

# Real-time Facial Asymmetry Analysis

## User's Manual

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### (A) Preface

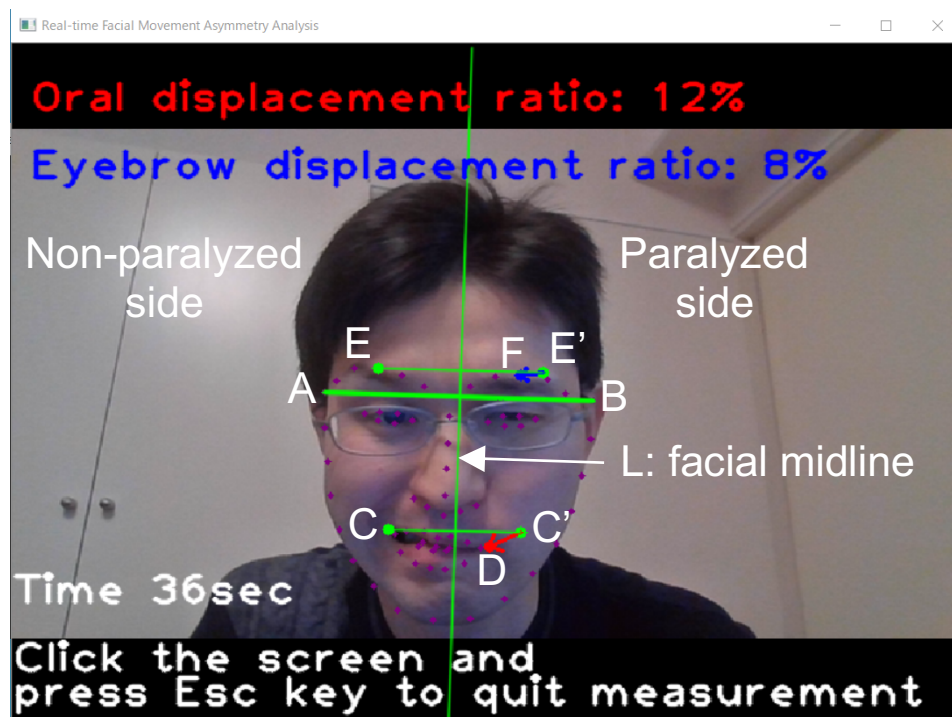
1. Real-time Facial Asymmetry Analysis (RFAA) is a free software designed for the assessment of facial paralysis.
2. RFAA operates on a Windows (Microsoft<sup>®</sup>) computer equipped with a webcam.



