Hand Posture Recognition in a Body-Face centered space

Sébastien MARCEL
France Télécom, Centre National d'Études des Télécommunications ,Technopole Anticipa, 2 avenue Pierre Marzin, 22307 Lannion , France
sebastien.marcel@cnet.francetelecom.fr

Introduction

Context :

A personal computer using a free hand gesture interaction.

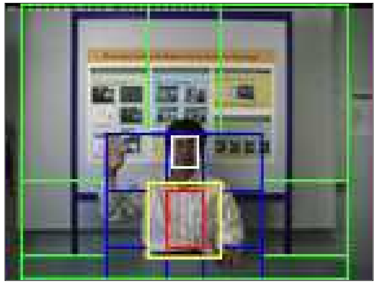
Goal :

Detect hand posture in a full user-body image.

Method used :

- Step 1 : LISTEN detects & tracks the local user face.
- Step 2 : The body-face space is built using the face.
- Step 3 : When a skin color blob enters an "active window", hand posture recognition is triggered.

Body-Face model

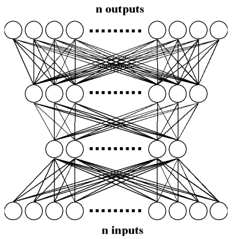


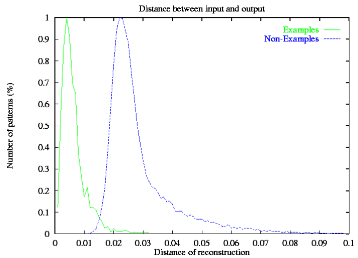
The body-face space is built using :

- the face,
- the anthropometric proportions of the body.

Neural Network detector

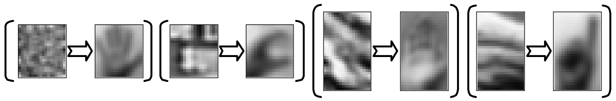
The Constrained Generative Model :





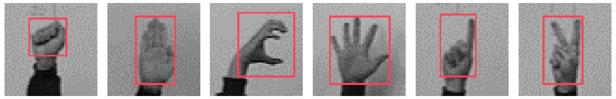
The Constrained Generative Learning :

- Hand example : reconstructed as itself.
- Non-Hand example : reconstructed as the mean neighbourhood of the nearest hand example.



Hand Posture Database

Selection of a small set of hand postures : A, B, C, Five, Point and V.



Results

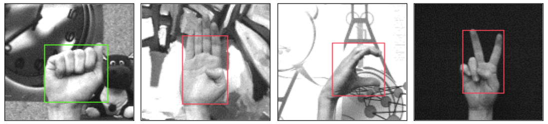
Mean results on A, B, C and V hand postures from our database :

	Detection rate	False alarm rate
Uniform background	93.8 %	1 / 11,111
Complex background	74.8 %	1 / 18,867

Mean results on A, B, C and V hand postures from Jochen gallery :

	Detection rate	False alarm rate
Uniform background	93.7 %	1 / 25,641
Complex background	84.4 %	1 / 15,873

Images from Jochen hand postures gallery :



Future work

Improvements needed :

- lower the false alarm rate,
- combine CGM detectors for hand posture classification.