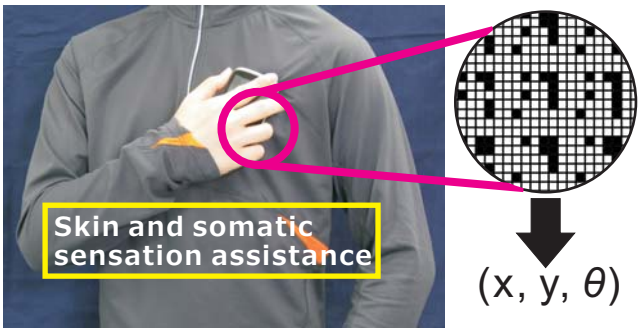
A Demonstration of Wearable Interface Based on Position on Fabric

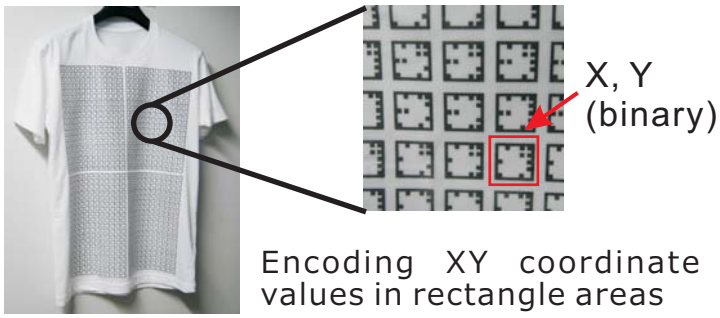
Kei NAKATSUMA, Hiroyuki SHINODA (The University of Tokyo)

In this demonstration, we present a wearable input technique for small computing devices like smart phones. Our input system does not require any visual assistance. We expand an interface of a handheld device to our clothes. We use a built–in camera of the device to detect a position information pattern printed on the clothes. Once the device identifies its position on the user's clothes, it processes an allotted function to the position. A user can utilize haptic and somatosensory feedback in place of visual feedback because our system requires direct contact between the device and the clothes.

System Overview



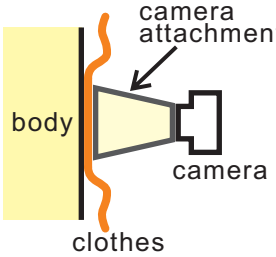
Fabric with Position Pattern



Encoding XY coordinate values in rectangle areas

➡ Unique pattern in over 5mx5m area

Camera Attachment



> Keep the capturing surface flat

> Keep the distance between the clothes and the camera

> Avoid occlusion

We encode a position information pattern on fabric. A camera captures the pattern and detects its own position and orientation on the fabric.

By constructing clothes with fabric with the position information pattern, some simple input operations for small computing devices such as smart phones is achieved. Various functions of the devices are allocated on the clothes depending on the position.

To capture the position pattern stably on flexible fabric, we mount an attachment on a camera. The attachment keeps the distance between the camera and the capturing pattern on fabric constant. Additionally, it makes the fabric surface flat. Invisible ink (e.g. UV luminescence ink) could make the position pattern invisible.

By holding the attachment directory on the clothes, users can perceive the input position through their skin and somatic sensations. Our goal is achieving a system to operate smart phones etc. without any visual assistance by utilizing these sensations. The system could be applied to situations such as driving, jogging, dangerous works which requires gazing, works with gloves, etc.

Email: tsuma@alab.t.u-tokyo.ac.jp Web: http://www.alab.t.u-tokyo.ac.jp/~tsuma/