
Rescue me: tangible collaboration

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The purpose of this paper is to describe the development of a tangible collaboration tool for the communication of principles related to cooperation and resource use decisions in a science centre environment.

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Rescue is a table-top rescue scenario with a shipload of people awaiting rescue. The players use wooden blocks to maneuver rescue implements (bridge, rope, ladder) to help the people transverse a series of obstacles. The game is designed in such a way that it is very difficult for one player to complete the task alone (there aren't enough resources). Decisions about survival are made on several levels as the player is being forced to make decisions about who survives (the shipwreck splits the whole group in two, the survivors have different abilities, and some islands have limited capacity).

Rescue is implemented as a finite state machine, in C#. Up to 100 survivors are generated by the shipwreck, splitting in two directions. Arriving on an island changes the person state to "seeking" which, in the absence of a tool to get off the island, generates a general milling about. On collision with an island edge they either turn around, or, with a suitably small percentage, fall into the sea. Arriving in the sea

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switches state to swimming, whereby they swim back to the ship.

The tools provide a means to move from island to island – either across water or to higher levels (implemented as separate islands). The tools are implemented using ReactIVision fiducials (<http://reactivision.sourceforge.net/>). ReactIVision is open source cross-platform computer vision framework for the fast and robust tracking of fiducial markers attached onto physical objects. The fiducials (think amoeba-like barcodes) are detected by a webcam modified to detect infrared. This, along with a projector for the gameplay and speakers, are mounted under a sheet of etched and strengthened glass. The box supporting the glass contains infra-red lights and is lined with aluminum foil to create consistent illumination. Fans expel air from the box. The projection is bounced off a mirror to lengthen the throw to enlarge the playing surface.

When the player moves or places a fiducial marker (on the underside of the tool blocks), it is detected by ReactIVision which sends a message to the C# application. The tool is graphically shown at a fixed offset from the wooden block – the survivors then walk, climb, slide or swing over the tool as appropriate. Multiple tools can move used or moved simultaneously.

The game is always running, so there is no start, nor end state. Any successful survivors who reach the Rescue tent are rewarded by the rescue flag being raised (height represents the number of successful survivors in last ten minutes). Pre-recorded sound files “help me”, “I’m hungry” and so on to attract attention, along with “thank you” messages when using tools, with increasing joy as survivors near the goal.

