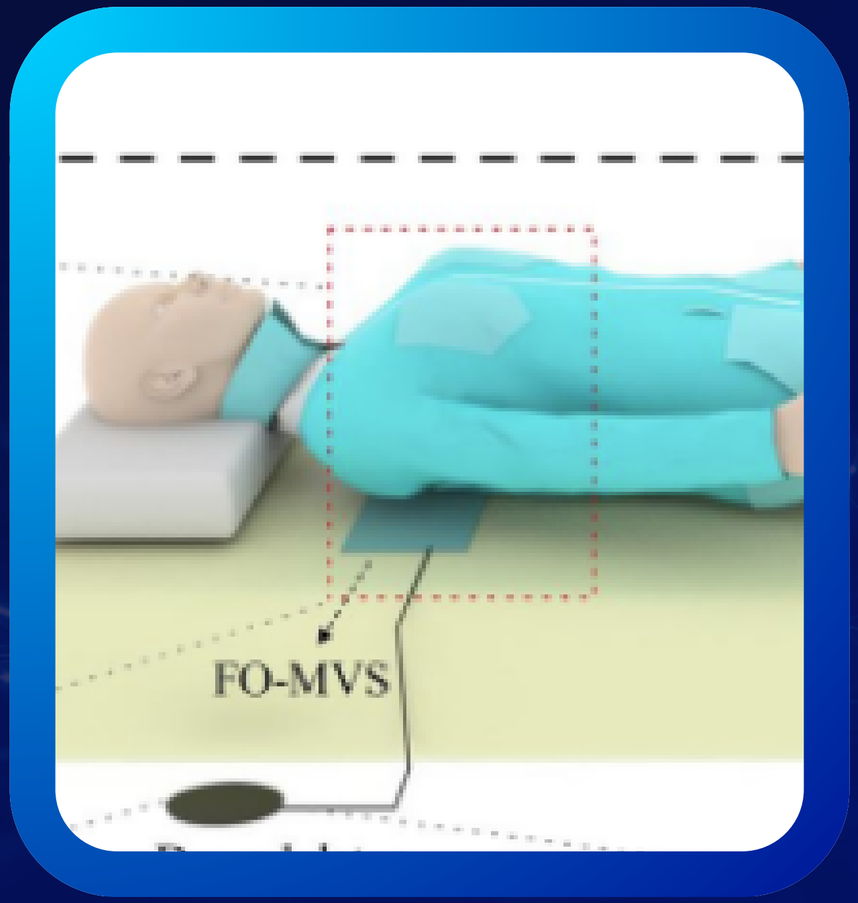
# SBES466
# Biomedical Data Analytics
# Final Project Presentation

| Team members | ID |
|---|---|
| Youssef Mohamed Ali | 1190396 |
| Ahmed Gehad | 1200387 |
| Ali Abdoun | 1200198 |

