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PEDESTRIAN COLLISION AVOIDANCE ON NARROW SIDEWALK: A MEETING BETWEEN PSYCHOLOGY AND VIRTUAL REALITY

Context: NARROW SIDEWALKS

- Pedestrians manage social interpersonal distances
- Encounter of two pedestrians is impossible
  - It can be seen as an URBAN JOUSTING

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

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

First Experiment – Questionnaire
- 64 videos of pre-jousting, before any modification of trajectory
  - 8 videos are fake videos
  - 8x8 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 scales
  - 80 participants

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

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 Perception Model
- Speed and attention influence the decision to step down from the narrow sidewalk
- Virtual pedestrian decides to step down if his 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 involving in the jousting
  - N.B.: the virtual pedestrian sees pedestrian in the public space, and detects him in the social space

Impact of 3 personal factors were studied
- Speed (fast – slow)
- Sex (Male – Female)
- Distraction (texting – non-texting)

Participants said if the jousting is credible
- One of 8 videos is a fake video

Credibility of model-based videos and fake videos according to the subjects’ answers

Influence of speed
- 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