3. Both real-time captured videos and pre-recorded videos can be analyzed.

4. RFAA automatically calculates oral displacement ratio (ODR) and eyebrow displacement ratio (EDR).

5. ODR and EDR are defined as shown in the figure below:



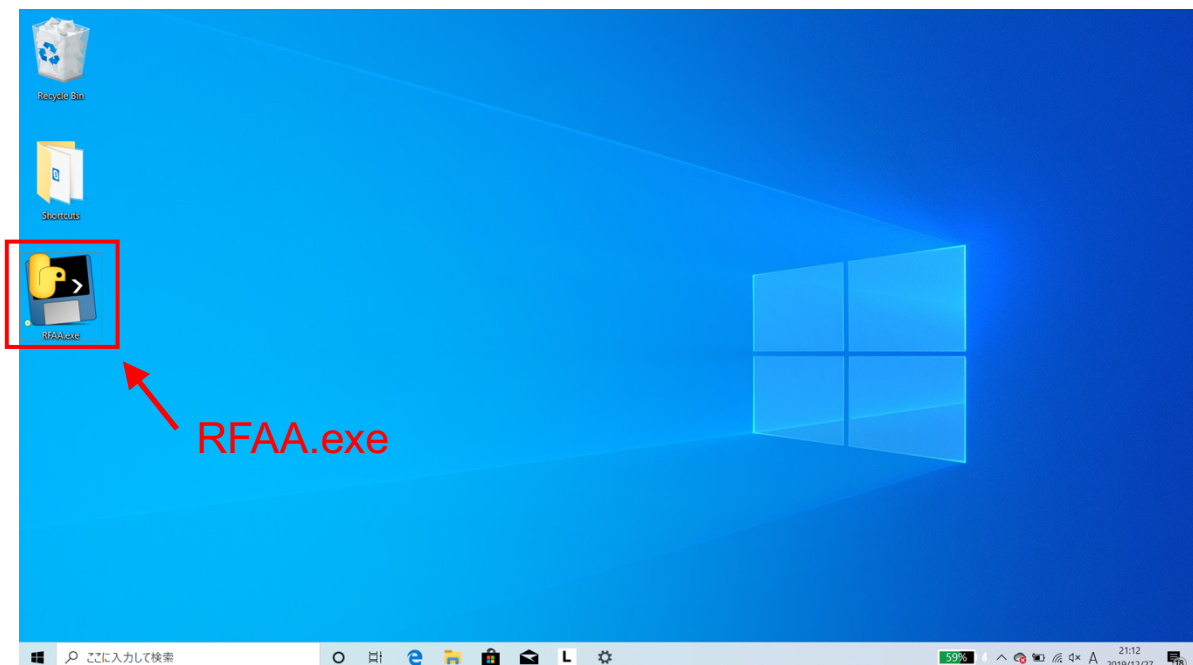
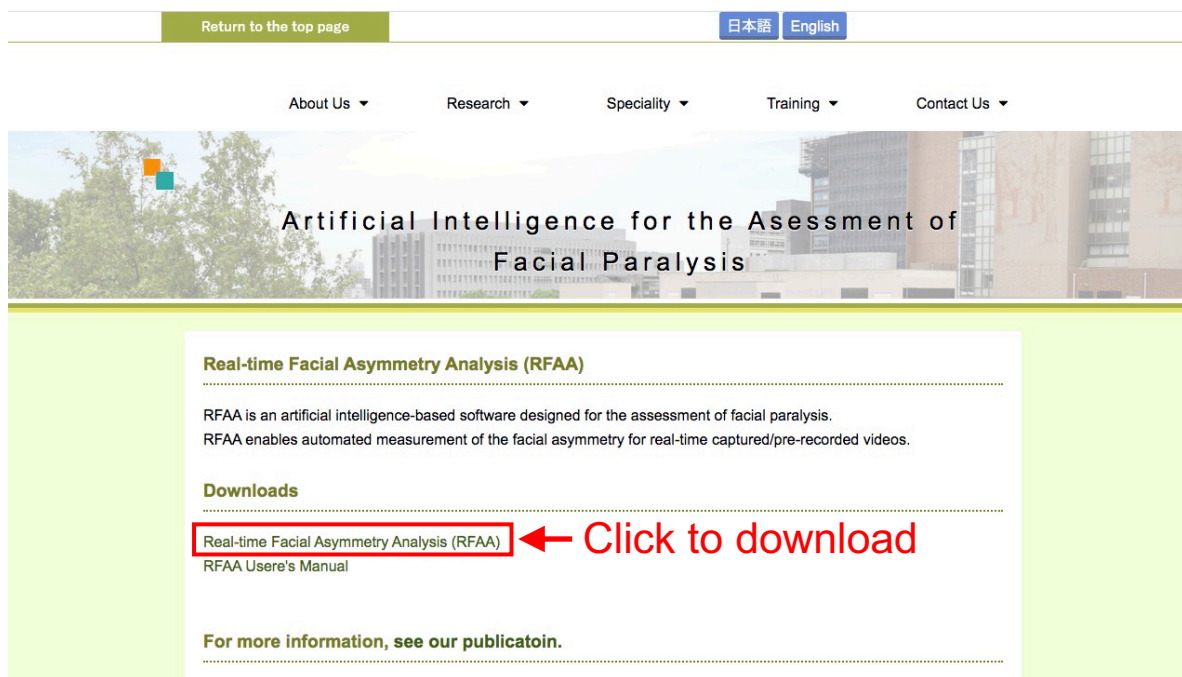
$$\text{ODR} = DC' / AB \times 100 (\%)$$

