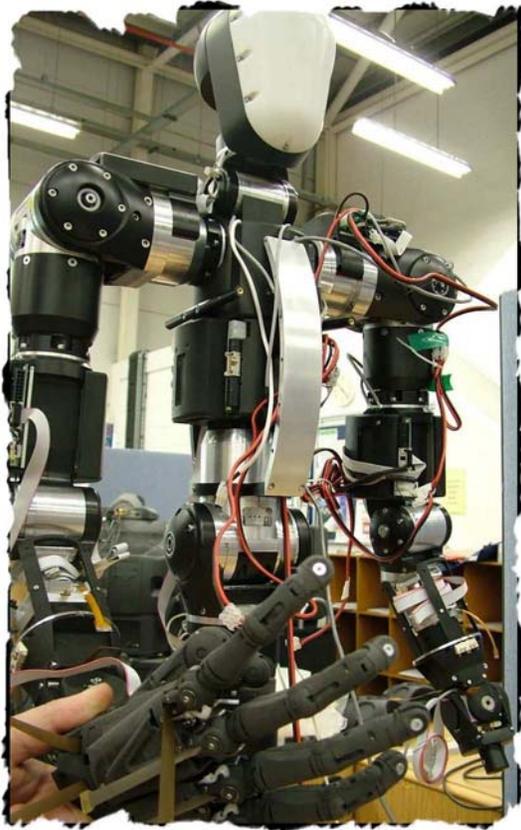


EPSRC DTA Studentship – Human(oid) control approaches for the Bristol Robot



The BRL humanoid robot hand-arm assembly is a multiple-redundant actuation system of impressive proportions. It is a heavily distributed system with sensors, actuators and micro-processor system communicating with each other over a Controller Area Network (CAN) interface. Each actuator, from finger-digit to shoulder requires to be controlled to create an overall human(oid) movement pattern. All this is to be brought to bear on 'active-touch' finger-tip investigations of object surface shape and texture.

The focus of the PhD research project is on exploring novel intelligent and optimal control system architectures which exceed the notion of standard robotic task completion and path planning. The control system has to exploit the strong cross-coupling in the system allowing both coarse movement, and finger-tip micro-actuation with human appearance. Signals from state-of-the-art sensors developed at the the Bristol Robotics

Laboratory (BRL) for force, temperature and surface shape/texture in the hand and fingers must guarantee safety and interaction with the outside world. The control strategy will require a context-dependent balance to be found between the options of coarse higher-power actuation, and finer micro-actuation of the finger-tips to achieve true human(oid) characteristics. In addition, the control system needs to take account of the practical limitations of the robot, e.g. its highly distributed character communicating over a CAN.

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