

Foresight Cognitive Systems Initiative Workshop on Speech, Language & HCI

A COMMON RESOURCE FOR THE COGNITIVE SYSTEMS GRAND CHALLENGE

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We suggest that one of the three large projects envisaged in the Cognitive Systems 'grand challenge' proposal should have the aim of providing a shared, integrative resource for the UK community working in the relevant areas. The resource would provide facilities for multimodal, multisensorial data collection in controlled conditions in real time. It would also include software for organising, analysing and annotating such data, and key management and technical personnel. The argument would be that to give the UK advantage in addressing the grand challenge we need a common resource which will support studies attacking fundamental problems in ways which are not feasible at the moment. The proposal would then go on to justify this argument by requesting support for a small number of multidisciplinary, collaborative projects based on the use of the resource, as exemplars.

This resource would be available to the UK 'cognitive' community, and would be used in something like the way astronomers use telescopes and particle physicists use accelerators: these are expensive to set up (ours would be relatively cheap!) but they have a long lifetime and support a range of studies, large and small. The availability of the resource will bring the community together, enable studies which would require much more funding if they were starting from scratch, promote evaluation standards, and so on. The resource would provide facilities for the collection and analysis of multimodal, multi-level data from 'scenes' in which humans and artifacts are engaged in individual or collaborative tasks. It would support studies investigating the integration of perception, action, learning, communication and reasoning. In addition to passive data collection/analysis there would be the opportunity, for instance, to research decision-making by placing artificial agents within the scenes and presenting them with the same problems faced by humans - such as in chairing a meeting. By resourcing projects like this we would propose to move Cognitive Systems research towards corpus-based studies, with their proven advantages of trainability, incremental progress and comparative evaluation. Data would be collected for the purpose of particular studies, but would then be available for other work, so that the value of the data repository itself would grow with time.

The resource would consist of one or more controlled environments (such as anechoic rooms) equipped with microphones, cameras, binaural & stereoscopic mannekins, imaging equipment¹ (see footnote) and so on. The range of sensors would be expanded as the resource was used for a widening range of studies, with the requirement that the sensing devices remain with the resource. In the long term, proposals to EPSRC (and to the EC ERC if/when it is set up) would make use of the resource, either studying existing data and/or adding to the resource, so that there is continuation beyond the funding period, by which time the momentum of the studies it enables would support its continued expansion from other grants.

To create this resource, the UK community can leverage on the data and the experience currently being accumulated in the EC-funded 'meetings' projects M4 and AMI, which are collecting multimodal corpora recorded in 'smart meetings rooms'. The UK partners in these projects are Edinburgh and Sheffield. A recording facility is being installed at Edinburgh. The ability to collect, organise, analyse and annotated this multimodal data is as important as the meetings corpora themselves, though they are a useful starting point. We can pursue the possibility of linking UK and EC funding, meeting ERA objectives

1 This outline proposal is written from the perspective of hearing, speech, language and vision rather than imaging, but we anticipate that the arguments for a central resource apply to that theme also.