Supervisor: Alex Barchiesi

Introduction
The Sinergia project joins the disciplines of Performing Arts, Science and Technology with the aim of creating mutual inspirations that lead to new trajectories for both artistic expression as well as technological experimentation and development. The major focus of the project lies in the transformation of theatrical stage environments under the influences of modern technologies such as robotics, novel acoustic and light technologies, 3(+1)D, interactive design, brain-computer-interface, telematics, body tracking, social networks, etc. New possibilities of stage-conception and devices as well as strategies and ways of making for technical production/realisations will be elaborated and creatively implemented.

Research focus
The project work focuses mainly on three dimensions of research that will be investigated with regard to the concept and the realities of stage performance:

a) Transformation of time and space perception and experience within stage-settings;

b) Intermediality as a dimension for expression and experimentation on stage;

c) Man-machine relations as a field for the exploration of human self-understanding and exposition in living environments impacted by artifacts, mechanisation and virtualization.

Stage, here, is understood as a laboratory for the experimentation on experience and concepts of meaning and expression. It is a space for exploration and a site for observing the present that allows to create and reflect future possibilities of world-making.

Background
The Kinect is a motion sensing device based on an infrared laser projector combined with a monochrome CMOS sensor, which captures video data in 3D under any light conditions and a camera to track the movement of objects and individuals in three dimension. It was produced as an interface for the XBox console but can be used through an Open Source driver from Adafruits and several third party libraries connected to a computer.

The AR-Drone is a quadrocopter equipped with 2 cameras controllable with IOS and Android devices. It uses a 468 MHz embedded microcontroller with 128 Megabytes of RAM running a Linux operating system. Communicates through Wifi and USB.

It relies on a guidance system based on MEMS 3-axis accelerometer, 2-axis gyrometer and a single-axis yaw precision gyrometer. In addition an ultrasonic altimeter provides vertical stabilization.

An API and several control applications have been developed to use it into augmented reality games interfacing it through a wireless ad hoc network with a computer.

Open Sound Control (OSC) is a protocol for messaging among computers and multimedia devices that are optimized for modern networking technology.

The Emotiv EPOC is a peripheral working as a cheap BMI with 14 electrodes (compared to the 19 electrodes of a standard medical EEG). It also has a two-axis gyroscope for measuring head rotation.

It can be used to get EEG data (the raw electricity measurements), with the Python Emokit without the need for EPOC's proprietary software.

Project Description (Semester/ Master project)
The project aims to implement a library to control AR-Drones out of commercial Brain Computer interface.

Benefits
Learn about the world of AR-Drone and Emotiv Epoc.
Learn about Processing platform and OSC.
Work on an well-known problem with real-world applications.

Develop and watch your own solution working.

Skills
Good programming skills and basic knowledge of Java and Processing framework;
Experience or interest with AR Drone and Emotiv Epoc devices.
Capability to write report in English.

Enthusiasm and creativity are very useful.