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*THE MAIN OBJECTIVE OF THE REFLECT PROJECT IS TO DEVELOP PERVASIVE-ADAPTIVE ENVIRONMENTS BASED ON THE MAXIM THAT "THE BEST ASSISTANT IS THE ONE YOU DO NOT NOTICE". THE NEW GENERATION OF SMART SYSTEMS USING REFLECTIVE TECHNOLOGY SHOULD UNDERSTAND USER'S EMOTIONS, NEEDS, INTENTIONS AND SOCIAL SITUATIONS AS WELL AS PROVIDE APPROPRIATE ASSISTANCE IN A DISCRETE AND PERSONALIZED MANNER.*

[HTTP://REFLECT.FIRST.FRAUNHOFER.DE](http://reflect.first.fraunhofer.de)

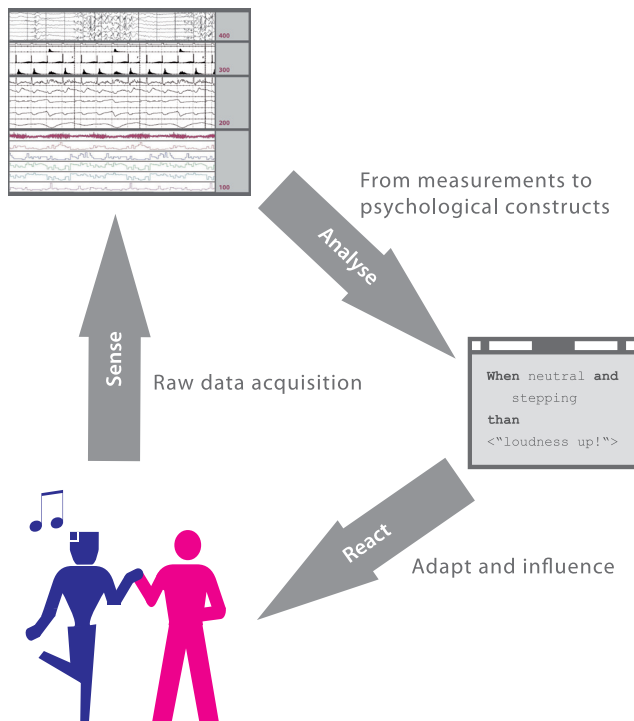
## REFLECTIVE MUSIC PLAYER

**Reinforcing  
positive feelings**



# Mood Player

Imagine coming home from work tired and not in the best mood. The reflective mood player acts instantly to improve the situation. It selects the music and analyses how you react. If you appear relaxed, and even start tapping your foot to the music being played, it automatically turns up the volume. If you show signs of boredom or stress, the music will change. Besides the music, the reflective player controls lighting, as colour and light intensity also contribute significantly to your emotional state. You are not necessarily aware of the emotional changes induced by the music and lighting. They respond adaptively to maintain a pleasant and positive effect. Ultimately you may feel good enough to call a friend and go out for a while. The reflective assistant switches itself off and waits – ready to activate again upon your return.



## TECHNOLOGY

The system uses reflective technology to exercise non-explicit man-machine interaction and is based on context awareness. The reflective player observes, diagnoses and responds to the affective, mental and bodily states of a person in a closed-loop fashion. The biocybernetic loop consists of:

- **Sensing:** a) The person's psycho-physiological characteristics (using facial expression, speech and movement detectors) and b) player settings and lighting information (music player and lighting system are used as both sensors and actuators)
- **Analysing:** Diagnosing the person's emotional and physical condition (positive emotion and tapping to the music are obvious signs that a listener likes the music)
- **Reacting:** Changing the player settings and ambient light to adapt to the person's condition and enjoyment of the music being played (if a person likes the music, lighting can be changed and the volume of the music may increase)

In a closed loop, the system re-examines the effects of its (re-)actions to further refine its behaviour. The ultimate goal is to ensure that listening to the music re-inforces joy.

Reflective technology controls multiple sensor and actuator devices in an environment based on the distributed OSGi platform (Open Services Gateway initiative), which deploys a service and component-oriented programming in Java that features event-driven pervasive adaptation.