**Submitted to:** Dr Ibrahim Sadek
**Submission date:** 11/5/2025

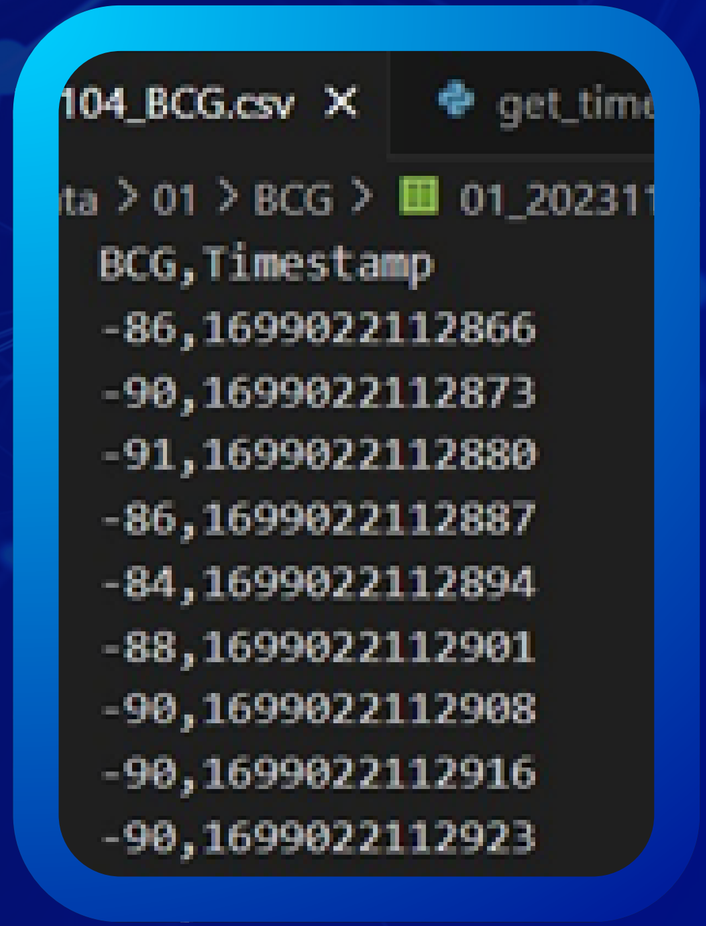



# Objective

- Extract heart rate from BCG signal
- Synchronize BCG with RR intervals
- Evaluate accuracy using error calculation

# Step1 – Get Timestamp for BCG

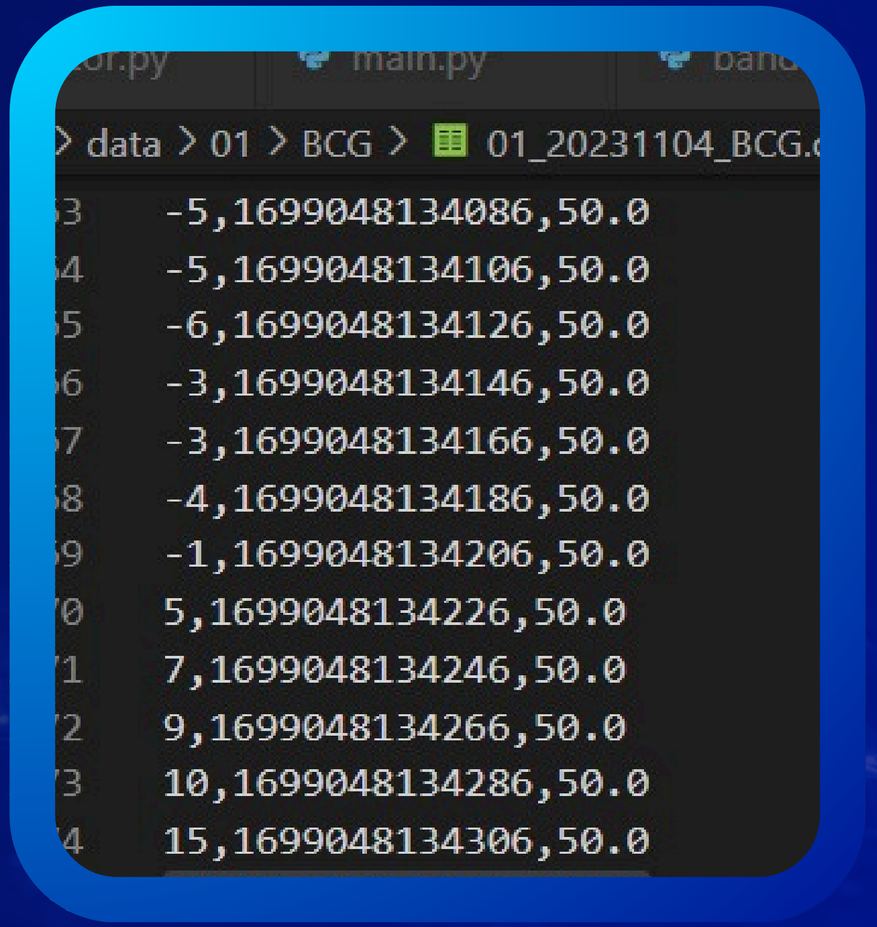
- Timestamps extracted from raw BCG data
- Serves as time reference for synchronization




- We began by extracting timestamps from the BCG signal, which were essential for aligning it later with the RR intervals.

