2007-03

Team 8: Representing Situation Awareness in Agent Based Models

Spaans, Mink; Dean, David; Matsopoulos, Alexandros; Sanchez, Paul

Team 8: Representing Situation Awareness in Agent Based Models

TEAM 8 MEMBERS

Mink Spaans – Lead, Contact*
Spoelstra, Maartje
TNO Defence, Security and Safety

David Dean - Contact *
Vincent, Alasdair
DSTL Land Battlespace Systems, UK

Matsopoulos, Alexandros
Sanchez, Paul
Naval Postgraduate School

GOALS

The ultimate aim of the Combat Identification (Combat ID) team is to enable the representation of Combat ID characteristics and behavior within a constructive simulation in order to enable the exploration of the benefit of system interventions based on Situational Awareness, Target Identification, Human Factors and TTPs in terms of increasing combat effectiveness and reducing fratricide levels. The main goal of our team for IDFW14 was to assess the feasibility of a representation of Situation Awareness (SA) and Target Identification (TI) in an Agent Based Model (ABM).

EXPERIMENTAL DESIGN

The Net Logo tool was selected for the representation of the SA agents and used to develop an experiment with a deliberately simple overall design.

- A battlespace is populated with red (enemy), green (neutral) and blue (friendly) entities.
- The battlespace is characterized by a preconception grid representing the decision making agent's (DMA's) belief of the allegiance of any entities present within a particular grid square.
- The DMA is randomly positioned and moves randomly around the grid, detecting entities, then approaching them to make classification and identification decisions.
- This process continues until either 5000 timesteps have passed, or all entities have been identified.

The experimental design derived 16 datafarmable variables which were used to populate a Nearly Orthogonal Latin Hypercube. The following outputs were selected to be recorded within the output data file:

- Number of identifications
- Percentage of entities identified
- Number of correct identifications
- Average Range at identification
- Number of incorrect identifications
- Average Confidence at identification

Results

Unfortunately development of the tool was not completed in time to undertake any analysis. However, the development process showed that the representations are feasible, and that future refinement of the process is likely to replicate the required behavior. It is intended to continue to develop the model with a view to using it to undertake analysis at a future workshop.

* Contact information: mink.spaans@tno.nl

* Contact information: dfdean@dstl.gov.uk