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POSSIBLE AVENUES IN ROBOTIC DEVICES
AS AIDS TO THE DISABLED

Little work on robotic aids seems to be going on in New Zealand at the moment [1], though it is certainly likely to be an important field in the future. That can be interpreted either as a signal for caution, or as an opportunity. The cautious argument goes like this : until there is more experience around, it would be premature to propose a high-level approach; the best procedure is probably just to take a few individual cases and to see where they lead. The alternative is to see the clear field as an invitation to formulate guidelines for future development, drawing on overseas experience, and unhindered by existing local interests : this would be my own choice, were I in a position to make such a choice.

As it is, I am only in a position to make proposals for my own activities, and this note is offered in that vein. It would obviously be sensible to begin with simple tasks which would be widely useful and which can be accomplished comparatively easily and cheaply. Some possibilities are :

o   Simple manual tasks, such as opening doors, or picking things up from the floor – something in the nature of power-assisted lazy tongs. The computing required is fairly undemanding, provided that the necessary intelligence is provided by a human operator (though there may be complications in trying to guide a machine from instructions given by someone of limited dexterity and articulation), so it should be possible to achieve something useful comparatively cheaply. (I can't guess at the cost of the mechanical components off the cuff, though with judicious choice of project one could avoid any requirement for precision engineering. Small robotic arms can be had for less than $1000.)

o   Simple assistance with mobility : to provide fine control of a wheelchair's path when the person in the wheelchair is only capable of gross movements. Negotiating doorways, proceeding smoothly along corridors (and avoiding obstacles !), perhaps eventually automatically making comparatively long journeys round some area such as a building or small park, small enough for its routes to be "taught" to the computer.

NOTE : I am aware that one would have to proceed with great circumspection on a project of this sort; technical problems aside, it is perhaps not a good idea to do for people what they could do themselves. This is one good reason for not aiming at a completely computer-controlled vehicle. While such machines can be constructed (2), it seems far better in principle to leave ultimate control as far as possible with the person using the vehicle.

o   Special devices to assist disabled people to live independently. Again, the intention would be to provide support for detailed, awkward, or continuing operations while relying on the disabled person for overall decisions. A productive approach could be to concentrate on a single field (cooking, sweeping, sewing) and to do it well, rather than to produce a few scattered items which could only be used for specific single purposes.

REFERENCES.

(1)   Adrianne Cranshaw : "*Computer use by disabled people*", p50 (New Zealand Council for Educational Research, 1985)

(2)   R.L. Madarasz, L.C. Heiny, R.F. Cromp, N.M. Mazur : "*The design of an autonomous vehicle for the disabled*", IEEE J. Robotics and Automation **2**, 117 (1986)