

Table for Lay Public Dissemination

Acronym	SFM-NN
Name of user	Alessandro Antonucci
Title	Structured neural network for socially aware robot navigation.
Objectives (Max 150 words, Calibri 11)	<p>The scope of the research is the development of a light weighted and efficient pedestrian trajectory predictor to be used on-board of mobile robots.</p> <p>The predictor is a novel neural network, namely the Structured Neural Network, where the internal layers are wired according to dynamical equations.</p> <p>The main advantages of this approach are the reduced number of learnable parameters, the possibility to exploit information from the environment in the surrounding of the robot, and a neural network with a behavior that is explainable in physical terms.</p> <p>Preliminary results demonstrated the performance of pedestrian trajectories prediction on short time windows both in simulation and on baseline datasets, in addition a first implementation working on a real robotic platform was developed.</p>
Impact (Max 150 words, Calibri 11)	<p>A growing number of applications involving autonomous mobile robots will require their navigation across environments in which spaces are shared with humans. In order to obtain a robot behavior that is socially acceptable, a reliable human motion predictor is of paramount importance in the context analysis and decisional process of the robot.</p> <p>The particular type of algorithm investigated offers as advantages a better prediction efficiency and a reduced computational load, in order to be efficiently performed in real time by the robot itself.</p> <p>The synergistic use of machine learning techniques and validated heuristic models grants a high adherence of the algorithm's inference to the motion behaviors of people in indoor environments.</p>