Introducing the Modifier Tactile Pattern for Vibrotactile Communication

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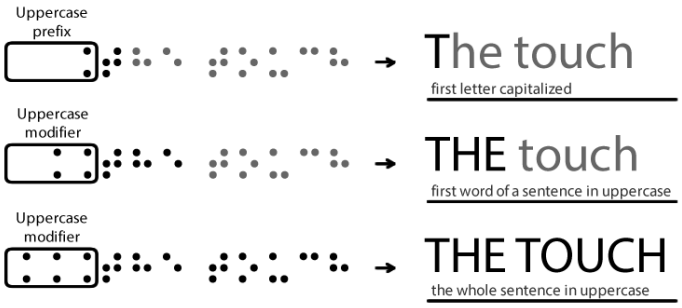
A Strategy for Tactile Prefixation

We present the concept of "Modifier Tactile Pattern" as a pattern that modifies the interpretation of other elements that compose a Tacton or an entire tactile message.

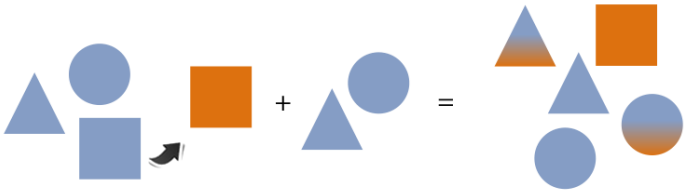
This concept was inspired by the prefixation strategy of the Braille system to increase its capability to compose new patterns.



Modifier in Braille formed by concatenating the uppercase prefix.

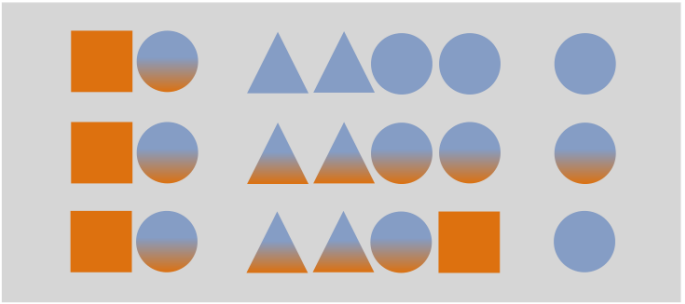
How to Design with Modifiers

The vibrotactile Modifier acts like a specializing flag. It can be composed by more than one pattern and its use increases the expressiveness of a set of tactile patterns.



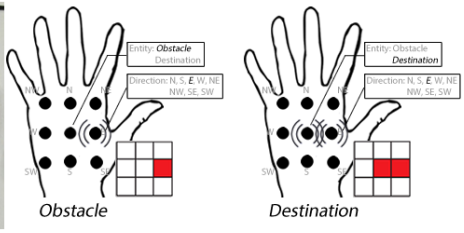
Symbolic representation of new pattern composition by the use of a signal as prefix.

It can change the meaning of the current Tacton or the meaning of the next Tacton. It can also change the meaning of an entire tactile sequence:



Testing a Modifier-based Vocabulary

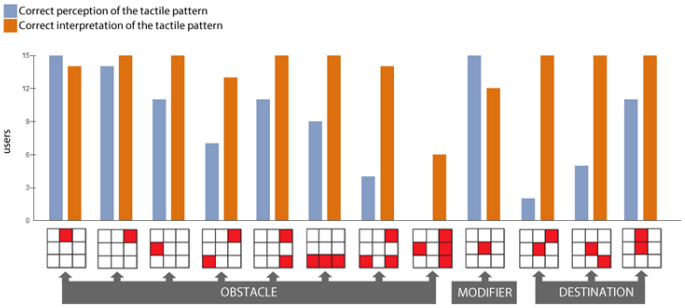
Vibrotactile display



Example of patterns delivered by the tactile display

We designed a vibrotactile display and a simple vocabulary to test the use of modifiers.

Then, we performed an experiment in which we verified the perception and interpretation for twelve different patterns.



Interpretation of the patterns' information was better than perception of the position of each motor.

The central vibrator became the first to be processed by users in order to discern what kind of information the tactons were transmitting.

More About Modifier Tactile Patterns

- The prefixation increases the language expressiveness without requiring additional symbols
- The prefixation strategy can keep the tactile language easy to learn and to memorise as we convey more information with new combinations
- The use of Modifiers can support the design of tactile visualizations and data representations with great expressiveness
- As future work, we want to assess the transmission of even more information during interactive tasks and try out other approaches for syntax construction

EUROHAPTICS 2014

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