PaperSynth: Distributed Orchestra Using Mobile Devices

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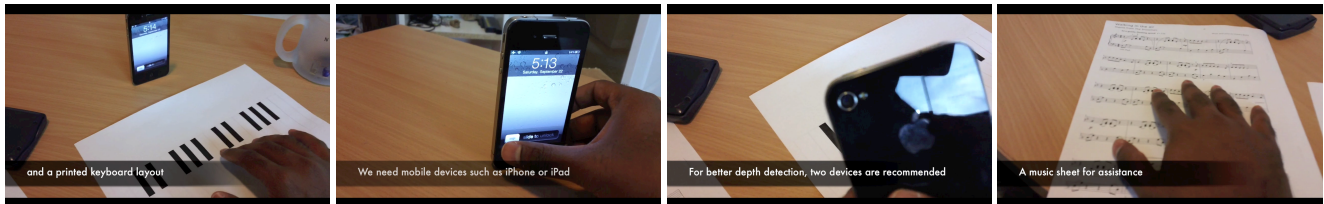Baltimore, MD, 21218, USA
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Figure 1. A prototype of a system for creating distributed orchestra using mobile devices.

ABSTRACT

Today we are living in the age of handheld computing devices, equipped with powerful processing power, networking capabilities, and rich input-output interfaces such as camera, microphone, speaker, touch screen etc. In OzCHI24 design challenge, we propose a system for creating real-time distributed orchestra using smart phones.

Author Keywords

Mobile HCI, Cloud-Computing, Orchestra

DESIGN REQUIREMENTS

We set following requirements for the concepts.

1. Users (Artists) are located at various places across the globe.

2. They need a system or interface to play a synchronized orchestra.

3. System should not cost additional resources, means it should be designed using personal computing devices or gadgets such as iPhone or iPad.

PROTOTYPE

Our prototype consists a pair of hand-held devices equipped with camera and internet. For example users may use one iPhone and one iPad. Two cameras (in two devices) are used to detect depth information. For the visual assistance, we need a piano keyboard layout that can be affixed on a table or any surface. Paper layout also provides a tangible interaction.
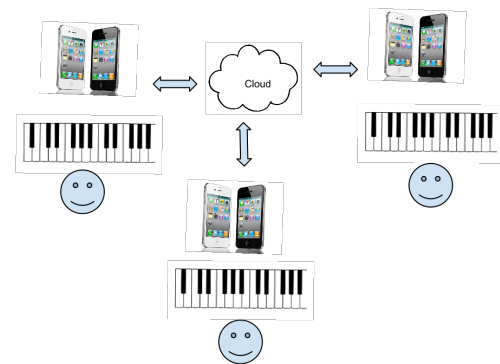
Figure 2. Multiple users across different locations can collaboratively create orchestra with the help of communication and sharing using cloud computing.

Software, running on devices, uses a computer vision based algorithm to tack location of fingers on the paper layout, and plays related musical notes. User hears sound as a feedback as soon as keys are touched. Multiple systems can be connected with the help of cloud and data (musical sound) is shared in real-time with multiple users performing at distributed places.

System also has some additional features such as recording of any particular performance, music or orchestra, communication for the preparation and sharing. Because some device has front and backside camera, we can use front camera for finger detection and screen to display notes or real-time view of other artists.

CONCLUSION

In this design concept, we used mobile devices, cloud-computing and high speed internet to design a system for creating a distributed orchestra. Our solution is easy to implement without an additional cost. Demo of design concept is available at `http://www.cs.jhu.edu/~pramod/ozchi2012`