Score-Based Recommendation for Efficiently Selecting Individual Virtual Agents in Multi-Agent-Systems

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**Introduction**

- Embedding Virtual Agents (VAs) raises virtual scene realism
- VAs are required to behave human-like and to be engageable into situation-dependent user-agent interactions
- Meaningful VA actions are often induced by operators, e.g., via Wizard-of-Oz [1]
- Challenging for operators to rapidly decide which VA to control next

Thus, we present:
- Score-based recommendation system to support operators in VA selection
- A GUI embedding this system

**Recommendation Score**

Based on two scores:
- Distance Score
  \[ DS_I = \begin{cases} 
  1 & \text{if } d_i \leq r_{\text{min}} \\
  1 - \frac{d_i - r_{\text{min}}}{r_{\text{max}} - r_{\text{min}}} & \text{if } r_{\text{min}} < d_i \leq r_{\text{max}} \\
  0 & \text{otherwise} 
  \end{cases} \]
- Gazing Score
  \[ GS_I = \begin{cases} 
  1 & \text{if } \alpha_i \leq \beta_{\text{min}} \\
  1 - \frac{\alpha_i - \beta_{\text{min}}}{\beta_{\text{max}} - \beta_{\text{min}}} & \text{if } \beta_{\text{min}} < \alpha_i \leq \beta_{\text{max}} \\
  0 & \text{otherwise} 
  \end{cases} \]

Their weighted sum yields the recommendation score
\[ S_I = \omega_{DS} \cdot DS_I + \omega_{GS} \cdot GS_I \text{ with } \omega_{DS}, \omega_{GS} \in [0,1] \]

Agents are recommended by descending score \( S_I \)

**Preliminary Evaluation**

- 6 subjects in the operator’s role
- General results:
  - Subjects were able to configure and use the recommendation system
  - Slight improvements to GUI design were suggested
    - System seems to support the selection task for situation-dependent user-agent-interaction by an operator

**Conclusion and Future Work**

- Basic, user-centered and score-based recommendation system supporting the selection of suitable VAs for a situation-dependent user-agent-interaction
- Score extension planned, e.g., by taking occlusions into account
- Automatic suggestion of suitable VA reactions planned

**References**


**Acknowledgements**

This work was funded by the project house ICT Foundations of a Digitized Industry, Economy, and Society at RWTH Aachen University.