International Journal of Innovative Computing, Information and Control
Volume **7**, Number **3**, March **2011**

ICIC International ©2011 ISSN 1349-4198
pp. **1397–1411**

A STUDY OF THREE NOVEL LINE-BASED TECHNIQUES FOR MULTI-TARGET SELECTION

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Received October 2009; revised February 2010

Abstract. *This paper presents three novel selection techniques (called Rubber-ling-sweep, Line-string and Coupling-with-pressure) to enhance multi-target acquisition in GUIs and to overcome the drawback of the standard Rubber-band box technique, i.e., the limitation of not being able to select an irregular layout of targets. Rubber-line-sweep utilizes a rubber-band line to select targets by "sweeping" them. Line-string employs a line stroke to "string" targets together and select them. Coupling-with-pressure couples the two techniques with pressure as a switch mode. Experiments were conducted to compare these techniques with the standard Rubber-band box, which used a two-dimensional grid which could include varied target sizes, distances and target layouts, and which is applied by using pens as input devices. Experimental results indicate that Rubber-line-sweep, Line-string and Coupling-with-pressure show significant advantages for targets of irregular layout. Taking performance and subjective ratings together, Coupling-with-pressure outperforms the other three techniques.*
Keywords: Pen-based interface, Rubber-band line, Gesture, Multi-target selection

1. **Introduction.** Pen devices such as PDAs and Tablet PCs, have been used more and more widely because of their natural pen input. However, the current operation systems (OS) for pen devices still remain the style of OS initially designed for Mice, e.g., multiple target selection technique: Rubber-band box. The Rubber-band box works like this: the rectangular selection region is specified by extending the diagonal of the rubber band box by dragging; the targets interacted by the rectangular selection region are highlighted for selection. An obvious drawback of the Rubber-band box is that it is difficult to select the multiple targets that are not included in the rectangular area. Conversely, it is impossible to exclude unwanted targets form the rectangular area without further clicks, taps or other maneuvers. So, when selecting multiple targets that are arranged irregularly, the user has to implement a variety of selection tasks such as using tapping the "Ctrl" key and the Rubber-band box together. In some sense the Rubber-band box limits the user's performance in multiple target selections.