# Step 2 – Resample BCG to 50 Hz

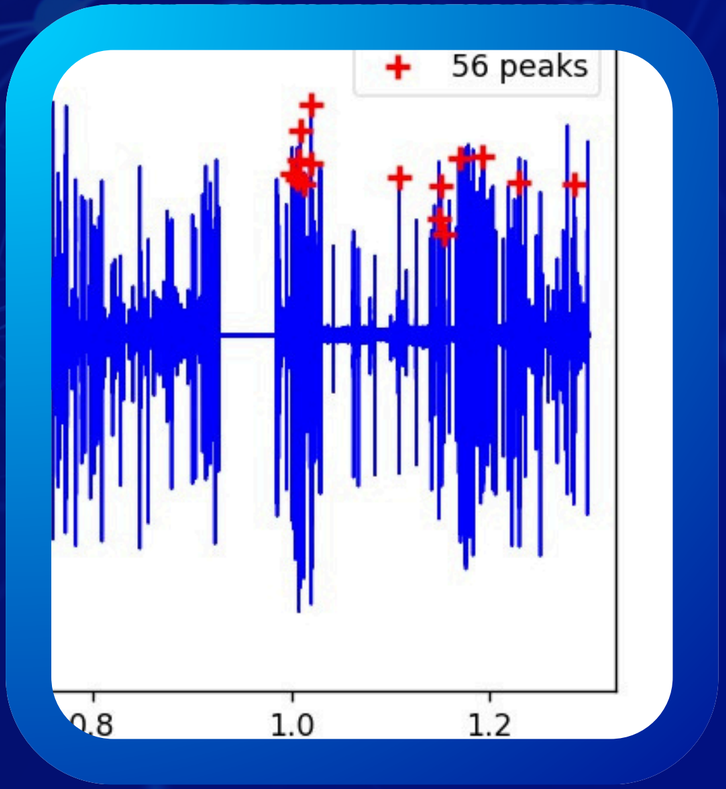
- Original frequency: 140 Hz
- Resampled to 50 Hz
- Standardized sampling for easier processing




- The BCG signal was originally sampled at 140 Hz. We resampled it to 50 Hz to make computations faster and match our desired window size of 10 seconds.

# Step 3 – Run JPeak Detection Code

- Used prewritten script to detect J-peaks
- Calculated HR from RR intervals between peaks




- To extract heart rate from the BCG, we ran a provided script that identifies J-peaks. The heart rate was calculated based on the time between these peaks.

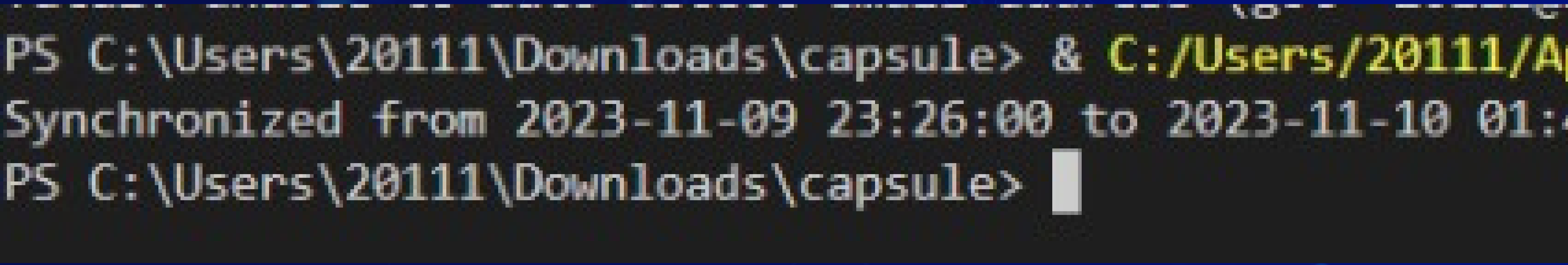
# Step 4 – Synchronize BCG and RR

- Converted one signal's timeline to match the other
- Ensured both signals align over the same period

- Since the BCG and RR signals operate on different timelines, we synchronized them to ensure that both datasets could be compared accurately.

