

# Identification of Error-Related Observations from Event Related Potentials Using Pattern Recognition Techniques

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**Aim:** to compare pattern recognition techniques that have been used for the identification of correct or incorrect actions by means of Event Related Potentials (ERPs).

**Material and method:** ERP data from 47 electrodes were acquired from 16 volunteers (observers), who observed correct or incorrect responses of subjects (actors) performing a special designed task.

## Features:

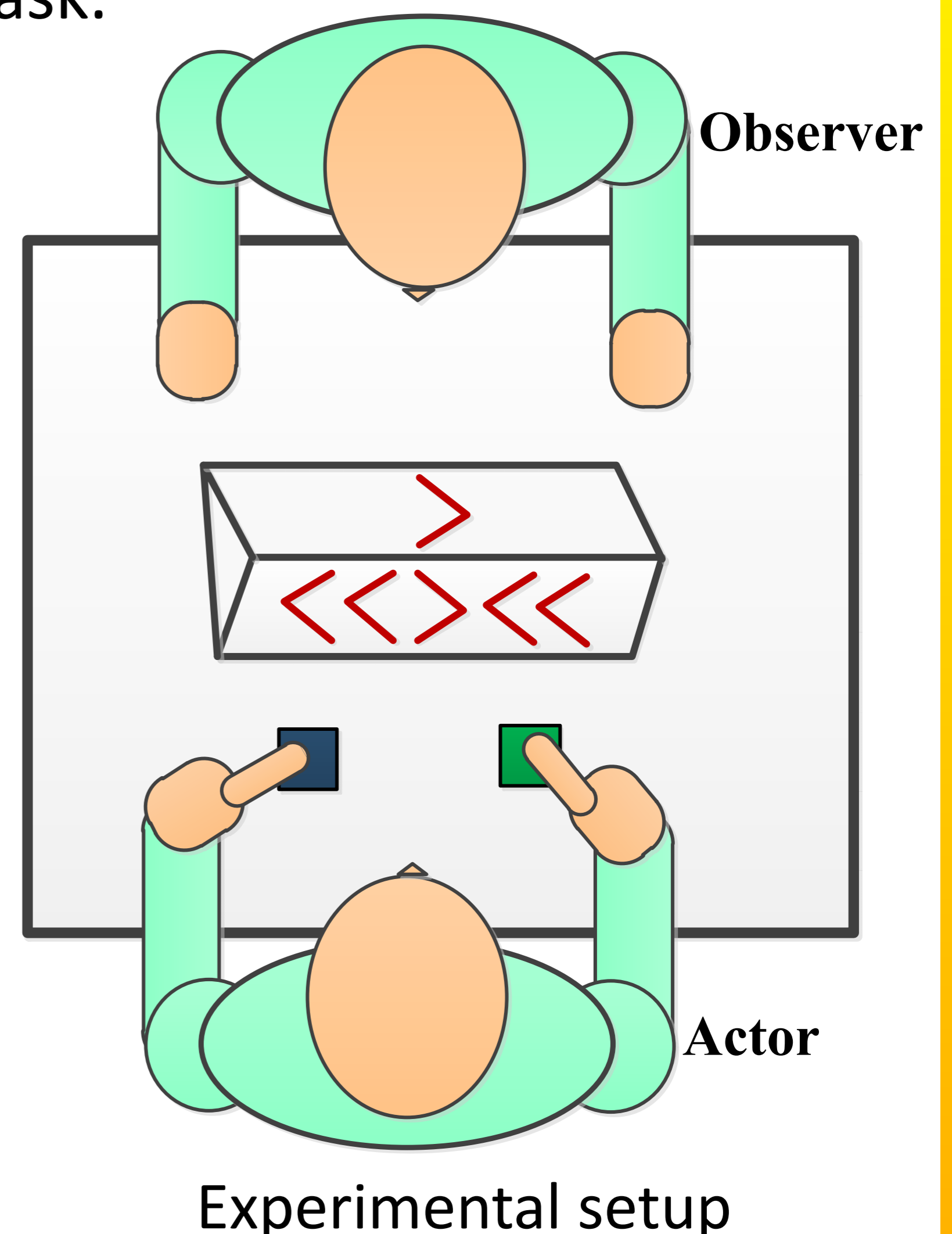
- First and second order statistical features
- frequency domain features
- $\Sigma$ - $\Phi$ - $\Omega$  features

## Feature selection methods:

- Sequential Floating Forward Selection (SFFS)
- Wilcoxon rank testing
- Genetic Algorithms (GA)

## Classification Algorithm:

- Artificial Neural Networks (ANN)
- Support Vector Machines (SVM)
- Fuzzy C-Means (FCM)



## Results

Features	Feature selection method	Classification Algorithm	Performance
1 <sup>st</sup> order statistical	Wilcoxon ranking	SVM	100%
$\Sigma$ - $\Phi$ - $\Omega$	GA	FCM	93.8%
1 <sup>st</sup> order statistical	SFFS	ANN	87.5%
Frequency domain	SFFS	FCM	84.4%
2 <sup>nd</sup> order statistical	Wilcoxon ranking	SVM	84.4%