Industrial Co-bots Understanding Behaviour

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Natural communication

Reinforcement learning

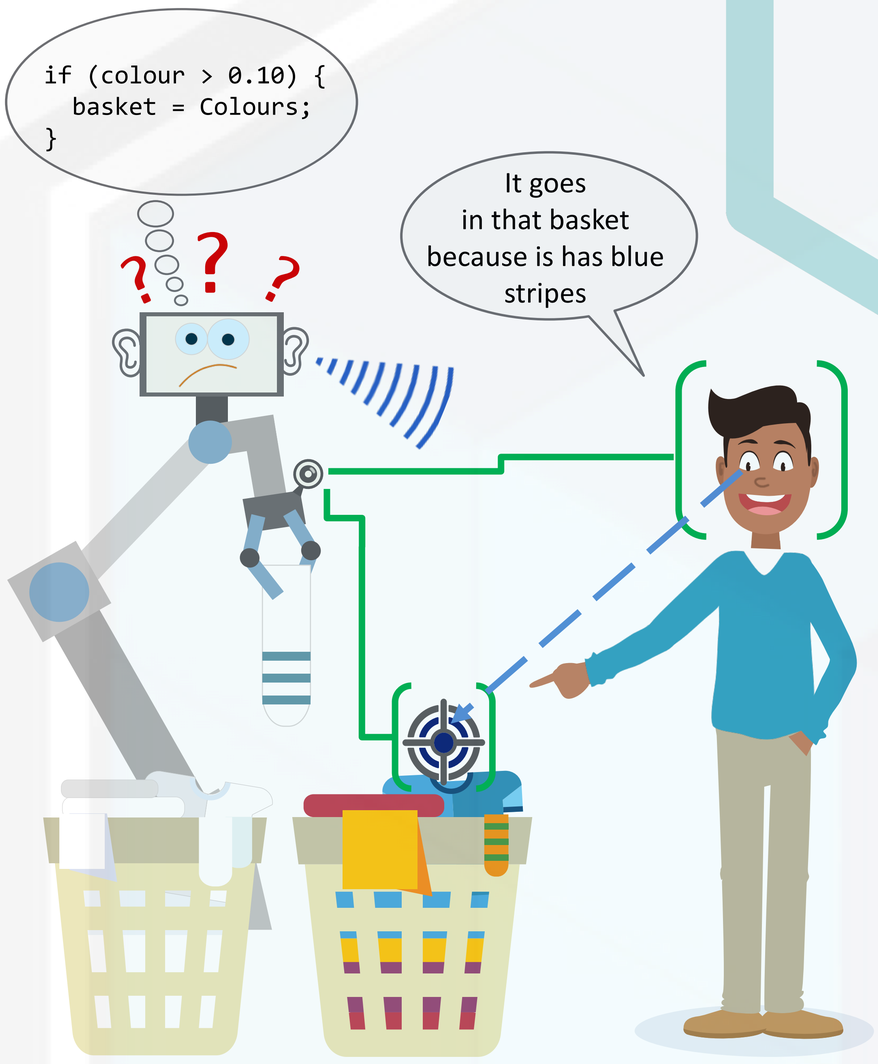
Speech recognition

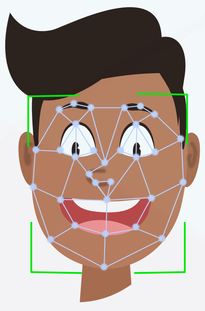
Existing collaborative robots, or **co-bots**, **lack the ability to sense** humans and their behaviour appropriately. **Current methods for teaching** co-bots how to perform tasks **rely on physical manipulation and programming** of mechanical, hierarchical, instructions given explicitly by the human trainer.

The **iCUBE** project is developing **new methods** to enable co-bots **to learn** in a more **naturalistic manner**, using **sensors** to interpret the actions, language, and expressions of their human collaborators. **Advanced algorithms** for decision-making, combined with **reinforcement learning** techniques will enable more **effective human-robot cooperation** in shared tasks.

Advanced algorithms

Pose estimation





Face analysis

Efficient Co-bots

Sensors

Human-robot cooperation

The demonstrator project

Our first demonstrator project shows how a small industrial co-bot can learn to sort laundry for washing. Starting with simple rules to separate white garments from colours, the co-bot will use computer vision techniques to identify which laundry basket to place each item into.

As the decisions become more complex, such as where to place a garment that is both white and coloured, the co-bot will detect and learn from cues given by the human trainer to formulate new rules to inform its decision-making. The co-bot will test these rules in future decisions, using reinforced learning to inform and update the decision-making algorithms.

Future Impact

- Application into manufacturing settings
- More fulfilled, healthier workforce
- Increased UK productivity

Aims

- Natural Human-Robot Interaction with enhanced communication between humans and robots through reinforcement learning
- Study how people use co-bots with established Human Factors techniques

Outcomes

- Improved human-robot communication
- New knowledge on how to teach robots using natural language and gestures

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