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)

Persoanl characteristics (psychological and physical)

Perception model for the virtual pedestrian
- ORCA Model used.
- Different types of collision avoidance (anticipative, reactive).
- Collision avoidance behaviors are a function of the walking speed, the detection time.

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. Detection time is then a score.
- 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.

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

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

First Experiment – Results
- Influence of speed and attention.
  - Pedestrian is expected to step down when:
    - He walks fast.
    - He is attentive.
  - For the participants, no gender effects.

Social Pedestrian Non Player Characters in order to study this kind of situation in virtual environment.

Second Experiment – Results
- Credibility of model-based videos and fake videos according to the subjects’ answers.
- One of 8 videos is a fake video. 8x8 counterbalanced videos.
- Overall ranking of the model-based videos. Median = 4.

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.

To keep a safety zone.

To anticipate the collision.

To avoid the collision by modifying our trajectory.

Collaborative effort (Y/N)

Direction

Speed

We avoid the collision by modifying our trajectory.

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

Second Experiment – Questionnaire
- 36 videos of complete jousting with the new model.
  - 30 counterbalanced videos.
  - One of 8 videos is a fake video.
  - Participants said if the jousting is credible.
  - 80 participants.