Music Everywhere is an AR application that teaches its users the basics of piano and piano improvisation. It utilizes the Microsoft HoloLens to display AR content directly onto a piano, creating an interactive learning environment. The user can select from 4 distinct styles of music – blues, rock, jazz, and classical – to learn and play along with. The application was developed in 2016 by students of Carnegie Mellon and released on the Microsoft app store in 2017 after partnering with Microsoft and AlphaLab.

This application is currently available for recreational use on the Microsoft app store, but it can be used in a teaching environment to further a piano student’s improvisational techniques. This application can also be used in an individual setting in order to learn improvisation skills on their own, or to simply enjoy an interactive, game-like piano environment.

In order for the application to run, a Microsoft HoloLens is necessary as well as a Bluetooth compatible digital piano. The Bluetooth compatible piano allows for communication between the keyboard and the HoloLens so keyboard presses can be registered.

While running, the app displays an overlay of AR content on top of the keyboard through the Microsoft HoloLens. The overlay consists of a mirrored keyboard that lies perpendicular to your real keyboard and an animated band that plays along behind the keyboard overlay. There are three key UI overlays that assist in the learning techniques. The first one, coined as the “precision overlay”, displays indicators that guide the user to play specific notes at specific times and durations. The second one, known as the “improvisation overlay”, features a range of notes that the user can play at a given time that will sound good with the current chord progression of the music. Finally, the third, the animated hand, displays a virtual hand that plays over your keyboard to teach correct hand and finger placement.

The technology that led up to this development started all the way back in 1990 when Dannenberg et al. developed the CMU MIDI Toolkit that used a MIDI interface to track and analyze your playing. Later, Yousician was developed which utilized a virtual piano on a smart device to teach piano techniques; however, due to the lack of an actual keyboard, it could not properly teach users hand placement or simulate the pressure of the keys. Taking some steps in the right direction, The ONE Smart Piano was developed with the same idea of an app on a smart device and combined it with the use of an actual keyboard. Finally, in 2005, AR Piano Tutor was developed which utilized a webcam, MIDI keyboard, and monitor to display content over a keyboard in order to teach basic principles of piano such as scales and chords.

The AR Piano Tutor application serves as the first application most similar to Music Everywhere; however, there is one application that is even more similar – Teomirn. Teomirn recently began development in 2017, and also utilizes the Miscrosoft HoloLens to project a virtual overlay of a keyboard. This application also uses virtual hands to teach hand placement as well as indicators to guide the user to play specific notes at certain times and durations. The main thing that sets these two applications apart is the UI choices. Music Everywhere displays a live band and an improvisation overlay that allows for the user to have freedom to play whatever they would like. A small, but significant detail that sets them apart is the placement of the virtual hand that teaches hand placement. The virtual hand in Teomirn is displayed on the virtual keyboard above your actual keyboard, whereas the hand in Music Everywhere is displayed on your actual keyboard. This is a more realistic choice and easier for the user to follow. While Teomirn lacks some of the qualities that Music Everywhere provides, it is more pleasing to the eye – the graphics are smoother and better quality overall.

Music Everywhere is already a very solid application. It teaches users to play piano in a fun, interactive way. Its overlays are very helpful with teaching the basics of hand placement and improvisational skills. A few weaknesses worth noting are the graphical quality, the photosensitive seizure warning, and that it runs on the Microsoft HoloLens (it costs $3000). While I have not interacted with the app myself, another weakness to note is there is some slight dizziness (1 or 2) just based on watching the videos. I think this may have to do with the low-quality graphics used.

Some future improvements and features I could see being added to this app are the ability to have jam sessions with other users and teaching users how to read real music. Having jam sessions with other users could further the learning process by placing them in an environment to apply their learnings. Adding a feature to teach users how to read music would further make this application well-rounded, and stand out from its competitors.

The Music Everywhere application is a solid idea for teaching users how to play piano and improvise with others. Though there are some applications like it, it stands out through its choices of UI, and implements a fun, interactive, game-like environment. The app still has some room to grow, but it is a solid start and serves as a great gateway to future musical teaching apps.

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