

## **Title : The pedestrian as the center of planning: No evaluation without data.**

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### **Abstract :**

Nowadays, only few solutions of microscopic traffic simulation exist that allow one to *a priori* evaluate urban planning for which the diversity among road users (pedestrian, driver) is predominant. In particular, underlying pedestrian microscopic models lack realism to simulate these situations, which differ from the situations they have been created for. In fact, despite the existing literature on pedestrians in the domain of Human and Social Sciences, research on pedestrians is numerous in the domain of passive safety but is seldom when moving simulation is considered except works done on crowd simulation (subway platforms, concourses, malls, emergency evacuation...). Actually, the initial choices of modelling are poorly favorable to establishing links between scientific communities.

Moreover, a major difficulty when creating a pedestrian simulation model for the road domain is the validation of these models. In fact, first there are only few “subtle” data that allow an *ad hoc* validation, and second gathering data needs means that go far beyond a “simple” electromagnetic loop. Furthermore, the validation process for a diversity zone such as “an encounter zone” also needs to rely on the verification of the nature and of the “intensity” of the interactions between road users.

A goal of the project “Simulation of Crossroads crossing by Pedestrians” (SiCaP<sup>1</sup>), a project granted by the French Road Safety Foundation, is to partially solve the problems raised above. The aim of this project stands on modelling the notion of anticipation of drivers’ behaviors by pedestrians, and then to suggest an algorithm for the crossroads crossing by pedestrians. The project is mainly composed of four parts. The first one is an experiment *in situ* that focused on the behaviors, the mental representations, and the strategies of pedestrians who have to achieve a street crossing activity. In order to study that, we developed two questionnaires and an observation grid. At this stage, 60 observations were made.

The second part, the object of this paper, is focused on the anticipation of pedestrians. In order to do so, we developed a panoramic video acquisition system which allowed us to display the videos on six different screens (2.2 x 2.8 m), joined to one another. By such a procedure, we obtained an apparatus that allow the pedestrian to have a sufficient visual field (180°) in such a way he is completely immersed. We chose to use real video instead of virtual 3D-animation, due to the lack of realism in the 3D pedestrian moves and interactions with car drivers, and despite the lack of interactivity in this kind of situation. Thus, we already have gathered videos from three different urban crossroads in Paris where there are many interactions between pedestrians and vehicles.

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<sup>1</sup> In French : Simulation de traversée de Carrefour par des Piétons

The third part focused on the modelling of road crossing by pedestrians, based on the works mentioned above, the approach described in [TAB08], and the previous theoretical frameworks of notably [Aub07, End95, GC38].

Finally, the fourth part is focused on gathering data in an urban crossroad dealing with pedestrians and drivers in order to obtain subtle data to assess the model.

In this contribution, we intended to explain how data gathering and processing will contribute to partially model street crossing by a pedestrian. This will be based on psychological features and “validated” by a subtle data set. Particularly, we will present the results of the experimentation “in virtuo”, focused on the anticipation of the pedestrians.

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