$$\text{EDR} = FE' / AB \times 100 (\%)$$

Where

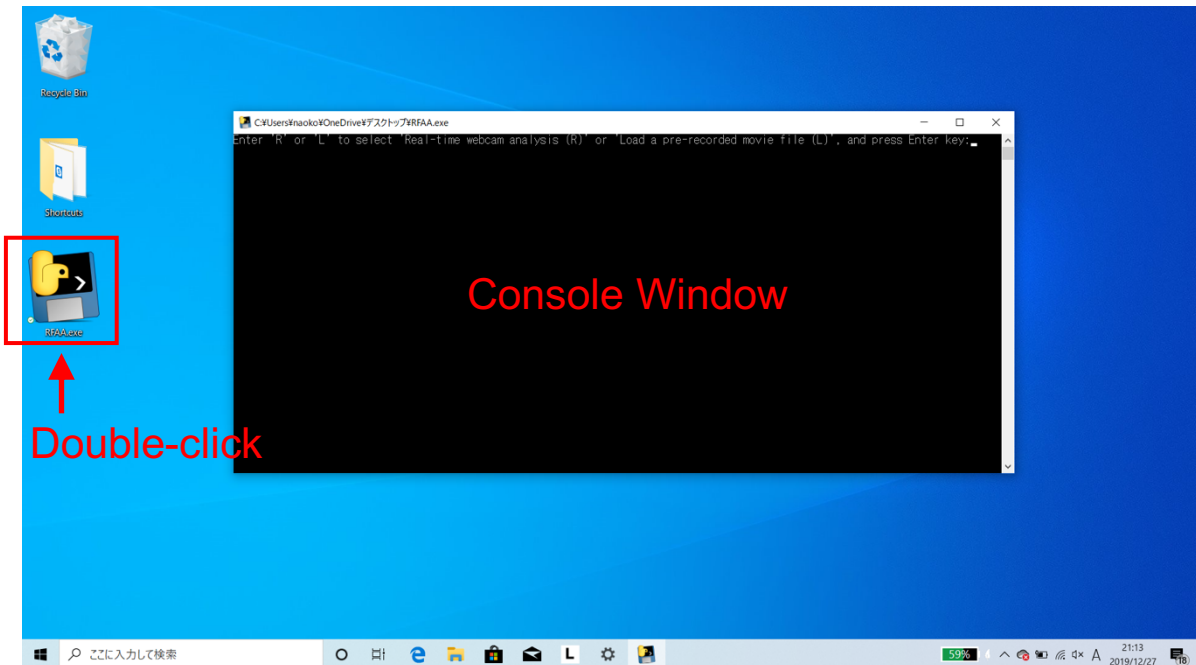
- A and B: Vertexes of the lower two-thirds of the face
- L: Facial midline (perpendicular bisector of AB)
- C and D: Oral commissures on non-paralyzed/paralyzed side
- C': Mirror reflection of point C in terms of L
- E and F: Eyebrow vertexes on non-paralyzed/paralyzed side
- E': Mirror reflection of point E in terms of L

