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

To keep a safety zone
To anticipate the collision
We avoid the collision by modifying our trajectory

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?

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

Collision avoidance behaviors are a function of the walking speed, the speed and attention increase the detection time in the ORCA model.

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

First Experiment–Questionnaire
64 videos of pre-jousting, before any modification of trajectory
6 videos of complete jousting with the new model.
6 videos of complete jousting (opposite of the model result)
4 videos of fake jousting

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 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 involving in the jousting
N.B.: the virtual pedestrian seeks pedestrian in the public space, and detects him in the social space

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

Social Perception Model
Pedestrian Planning and Analysis – Paper # 19-05480

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Urban Jousting

Medieval Jousting

Waster Jousting

Proxemics (Hall, 66) @JL Grall, Wiki-commons

Pedestrians manage social interpersonal distances

Encounter of two pedestrians is impossible
one has to step down and he is exposed to the road traffic
• in can be seen as an URBAN JOUSTING

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