

# AUGMENTING ENVIRONMENTS BY AUTOMATED SIGN LOCATION AND TEXT DETECTION



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# BACKGROUND

Interested in developing a framework augmented/mixed reality studies ...

... that use AI techniques for *robustness* and *information selection/sequencing*

- ★ Real-time object recognition/tracking
  - ☞ user movement, lighting effects
- ★ HCI studies into the most effective presentation of information about objects
  - ☞ text, graphics, audio



# AIMS and OBJECTIVES

With the increasing movement of tourists and students, can assistance be given when street/road signs are not in their native language?

Can AR/MR techniques can provide a practical solution, by *locating* signs in the field of view, *detecting* a sign's text and *translating* it into their native language?

➔ with audio output the system could also be used for visually impaired



# OPERATING CONSTRAINTS

In order to investigate the feasibility of this approach a very constrained environment was used:

The direction signs on the Salford Campus are green and rectangular, with a fixed size and font

It was also assumed that the user was walking towards a sign (and looking at it)





# OPERATING PLATFORM

The intended platform is a wearable PC with a video camera input, with mobile communications link to a centralised database containing the translations ...

... but the feasibility study used a laptop with lightweight (low resolution) Webcam and a small database with templates of likely words, text translations, sounds

☞ students uncomfortable walking around Campus wearing a HMD



# DEVELOPMENT METHODOLOGY

In-house software C/C++ framework for live video capture/display, but able to import still images for development/testing object recognition and template matching

System processing stages:

- ① look for a rectangular 'green' object with correct aspect ratio
- ② keep monitoring until the object has a pre-determined size
- ③ template match with 'likely' words
- ④ display match in chosen language





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# RESULTS

The system works within the constraints, but is not robust enough for general use

➔ particularly the object location and tracking in varying lighting

However, it is sufficiently reliable for the HCI presentation media studies to start

It will also be evaluated in Egypt for translating their Arabic signs into English



# CONCLUDING COMMENTS

The basic approach seems to offer a solution to street sign location and text translation, but the object recognition needs to be more robust

- ☞ system uses simple rules, but no reasoning/learning capabilities yet

The continuous video monitoring/analysis approach may not be the best for this task

- ☞ PDA+camera, letting a user point out specific signs for translation?