6. Download RFAA.exe to a given folder/directory (e.g. Desktop).



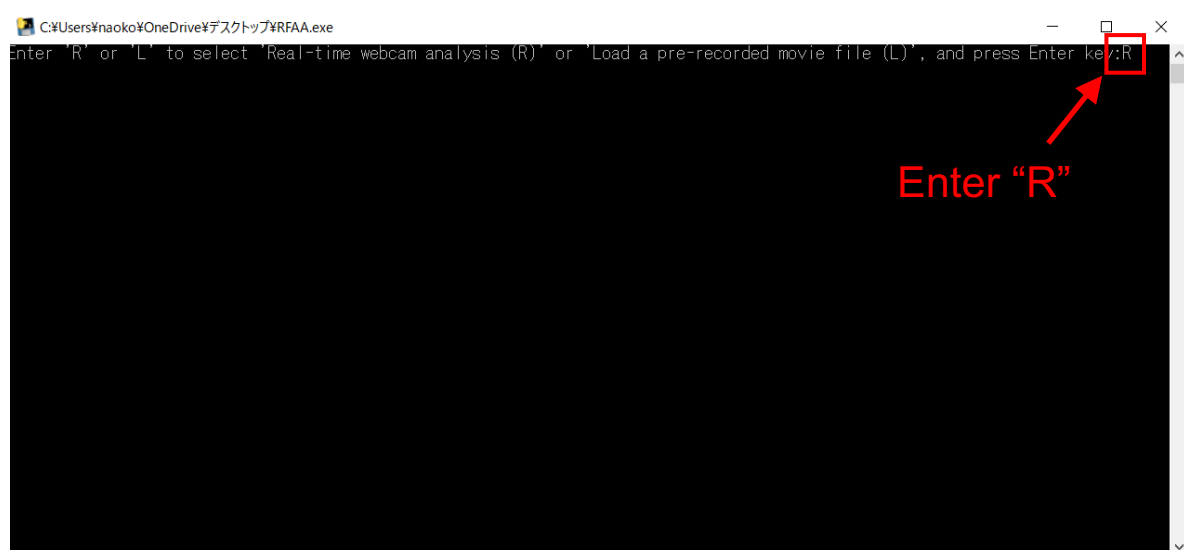
## (B) Real-time Movie Analysis

1. Double-click the icon to open a console window (may need a few minutes).



2. Click the console window to activate.

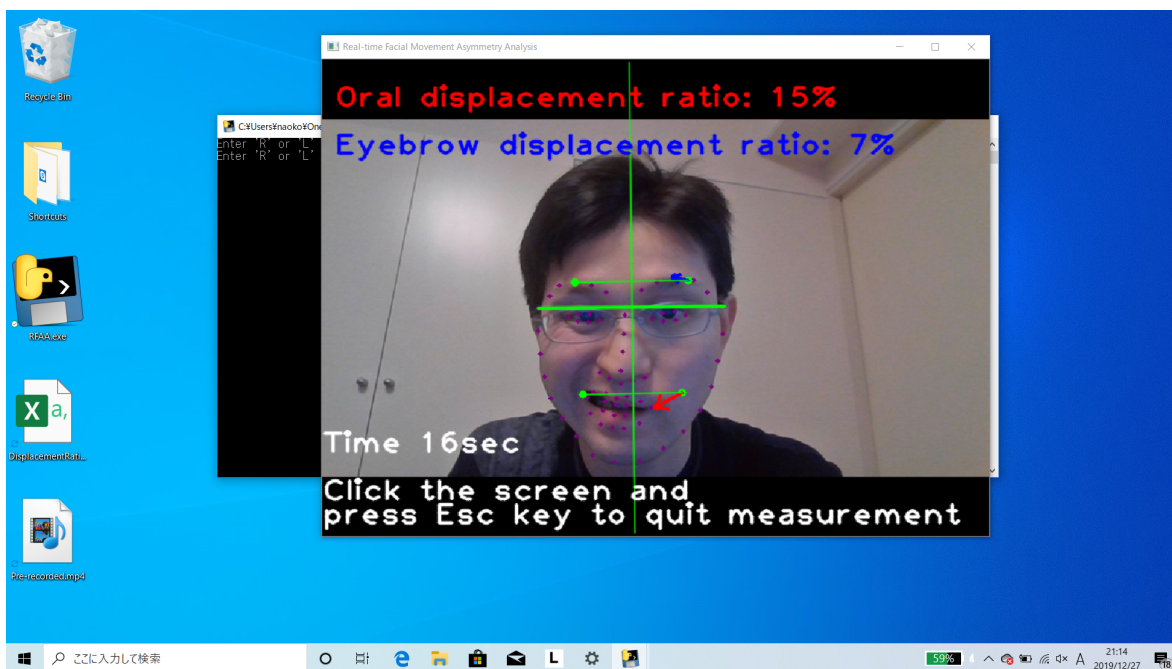
3. Select Real-time movie mode: enter “R” and press Enter key.



