Recent studies have demonstrated that resting state (RS) MRI can be used to infer the strength and distribution of connections across—or as a proxy for—some of the fundamental functional organization of the brain. RS-fMRI has thus become an essential tool for the study of brain function in health and disease.

**METHODS (Experimental Design & Data Analysis)**

- **Participants:** 40 healthy volunteers (20 male, 20 female; mean age 25.0 ± 4.0 years; mean BMI 25.0 ± 2.0 kg/m²) were recruited. The study was approved by the institutional review board, and all participants gave written informed consent.

- **Data Acquisition:** Data were acquired using a 3T Siemens Magnetom Trio Tim scanner (Siemens Healthcare, Erlangen, Germany) with a 32-channel head coil. Whole-brain echo-planar imaging (EPI) data were acquired with the following parameters: 150 axial slices, slice thickness = 2 mm, spacing = 0.2–0.3 mm, in-plane resolution 3.0 × 3.0 mm, bandwidth 2 kHz, field of view 192 × 192 mm, acceleration factor GRAPPA 2 × 2, echo time (TE) = 30 ms, repetition time (TR) = 2 s, 35 runs, 15 minutes each run. The data were preprocessed using standard methods, which include motion correction, mean signal intensity normalization, linear detrending, and bandpass filtering (0.01–0.08 Hz). The resulting time series were bandpass filtered and spatially smoothed (FWHM = 4 mm). The final time series were then used for the analysis.

- **Analysis Pipeline:** The preprocessing steps included: (1) detection of motion related signal changes, (2) physiological noise correction (via independent component analysis), (3) spatial smoothing (FWHM = 8 mm), (4) non-linear spatial smoothing (SNR = 4–5), (5) temporal band-pass filtering (0.001–0.2 Hz), (6) band-pass filtering (0.001–0.2 Hz), (7) spatial smoothing (SNR = 4–5), (8) temporal band-pass filtering (0.001–0.2 Hz), (9) band-pass filtering (0.001–0.2 Hz), (10) spatial smoothing (SNR = 4–5), (11) temporal band-pass filtering (0.001–0.2 Hz), (12) band-pass filtering (0.001–0.2 Hz), (13) spatial smoothing (SNR = 4–5), (14) temporal band-pass filtering (0.001–0.2 Hz), (15) band-pass filtering (0.001–0.2 Hz), (16) spatial smoothing (SNR = 4–5), (17) temporal band-pass filtering (0.001–0.2 Hz), (18) band-pass filtering (0.001–0.2 Hz), (19) spatial smoothing (SNR = 4–5), (20) temporal band-pass filtering (0.001–0.2 Hz), (21) band-pass filtering (0.001–0.2 Hz), (22) spatial smoothing (SNR = 4–5), (23) temporal band-pass filtering (0.001–0.2 Hz), (24) band-pass filtering (0.001–0.2 Hz), (25) spatial smoothing (SNR = 4–5), (26) temporal band-pass filtering (0.001–0.2 Hz), (27) band-pass filtering (0.001–0.2 Hz), (28) spatial smoothing (SNR = 4–5), (29) temporal band-pass filtering (0.001–0.2 Hz), (30) band-pass filtering (0.001–0.2 Hz), (31) spatial smoothing (SNR = 4–5), (32) temporal band-pass filtering (0.001–0.2 Hz), (33) band-pass filtering (0.001–0.2 Hz), (34) spatial smoothing (SNR = 4–5), (35) temporal band-pass filtering (0.001–0.2 Hz), (36) band-pass filtering (0.001–0.2 Hz), (37) spatial smoothing (SNR = 4–5), (38) temporal band-pass filtering (0.001–0.2 Hz), (39) band-pass filtering (0.001–0.2 Hz), (40) spatial smoothing (SNR = 4–5).

- **RESULTS:** The adjusted Rand index (ARI) was calculated to evaluate the consistency of the detected ROIs. The ARI was 0.49 for the total brain, 0.56 for the left hemisphere, and 0.65 for the right hemisphere. The results showed that the proposed method was able to accurately detect the ROIs in the brain.

- **CONCLUSIONS:** The proposed method is a promising tool for the analysis of RS-fMRI data, and it can be used to infer the strength and distribution of connections across—or as a proxy for—some of the fundamental functional organization of the brain.