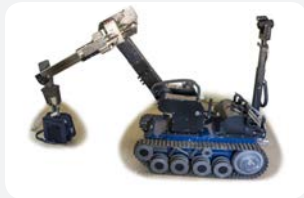


Standard Test Methods for Response Robots

In Partnership with the US National Institute of Standards and Technology (NIST), US Department of Homeland Security (DHS), US Defence Advanced Research Projects Agency (DARPA) and the Japan Science and Technology Agency (JST).

As part of the DHS-NIST-ASTM International Standard Test Methods for Response Robots project, we work with collaborators from around the world to develop performance metrics for robots used by bomb squads, search and rescue teams, police, hazardous materials responders and the military.



We are leading projects to bring response robotics research challenges to high school students. The Open Academic Robot Kit (OARKit) leverages 3D printing and laser cutting to lower the cost, infrastructure and skill barriers of entry into robotics research. The Rapidly Manufactured Robot Challenge provides an arena where high school students can demonstrate their novel solutions to open problems in the response robotics field.



See <http://robottestmethods.nist.gov> for details!

See <http://comp.oarkit.org> for details!

Explainable Artificial Intelligence (XAI)

In Partnership with the US Naval Research Laboratory, US Air Force Office of Scientific Research, Australian Defence Science and Technology Group and the University of New South Wales.

We are working on agents that explain their decisions, justify their actions and teach us what they have learned. We need to be able to trust that mission critical agents make decisions that are well founded, that we can discover the extent of errors and that we can verifiably correct them.

A Categorisation of Explanation:

Source:

Post-Hoc Rationalisation - explanation that fits the decision.

Introspective - tracing the actual decision making process.

Depth:

Attribute Identity - which attributes were used.

Attribute Use - how they were used.

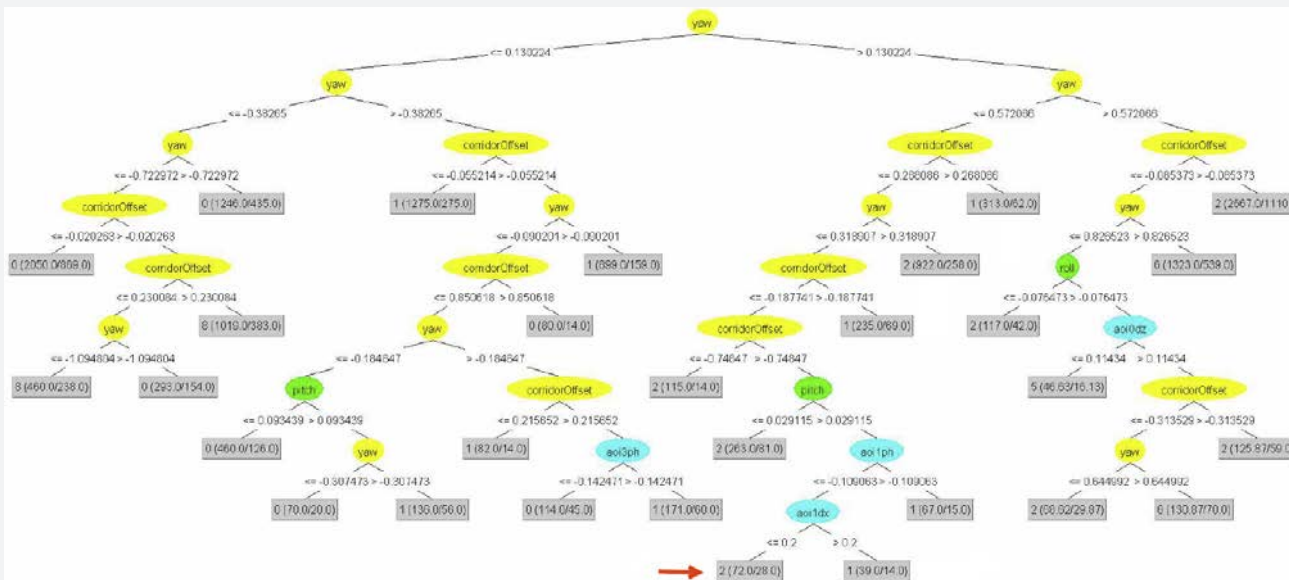
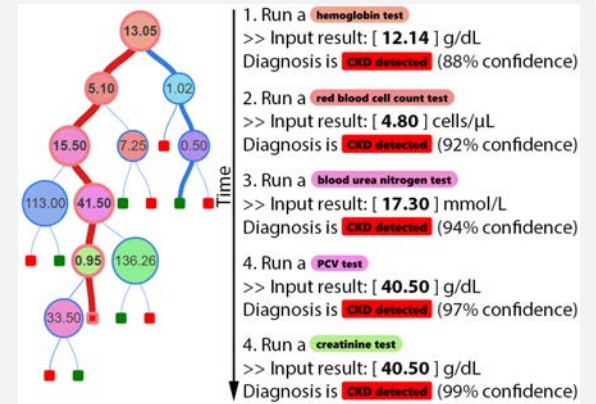
Model - how the underlying model was generated.

Scope:

Justification - justifying a decision or set of decisions.

Teaching - what has the agent learned more generally.

These categories enable the matching of the different explanatory requirements of various applications and users to the explanatory capabilities of different XAI techniques.



Hum: What are you about to do?
 Rob: I have decided to drive forward and to the right.

Hum: Why did you do that?
 Rob: I believe that I should drive forward and to the right BECAUSE I am headed between 7.5° and 18° relative to the corridor AND between 19% and 75% to the left of the corridor AND pitched up by more than 1.7° AND the area in front of my left wheel is higher than normal ground level AND the largest obstacle in that area is in the left 20%.

Hum: How confident are you in this decision?
 Rob: This action is predicted to be correct 61% of the time, based on 72 training examples and 8 possible actions.

Hum: What is the next most likely action to take?
 Rob: The next best action is drive forward but that would require the largest obstacle in the area to the front of the left wheel to be in the right 80%.

See <http://explainableai.org> for details!