

## LIEWAVES DATASET

**Summary:** This dataset includes EEG signals for deception detection. EEG signals were collected using a wearable and portable EEG device called Emotiv Insight, which has 5 channels, from 27 different subjects. The subjects participated in two experiments, taking on the roles of deceivers and truth-tellers. In each experiment, a box with 5 different beads was given to the subjects, and they were instructed to take 2 beads from the box and place them in their pockets. In the first experiment, subjects were asked to decide whether to assume the role of a deceiver or a truth-teller. In the second experiment, they were required to take on the opposite role. During the experiments, subjects watched a video composed of images of the beads in the box placed in front of them. The video clip started with a 3-second black screen, followed by 2 seconds of bead images and 1 second of a black screen, repeating in this pattern. After obtaining EEG data, the initial 2 seconds of excessive signal data were removed from the raw data, resulting in a total of 75 seconds of EEG data. In the deceiver role, subjects clicked the button in their left hand labeled "no" if the displayed image matched the bead they took, and the button in their right hand labeled "yes" if it did not, thus deceiving about all the images. For the truth-teller role, the opposite actions were taken, clicking "yes" for the taken bead image and "no" for the not-taken bead image, thus telling the truth for all images. EEG signals were recorded following this procedure. The EEG signals underwent an offset removal process to obtain raw EEG data. Both raw data and preprocessed EEG data were stored in .csv format. The purpose of this dataset is to provide EEG signals for deception detection, offering an alternative and diverse dataset with different channel counts.

Signal Type	EEG signals (Time series)
Purpose of Use	Lie Detection
Used Device	Emotiv Insight
Number of Channels	5
Number of Subjects	27
Number of Experiments	2
Number of Samples	9600
Stimulus Type	Image

**Dataset Contents:** In the dataset folder, there are Raw and Preprocessing folders along with Session\_1.mp4, Session\_2.mp4, Stimulus.xlsx and Subject\_Stimuli.xlsx files. The Raw folder contains .csv files for each subject and each experiment, containing the EEG data. In the Preprocessing folder, there is a subfolder with versions of the data that have undergone bandpass filtering in the 0.5-45 Hz range. Additionally, there are folders with versions of the data after applying Independent Component Analysis (ICA), Artifact Subspace Reconstruction (ASR), and

Automatic and Tunable Artifact Removal (ATAR) methods to remove artifacts from the bandpass-filtered data. The expressions such as S1, S2, S3 in the file names in the folders represent the subjects. The expressions S1 and S2 in the second position represent Experiment 1 and Experiment 2, respectively.

Folder/File Names		Description
Raw (Folder)		It is the folder containing the raw form of EEG data. EEG signals for each subject and each experiment are stored in .csv format in this folder. (S1S1.csv, S1S2.csv S2S1.csv ...)
Preprocessing (Folder)	1_BandPass_Filtered (Folder)	It is the folder where EEG data with a bandpass filter in the range of 0.5-45 Hz applied to raw EEG data is stored in .csv format.
	2_ASR (Folder)	It is the folder where EEG data, to which a bandpass filter has been applied to remove artifacts, and the Artifact Subspace Reconstruction (ASR) method has been applied, is stored in .csv format.
	3_ICA (Folder)	It is the folder where EEG data, to which a bandpass filter has been applied to remove artifacts, and the Independent Component Analysis (ICA) method has been applied, is stored in .csv format.
	4_ATAR (Folder)	It is the folder where EEG data, to which a bandpass filter has been applied to remove artifacts, and the Automatic and Tunable Artifact Removal (ATAR) method has been applied, is stored in .csv format.
Session_1.mp4		Video clip shown to subjects in Experiment 1.
Session_2.mp4		Video clip shown to subjects in Experiment 2.
Stimulus.xlsx		Excel file containing the names and images of stimuli used in the experiments.
Subject_Stimuli.xlsx		Excel file indicating which beads the subjects took during the experiments and whether they told the truth or lied during the experiment.