4. Select paralyzed side: enter “R” (right) or “L” (left) and press Enter key.

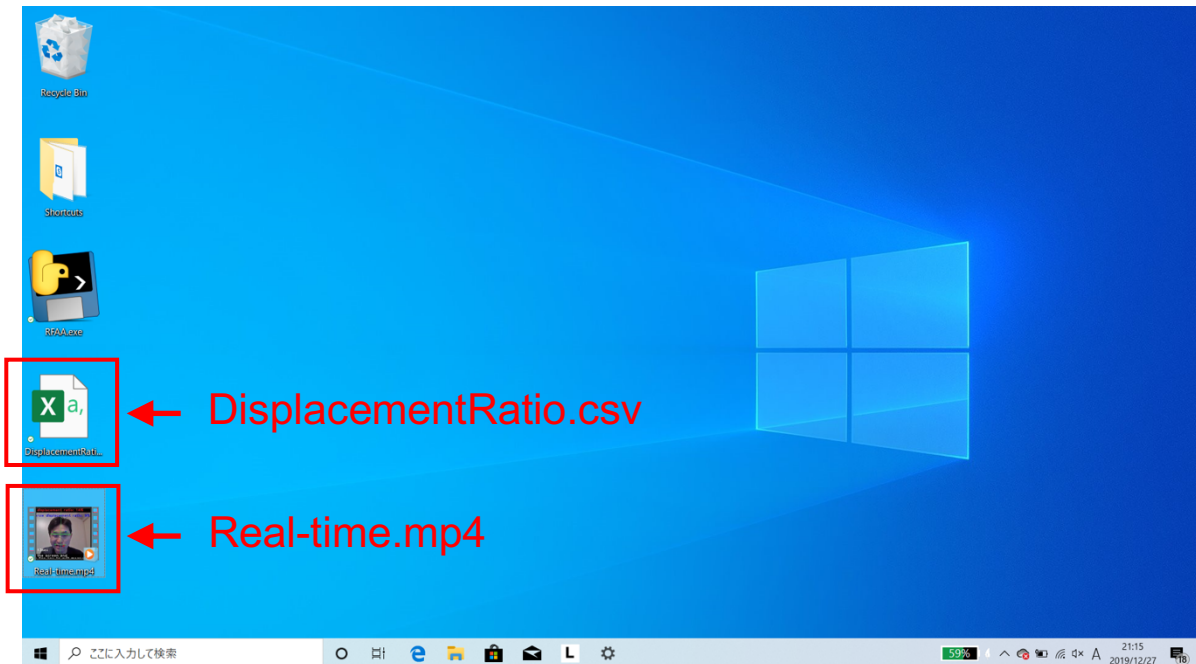


5. A webcam window automatically appears and a measurement is initiated.

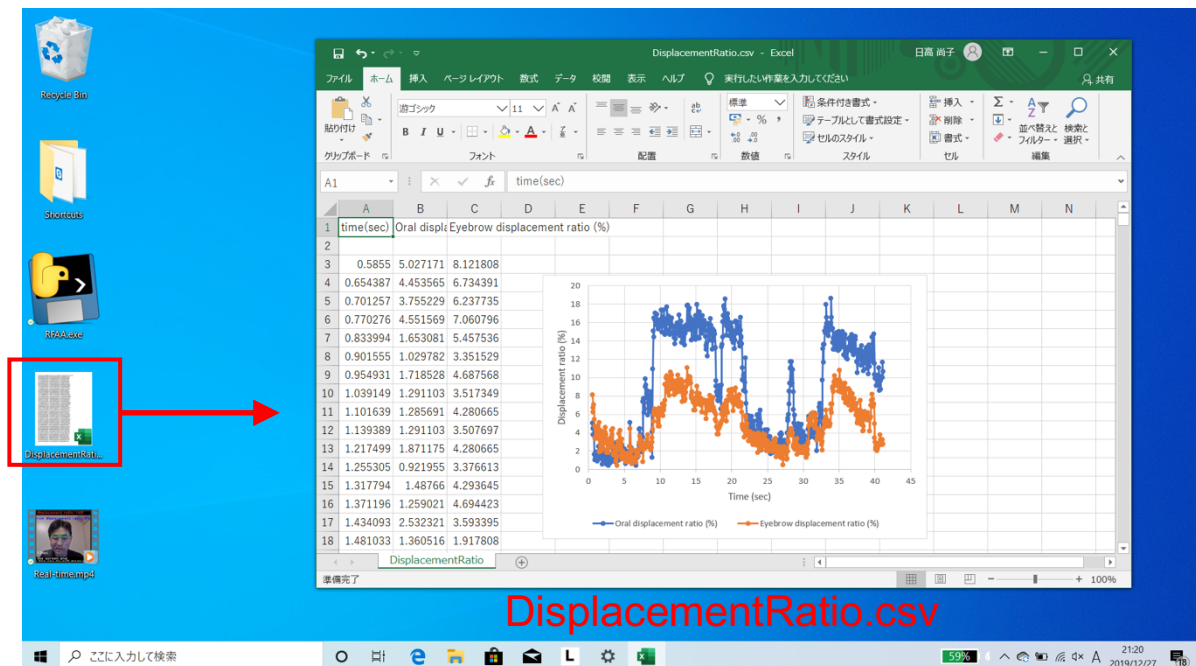


6. Terminate the measurement: click the webcam window and press Escape key.

7. The analyzed video (Real-time.mp4) and the time-series data of ODR and EDR (DisplacementRatio.csv) are automatically saved.



