

Amr Mohamed and Lucas Lin  
Professor Gordon Wetzstein  
EE 267: Virtual Reality  
May 5, 2016

## Tutting Dance with IMU

### Description

The VR/IMU demo that we wish to build is essentially a hand/arm tracking program to teach the dance style of tutting by mimicry. Tutting is a form of dance that involves the use of the body--usually the arms and hands--to create geometric shapes and usually with right angles. This style of dance is usually focused on making sure the shapes created by the limbs are as precise as possible. Additionally, these motions generally are done to the beat and each position quickly flows from one position to another.

Our intended demo is to create a program to help people learn a tutting routine. The demo would make use of 4 IMUs on both arms to track the arms as well as the wrist angle. We would aim to be able to "record" some movements in one run through and then be able to display these arm/hand motions in virtual reality through a primitive arm and hand model. This would essentially allow users to practice a certain tutting routine by comparing themselves to the recording. During this simulation of the previous run through, users would be able to try and follow along themselves, getting an accuracy score based on how close their arm/hand angles are to the correct position at each point in time.

## Technical Details

Two IMUs per side are necessary to determine the wrist angle and disambiguate measurement changes as changes in whole arm orientation or wrist orientation. To do this, we will need to have the IMU pair for each arm start in the same orientation (assuming we put the IMUs on the back of the hand and on the back of the forearm) so we can keep track of relative orientation. We will be using Unity to construct the graphical part of the project. Furthermore, to implement the recording of movements to play back in the simulation, we will be defining data structures containing the movement data in order to have the program read and display it.