



**Figure:** The proposed prototype [1] can easily insert into a shoe.

### Prototype

The actual construction of the first prototype consists of Plexiglas base, which has six copper fields attached to it. The pressure is measured using capacitive sensing with a plastic sponge layer that functions as a buffer layer. Furthermore, a Peltier element and vibration motors provides additional haptic feedback.

### Author Keywords

Virtual Reality; Locomotion Interface; Hands-Free; Eyes-Free; Foot Interface; Wearable Computing.

### ACM Classification

#### Keywords

H.5.2 [Information interfaces and presentation]: User Interfaces—Input devices and strategies, Interaction styles.

# ShoeSoleSense: Demonstrating A Wearable Foot Interface For Locomotion In Virtual Environments

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### Abstract

User input in a virtual environment (VE) is usually accomplished through simple finger interactions, such as walking in a 3D scene by pressing a button. These interactions are not very suitable for movement in VE. Moving through scenes such as a safety training applications by walking-in-place while forgoing hand or

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finger input for other purposes enables a more realistic feeling. Already existing solutions, such as multi-directional treadmills, are still expensive and need additional fixation of the body. Others, like using external tracking that are usually accomplished by using statically installed cameras in CAVE-like-installations, also have limitations in terms of occlusion. The built prototype - an insole - directly measures the pressure under the feet and hence enables a detection of movements, which is wirelessly forwarded to the scene manager server.

### Future Work

While we are working on a new prototype, we also classified new foot gestures, such as different types of tapping, which can be assigned to smartphone functionalities (e.g. switching music or responding on phone calls). We will investigate the combination of ShoeSoleSense and a peripheral head-mounted display, such as Google Glasses, that potentially enables a fully hands-free interaction beyond microinteractions.

### References

[1] Matthies, D.J.C., Müller, F., Anthes, C., & Kranzlmüller, D. (2013, October). ShoeSoleSense: Proof of Concept for a Wearable Foot Interface for Virtual and Real environments. *Proceedings of VRST'13*. 93-96. ACM.