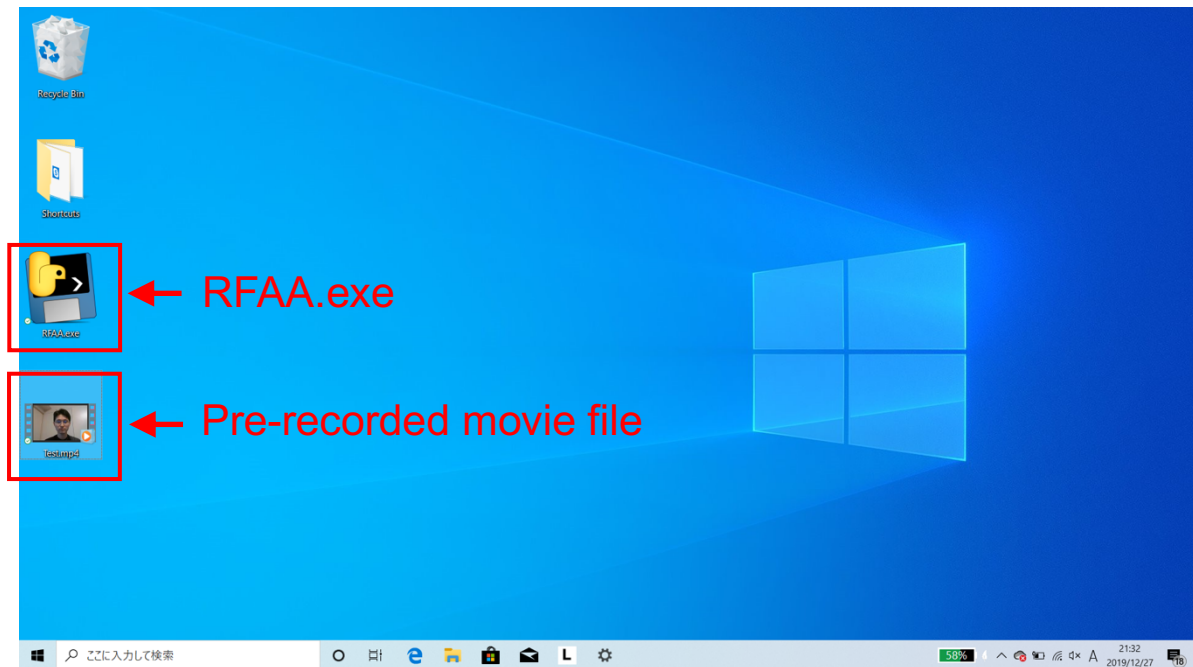
8. Post-hoc analysis: time-series data can be analyzed with Excel (Microsoft®).