# Step 5 – Identify Start and End

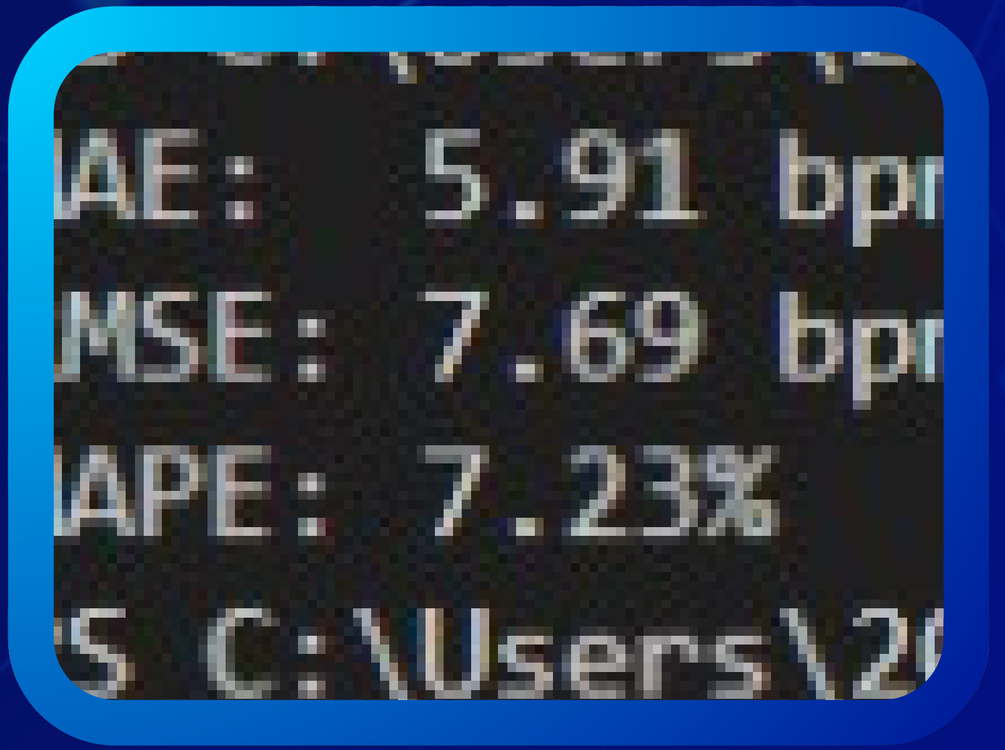
- Located overlapping time segments in both signals
- Selected common start and end points




- After synchronization, we identified where both signals overlapped in time, allowing us to extract corresponding segments for analysis.

# Step 6 – Calculate Error

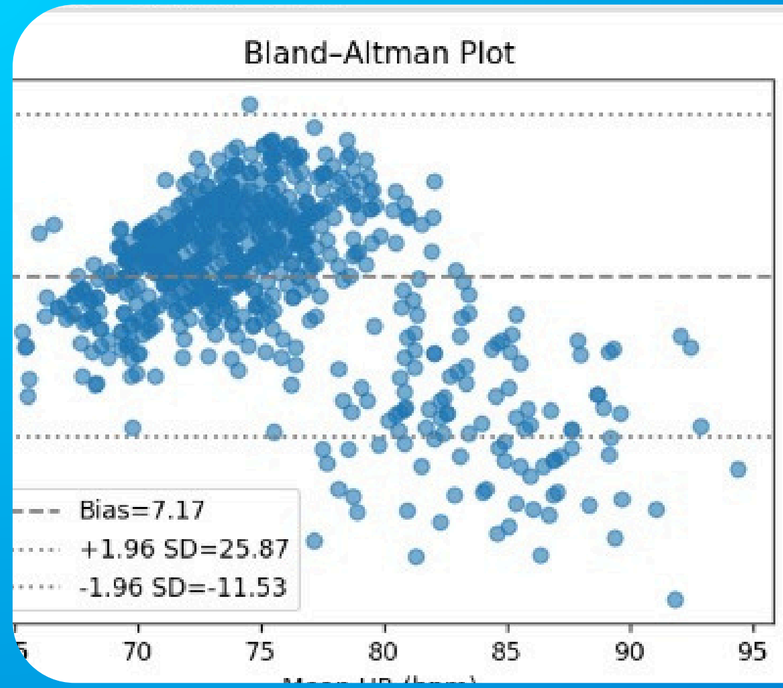
- Compared BCG-derived HR with RR-based HR
- Computed the difference (error) in each window

