**Progetto #1: AMBIENT ASSISTED LIVING**

**Motivation**

With the rise of life expectancy and ageing of population, the development of new technologies that may enable a more independent and safer life to the elderly and the chronically ill has become a challenge. Ambient Assisted Living (AAL) is one possibility to increase independence and reduce treatment costs, but it is still imperative to generate further knowledge in order to develop ubiquitous computing applications that provide support to home care and enable collaboration among physicians, families and patients. Human Activity Recognition (HAR) is an active research area, results of which have the potential to benefit the development of assistive technologies in order to support care of the elderly, the chronically ill and people with special needs. Activity recognition can be used to provide information about patients’ routines to support the development of e-health systems. A common approach is related to the use of **wearable sensors**.

**Wearable Accelerometers for Activity Recognition**

Our wearable device comprised 4 tri-axial ADXL335 accelerometers connected to an ATmega328V microcontroller. All modules were of the Lilypad Arduino toolkit. The wearable device and the accelerometers’ positioning and orientation diagram are illustrated in Figure 2. The accelerometers were respectively positioned in the waist (1), left thigh (2), right ankle (3), and right arm (4). The read values of each axis during data collection are subtracted from the values obtained at the time of the calibration.



**Obiettivi del progetto:**

1. Modello BAYESIAN NETWORK

1. Definire la struttura della rete
2. Stimare i parametri del modello sulla base dei campioni di training

2. Analisi dei dati

1. Il modello Bayesiano è in grado di prevedere l’attività svolta da parte dei pazienti date le osservazioni pervenute dai sensori?
2. Il modello riesce a riconoscere bene tutte le attività svolte? Oppure la distribuzione dei campioni ha un qualche effetto sulle capacità predittive del modello?

**Software**

Software utilizzabili:

1. Python: <http://pythonhosted.org/libpgm/>
2. Matlab: <https://code.google.com/archive/p/bnt/>
3. Java:
   1. <https://sourceforge.net/projects/unbbayes/>
   2. <https://sourceforge.net/projects/bnj/>
   3. <http://www.cs.waikato.ac.nz/ml/weka/>
4. R: <http://www.bnlearn.com/>