### (C) Pre-recorded Movie Analysis

1. RFAA.exe and a pre-recorded movie file should be placed on the same folder/directory.

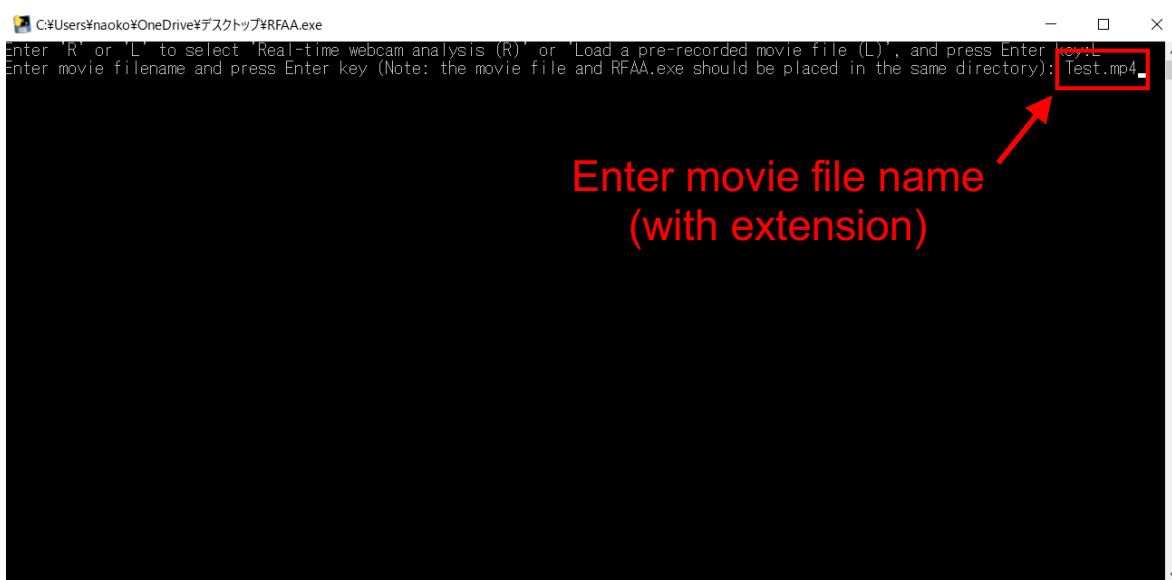


2. Activate a console window [as illustrated in (B) 1 and 2].

3. Select Pre-recorded movie mode: enter “L” (load movie file) and press Enter key.



4. Enter pre-recorded movie file name (e.g. Test.mp4).

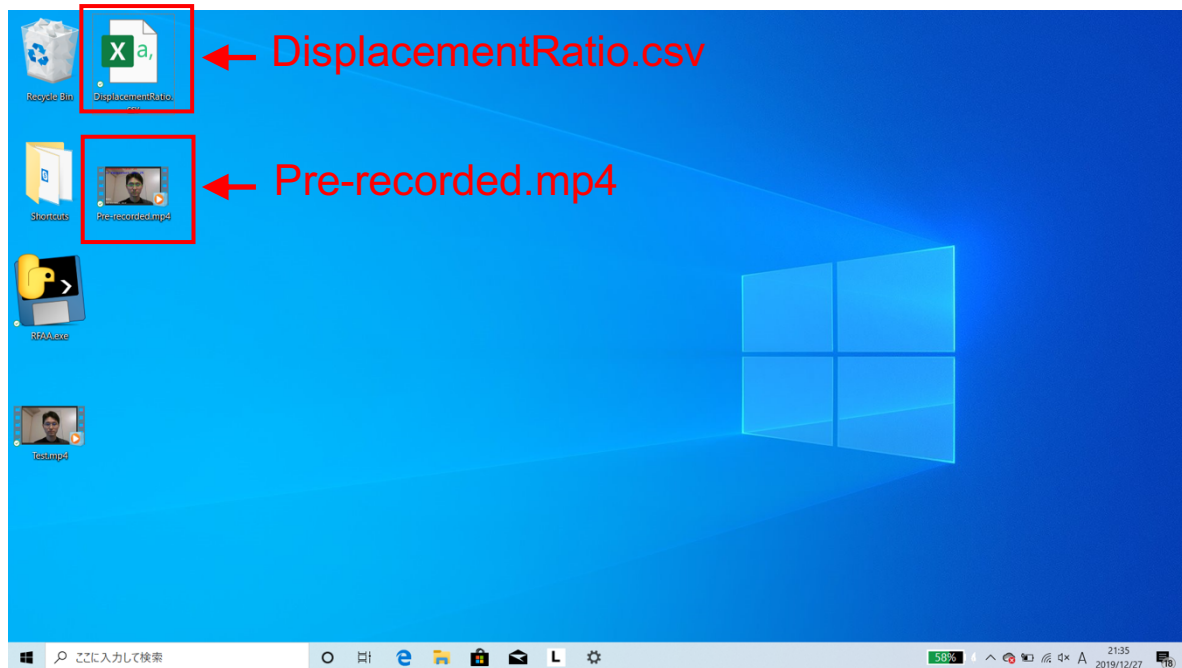


5. Select paralyzed side and start measurement [as illustrated in (B) 4 and 5].

6. Terminate the measurement [as illustrated in (B) 6].



7. The analyzed video (Pre-recorded.mp4) and the time-series data of ODR and EDR (DisplacementRatio.csv) are automatically saved.



8. Post-hoc analysis can be performed in the same way as shown in (B) 8.