Title (tentative): Electrovibration-based tactile feedback for touch-based interactive systems

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Motivation and application domain
A major problem with current-generation touch screens is lack of dynamic tactile feedback, which limits the realism of the interaction. Controlling the electrostatic friction between an instrumented touch surface and the user's fingers (electrovibration effect) would potentially enable a broad range of tactile sensations. Applications range from understanding the mechanisms of dynamic touch, to assistive devices for visually impaired persons, to advanced touch-based interfaces.

General objectives and main activities
The main goal is to develop a novel device that complements a touch screen with vibrotactile feedback based on electro-vibration. The device will be initially used to systematically assess whether and to what extent electrovibration is capable of rendering realistic haptic sensations. Further, experimental investigations will be carried out on visuo-haptic information transfer. The work will have a technical part (development of the device) and an experimental part (experimental study of electrovibration effect, studies of visuo-haptic stimulation).

Training Objectives (technical/analytical tools, experimental methodologies)
- Design and development of electronic device integrating touchscreen and electrovibration
- Conducting psychophysics experiments with healthy subjects
- Conducting visuo-haptic integration experiments (e.g., psychophysical illusions)
- Analysis of psychophysics and/or sensorimotor data with MATLAB

Place(s) where the thesis work will be carried out:
Neurolab DIBRIS (Pad. E, II floor), PSPClab DIBRIS (via Opera Pia 11a, III floor)

Pre-requisite abilities/skills:
Interest in experimental activities with human subjects; programming skills in MATLAB and C/C++ are highly desirable.

Maximum number of students: 2