Performing with QuaverSeries Live Coding Environment

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ABSTRACT

This performance will use QuaverSeries, a collaborative live coding environment. The three performers will collaborate on the website of QuaverSeries, writing programs to produce ambient techno music with its domain-specific language. The first two performers will perform at the conference scene in Trondheim, while the third performer will join the performance online in Oslo.

1. ENVIRONMENT INTRODUCTION

QuaverSeries is designed and developed by the first performer, under the supervision of the third performer. It consists of a domain-specific language and a single-page web application for collaborative live coding in music performances. Its domain-specific language borrows principles from both programming and digital interface design in its syntax rules, and hence adopts the paradigm of functional programming. The collaborative environment features the concept of 'virtual rooms', in which performers can collaborate from different locations, and the audience can watch the collaboration at the same time. Not only is the code synchronised among all the performers and online audience connected to the server, but the code executing command is also broadcast. This communication strategy, achieved by the integration of the language design and the environment design, provides a new form of interaction for web-based live coding performances.

2. TECHNICAL DETAILS

The three performers will use individual laptops, and enter the same 'virtual room' on the QuaverSeries website[1]. Another laptop will be used to connect to the same room, serving as an 'audience'. Its screen will be projected to the main screen on the scene. The code will be synchronised among these four laptops, together with the code executing actions.

There are two reasons to use the fourth laptop. First, the figure of the third performer in Oslo can be broadcast to the conference scene through a web camera, shown in a small window on the main screen. Second, having a laptop as an 'audience' can demonstrate our design of room hierarchy, i.e. how the performers can control the browser of an audience using web technologies [2].

Figure 1: A screenshot of the code written in a rehearsal.

The actions of the performers can be identified with the cursor sharing function implemented in the environment. The performers will each make a one-line self-introduction, to specify the cursor colours (see Figure 2). Also, the body movement of the first two performers can be watched at the scene, while the motion of the third performer will can be seen through the web camera.

Hence, the requirements of the performance include:

- Good network connection
- A main screen for projection
- Basic audio playback system with two speakers

3. RISK CONTROL

The risk of performance lies in the code errors. Each performer will have the browser console open on the side, to receive and handle any coming error message. We have carried out several rehearsals, and have formed a practice for

[1] https://quaverseries.web.app

[2] https://github.com/chaosprint/QuaverSeries

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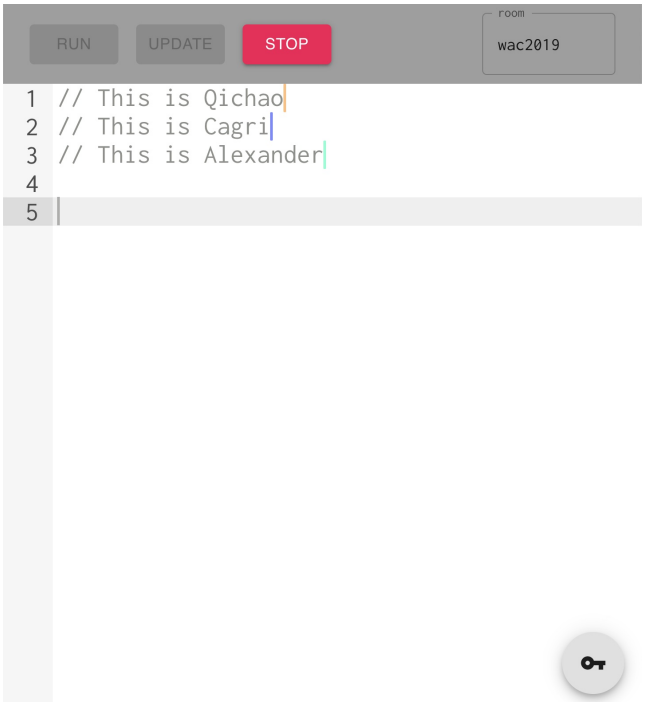

Figure 2: The performance interface. Entering as an audience, one cannot execute the *run* or *update* commands, but can watch new code appearing to generate new sound. The three performers will make one-line self-introduction and specify individual cursor colour.

performing collaboratively that each performer should comment out the code when editing it[3]. We will do more rehearsals to lower the risk of code errors to the minimum. Also, we are improving the code with `if` and `try-catch` statements, to ensure that if the errors should appear, the music can continue.

4. BIOGRAPHIES OF ALL PERFORMERS

- **Qichao Lan**

Qichao Lan is a researcher specialising music programming, with a background of computational linguistics, electroacoustic music composition and live coding. In 2018, he gained his Master's degree in Sonic Arts at the University of Sheffield, during which he frequently participated in activities of the Algorave community. Now, as a doctoral research fellow at the RITMO Centre for Interdisciplinary Studies in Rhythm, Time and Motion at the University of Oslo, he is researching on how new technologies and new forms of music interfaces can influence the embodied music interaction.

- **Çağrı Erdem**

Çağrı Erdem is a performer and researcher specializing in improvised electroacoustic music and body–machine instruments. Following a training in composition and guitar performance, he earned a Master's degree in Sonic Arts, which focused on the development of a new musical interface for the extraction of body movements in the form of biosignals to be used to expand the player's control space. As a PhD fellow at the RITMO Centre for Interdisciplinary Studies in Rhythm, Time and Motion at the University of Oslo, he is expanding his research on the relationship between the dynamics of motion and sound in the context of both traditional and new musical instruments.

- **Alexander Refsum Jensenius**

Alexander Refsum Jensenius is a music researcher and research musician. His research focuses on why music makes us move, which he explores through empirical studies using different types of motion sensing technologies. He also uses the analytic knowledge and tools in the creation of new music, with both traditional and very untraditional instruments. As chair of the NIME steering committee, he is a leading figure in the international computer music community. From 2017 he co-directs RITMO Centre for Interdisciplinary Studies in Rhythm, Time and Motion, an interdisciplinary centre of excellence at the University of Oslo. As a member of the Young Academy of Norway and the EUA Open Science Committee, he is also involved in pushing for modernizing the way research is conceived and conducted.

5. ACKNOWLEDGMENTS

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[3]One of the rehearsal videos can be found on YouTube: https://youtu.be/1tMeSe8lShE