Workforce Development in Microelectronics Manufacturing

Thomas Wischgoll

The federal CHIPS Act has resulted in a significant increase in investment in chip and microelectronics manufacturing in the United States. In Ohio, Intel is planning to make a $20 billion investment to build a new facility for chip manufacturing. This is projected to create 3,000 jobs directly and about 20,000 jobs across the state. Given this level of investment, workforce training is needed to appropriately prepare the workforce for these jobs. Wright State has developed a dedicated laboratory for manufacturing microelectronics to prepare students in this important area. This involved a series of machines that utilize drill bits and other cutting tools as well as high-powered lasers. Due to the hazards some of these tools can pose, safety training to prevent injuries is paramount.

Virtual Reality environments can be a great tool for workforce development and safety training as these will not expose a participants to harm if done correctly. Generally, the participant cannot hurt themselves or even break any of the equipment virtually displayed in the environment. The advent of low-cost virtual reality tools, such as head-mounted display systems, e.g., Oculus Rift, HTC Vive, or Microsoft's HoloLens, have reinvigorated the area of Virtual Reality with myriads of applications in healthcare, training, and engineering due to their ability to increase retention and safety, and reduce costs. Utilizing this technology for workforce development and for more advanced training in several application disciplines is critical to Ohio’s economy. We envision the availability of Virtual Reality-based training to both increase safety as well as result in fewer damage to equipment.

With the Appenzeller Visualization Laboratory and the Immersive Visualization and Animation Theater, students at Wright State have access to a variety of display systems, such as a new four-walled CAVE-type display environment and head-mounted augmented reality displays. This augments the existing systems of 3D-capable display systems combined with optical tracking and head-mounted displays, such as different types of stereoscopic display systems [1], a three-walled tiled display configuration [2], and head-mounted displays suitable for AR and VR. These systems have been used for different experiments [3] and nursing students at Wright State University who are currently learning using AR devices, such as the Magic Leap One, that allows the student to see organs inside the manikins traditionally used for training [4]. Similar to the different hardware devices that can be used for XR, there are various different software platforms and environments available for developing AR and VR software [5]. These software and hardware platforms provide us with a great test bed to experiment with different frameworks to experiment with and to determine the most suitable one for virtual training and workforce development and expand into more and more areas.

References:

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