
Master project, 2018-2019

— Optimal design and control of a transducer having several modes of resonance —

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Context

Capacitive Touchscreens are the major input device for Human Machine Interaction, from smartphones to automotive dashboards. However, growth rate of such devices is now limited by the fact that since no tactile feedback is felt by the users, they attract visual attention which is a limitation in many applications, like automotive for instance. Recently, the multimodal approach has been proposed to focus ultrasonic wave in a solid medium in order to create tactile stimulation on a capacitive touchscreen. To operate, these devices need to control the vibration of more than 15 modes. So far, the control of the modes is done 'open-loop' with a model. The PhD thesis of Anis Kaci is about the closed loop control of $N > 15$ modes in closed loop.

Objective

The aim of the Master Thesis is to participate to the development of an enhanced touchscreen with haptic feedback. You will have to work with Anis Kaci in order to implement the closed loop control on a tactile display. In particular, you will have to make the design of the touchscreen and manufacture it.

Work steps

For that purpose, you will have to:

- propose a design of a transducer which is optimized for the actuation of the required number of modes,
- implement the control loops in order to focus the waves in the medium
- conduct experimental evaluation in a psychophysical study.

Key word

Haptic, piezoelectric transducer,

References

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