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701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

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Chapter XIII

On the POPSICLE Experiments

with Andrew Terzi, Towson University, USA

Abstract

This chapter presents an empirical investigation executed with the purpose of calibrating parameters of the Interactivist-Expectative Theory of Agency and Learning (IETAL) and Multi-Agent Simulated Interactive Virtual Environments (MASIVE) simulations. The experiment aims to understand the use of inborn schemes in humans, their use of context, as well as imitation in two-person teams. Variations were performed in order to implement observations from previous versions of the experiment.

Introduction

Patters in Orientation: Pattern-Aided Simulated Interactive Context Learning Experiment (POPSICLE) focuses on studying patterns in orientation in subjects, representing a study of their inborn scheme. It uses a set of small mazes with obstacles, whose every block (tile) is of a particular color. It is a pattern-aided

experiment, as there are hidden pattern in the mazes — for example, if the subject keeps on stepping on red tiles, he/she will get to the goal tile. The goal is placed in a single place in this environment and this is where the drive of the subject is satisfied, as their goal is to find that place. This experiment simulates the IETAL/MASIVE agents and is interactive on at least two levels: (1) the subjects interact with the software agent, and (2) they interact between themselves. The investigation looks at contextual learning, as the agent's visible environment differs from that of the designer's. At different stages of the experiment, a different amount of information is presented to the subject, in the sense of instructions and context. The subject does not get to see the whole environment. In different stages of the experiment, he/she sees either the color of the square (tile) of the maze they are on (context 0), or the present tile and the immediate neighboring tiles (context 1).

Emulating Agents on Humans

In this section we comment on how we can emulate our agents in human subjects. In the sense of our theories, humans are the only agents that are linguistically competent.

For the purposes of experiments with humans when trying to emulate abstract agents, we need to achieve that the human subjects take into consideration only actions that can be undertaken in the quest for the goal. The agent is defined by the perceptual resolution, the action repertoire, the inborn scheme, and the drives.

We control the *perceptual resolution* of the experiment by choosing a limited number of distinct colors (red, yellow, green, and blue, with black denoting obstacles). Human perceptual resolution, when color is in question, is significantly better, although it varies individually.

When defining the *actions*, we tell the subject what inputs he/she should pay attention to and what possible motor actions he/she is allowed to do. The subject is told: "You are allowed to press or not to press these buttons" and the experimenter shows the buttons to the subject. In the POPSICLE experiment, the agents can move *up, down, left,* and *right*. All other keys on the keyboard are disabled.

Schemes are inborn, and with the restrictions in action they reflect the subject's schemes. The *contingency table* is initially empty as the subjects do not know anything about the experiment that is to follow.

External goals are also verbally given to the subject. Examples of those would be statements like "React as fast as you can!" or "Make the screen go pink!"