Leonardo Angelini – Tangible Gesture Interaction

The aim of my PhD work is describing tangible gesture interaction, i.e., gestural interaction with real-world objects. The different forms that tangible gestures can assume are represented in the Tangible Gesture Interaction Framework. This framework can serve as a taxonomy for tangible gestures as well as guidelines for the development of applications that make use of tangible gestures. Tangible gestures interaction has been recently defined by Hoven and Mazalek, placing it at the intersection of two broad domains in Human Computer Interaction: gestural interaction and tangible interaction. Each domain brings an important characteristic to tangible gestures: gestural interaction implies a communicative role of tangible gestures, while tangible interaction brings the manipulation of the physical world and the affordances given by the objects. TGIF analyzes three important aspects of tangible gestures: syntax, i.e., how tangible gestures are physically performed according to three basic components (move, hold and touch), semantics, i.e., the meaning that can be associated to tangible gestures and the technologies that can be used to recognize tangible gestures.

In order to validate the framework I applied tangible gesture interaction to three main interaction environment, home, office and car. The first prototype, a smart watch, aims at recognizing gestures made with common objects in the hand to interact in a smart home. The second prototype, a smart pen, aims at investigating the embodiment of sensors in a smart handheld object, exploring the tangible gestures in smart offices. Finally, the Wheelsense project explores tangible gestures in the car, enhancing the steering wheel with pressure sensors.

The overall schema of my thesis is shown in Figure:

