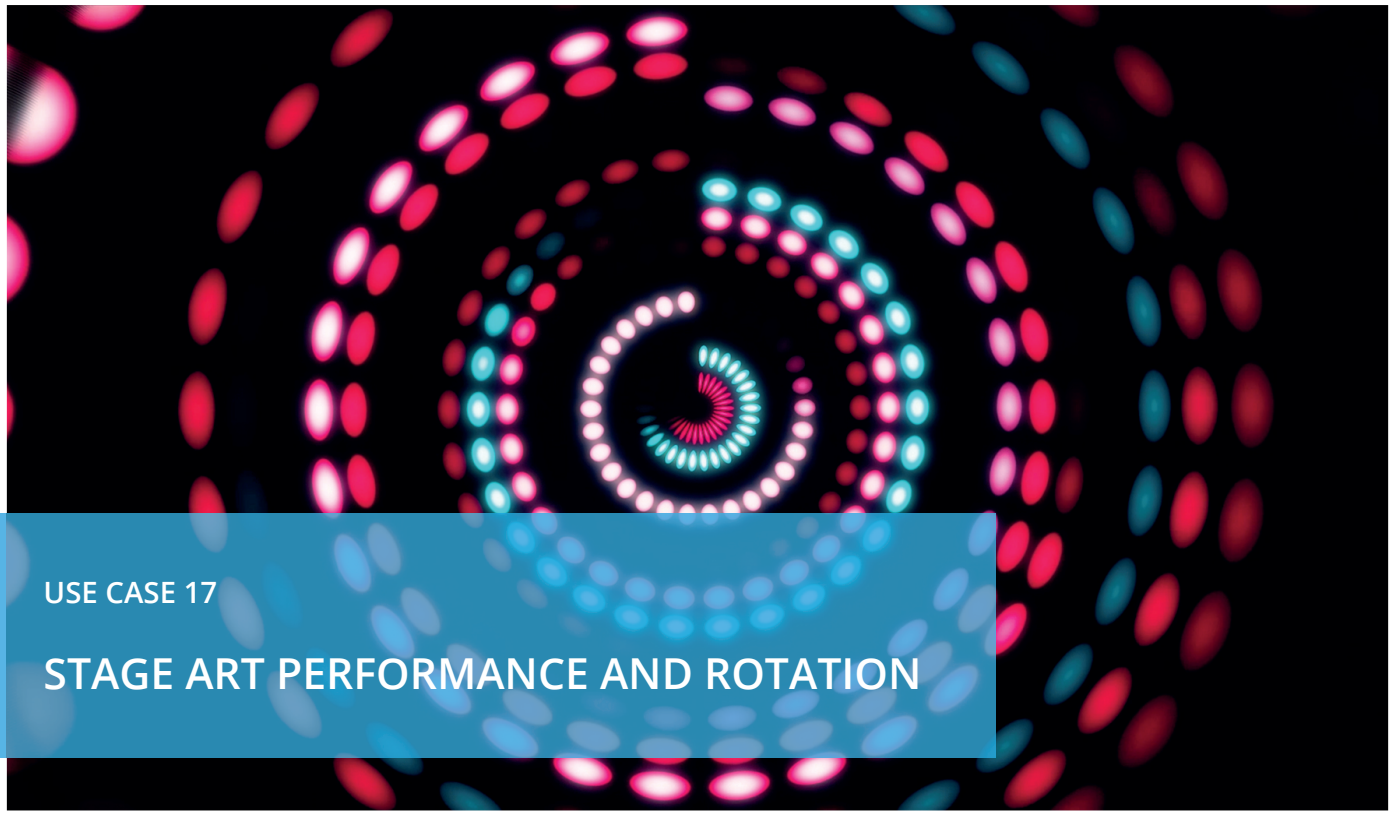

USE CASE 17

STAGE ART PERFORMANCE AND ROTATION

Age & Level

Dave is 15 years old and student of a high school near Birmingham, UK.

He admires many different football stars, but his favourite club are 'The Blues', the Birmingham City Football Club. Dave is also very much into computers, though he is only allowed to play at the PC after he has finished his homework.

His two best friends Mike and Jess have similar interests, and often he is meeting them at the football yard or they play an online game with each other.

Primary Actor and Main Goal

When he thinks of his future, he knows he would like to be involved in developing and programming apps and games. He feels he would be building on programming skills like Snap! that he has already developed in very early years.

Obviously his IT teacher is very fond of Dave since he has developed several programming projects on his own already. However at school Dave is o.k. but as his teachers told his parents, he is performing way under his potentials they believe. His teachers have the impression that he is not very motivated and focuses his interests only on very specific things.

Topic and Content

As for this year, his art teacher has launched a cooperation with the school theatre group: the class is supposed to perform Shakespeares 'Romeo and Juliet' in an own version and his class should prepare the stage setting. Thus, the group will interpret the story and perform it at the end of the school year. Each student should think of ideas on how he/she can contribute.

Soon several students have ideas and after a while they have a new setting of Shakespeare version, adapted texts and even one dancing part thanks to one school maid that is good in ballet. As usual, Dave is not very fond of this task. In his opinion this will become a boring task for him and in addition he does not want to create nor paint any stage walls or artefacts.

Description of Environment and Possible Pre-conditions

At the end, his teacher is proposing him to over-take the responsibility of the illumination of the stage – the only task that seems to be for him least painful. But during the first rehearsal he realizes that the lighting is a task where he needs to pay close attention but with long periods in between where he feels bored.

When he listens to the performance of the actors, he thinks that the way how the actors perform could be even more emphasized if the lights could change accordingly. He realizes that the theatre has a small LED wall in the back, but when he is talking to the technician, he understands that it is very rarely used. During some days Dave has developed an idea that would use the wall to add to the performance a more artistic touch, especially since the stage setting looks very poor.

Dave would like to use the talks and sounds on stage to steer the LED wall in the back. He thinks that especially the fights would be emphasised a lot, since there is loud fighting and arguments on stage.

Preparatory Work

When Dave is explaining to the teacher his idea, she looks very puzzled, hesitates at first, but when discussing with the entire group, they agreed that it would be worth a try. The teacher knows about Daves' special interests, so she agrees under the condition that Dave gets the allowance from the theatre technician and the support from the IT teacher.

Description of Activity

For sound sending, Daves uses a sound sensor, then does an analog read on the sound sensor to map the value to the LED. For the more advance version, he maps the sound in MaxMsp, and applies the lowpass filter and highpass filter to get different colors, then send the signal via serial port via FTDI cable to the Arduino.

The Arduino micro controller then reads the number and maps the value to the number. Dave downloads the MasMsp patch, the Arduino Code, and the pattern for the wall. After some testing and adaptation, the wall displays well the different sounds in different colours.

At some point Dave would like to install an additional Arduino on the dancing dress of his school maid that does the dancing performance. He has the idea that as soon as she would rotate with the dress, integrated LED would start shining.

Dave estimates that this should be a rather easy task: attaching the neopixels RGB stripe and the Arduino on the dress, programming and testing. Dave is working at home to connect a bread board with the LED stripe and the Arduino.

He had to Google on how to do this, and he got the recommendation, that although there is a capacitor on each LED, he should install additional 100 Mc capacitor between ground and the 5V. The LED stripe and the Arduino finally get connected by a common ground by a wire.

Soon the students understand that the rotation of the dancer is way slower than i.e. a motor. Having adjusted the rotation speed to the Arduino programming, finally the LEDs on the dress shine as soon as there is rotation.

Still, Dave needs some advice from his IT teacher on how to integrate a rotation sensor on Arduino. Again, both he and his teacher need to google and finally they get some advice from an Arduino interest group on how to connect the rotation sensor. Dave spends several hours programming the Arduino and having everything installed and programmed, the set up works: as soon as Dave is rotating the Arduino, the LED lights shine.

But soon Dave and his school maid realize that the programming needs to be changed: his class maid is by far not rotating that fast when doing the pirouettes.

After several tries and adaptations, they understand that they rather need to calculate the rotation speed. Finally they have to ask their Physics teacher for help. Due to the fact all the other students are really happy with the LED wall, all of them would like to see the dress succeeding.

Thus the Physics teacher takes the opportunity to give the kids an understanding of rotational speed (or speed of revolution) and how it's been calculated (object rotating around an axis is the number of turns of the object divided by time, specified as revolutions per minute (rpm), cycles per second (cps), radians per second (rad/s)). Finally all students calculate different rotation objects.

Success and Condition

At the day of the performance, Dave is really nervous if the LED wall as well as the neopixles on the dress will work. He feels really relieved when he realizes that wall is already reacting to the noise of the visitors that come in and chat with each other.

Seeing the performance, he is very happy with the installation of the wall since it's bright red with many lights when there are fights, but only few blue lights when there is dark night. His school maid gets lots of applause for her performance with the shining dress when rotating – and of course the wall gets bright red.

After the performance many visitors talk to Dave and congratulate him to the amazing performance of the stage setting.

Variations

Finally at home, Dave is still reflecting about the stage performance and is wondering how his installation would have worked if the LEDs would have reacted not on sound, but on movements. For sure this would be a very interesting set up – but possibly for the next time.