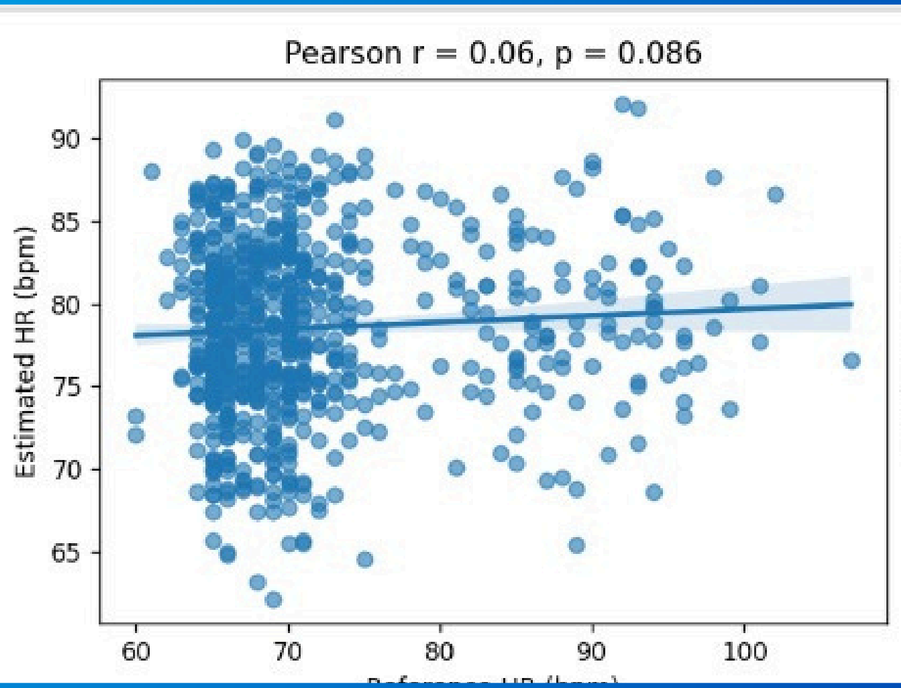


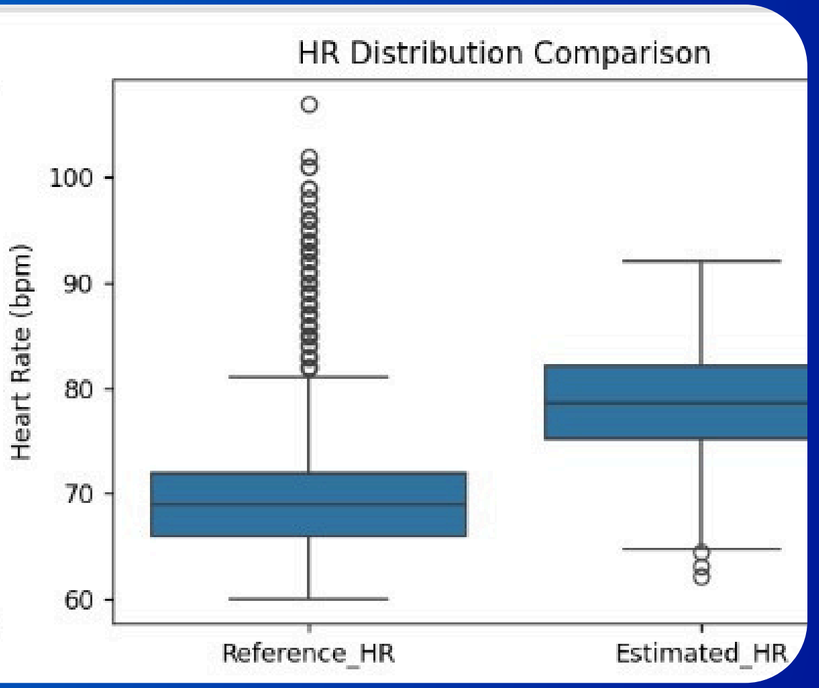

- Finally, we compared the heart rate from BCG to the reference from RR intervals and calculated the error to evaluate performance.

# Final Output

- **Successfully processed and synchronized signals**
- **Extracted HR and quantified error**
- **Useful for validating non-invasive HR monitoring**



# THANK YOU