Pedestrian collision avoidance on narrow sidewalk: a meeting between psychology and virtual reality
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PEDESTRIAN COLLISION AVOIDANCE ON NARROW SIDEWALK: A MEETING BETWEEN PSYCHOLOGY AND VIRTUAL REALITY

Context: NARROW SIDEWALKS

Impact of 3 personal factors were studied

- Speed (fast – slow)
- Sex (male – female)
- Distraction (texting – non-texting)

Problem:

- Why do we choose to step down or stay on the narrow sidewalk when we encounter a pedestrian walking in the opposite way?

Goal:

- To simulate a social virtual pedestrian (non-player character) in order to study this kind of situation in virtual environment

Discussion:

- To use Social Pedestrian Non Player Characters in VR environment is feasible
- Needs to take into account the empowerment/authority

Social Perception Model

- Speed and attention influence the decision to step down from the narrow sidewalk

Assumption:

- Speed and attention increase the detection time in the ORCA model.
- Virtual pedestrian decides to step down if his detection time is greater than the other pedestrian involved in the jousting

N.B.: The virtual pedestrian sees pedestrian in the public space, and detects him in the social space

Collision avoidance behaviors simulation (Orca model)

- Different types of collision avoidance (anticipative, reactive)
- Collision avoidance behaviors are a function of the walking speed, the detection time

2nd Experiment – Results

Overall ranking of the model-based videos, Median = 4

Evaluation model: Social Perception Model

1. To keep a safety zone
2. To anticipate the collision
3. We avoid the collision by modifying our trajectory
4. Perceived physical and psychological proximity

1st Experiment – Questionnaire

- 64 videos of pre-jousting, before any modification of trajectory
- 64 counterbalanced videos
- Participants told who was to step down: pedestrian at left or right in the jousting with a Likert scale.
- Participants said why the virtual pedestrian stepped down (speed, sex, distraction) with Likert scales
- 60 participants

First Experiment – Questionnaire

- 8 videos of complete jousting with the new model.
- 8 videos of complete jousting with the opposite of the model result
- Participants said if the jousting is credible
- 64 videos of complete jousting with Likert scale.
- Participants told who was to step down:

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