

## Hands Free Vibraphone Modulator

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This project relates to the creation of a gesture sensor-controller that modulates the speed of the vibrato mechanism on the vibraphone, a musical instrument in the percussion family. The working name for the device is the Hands-Free Modulator (HFM). The HFM is comprised of a motion sensing mechanism that feeds data to data processing and machine learning (ML) algorithms that control a motor attached to the vibraphone. This motor then turns modulating caps over the resonators of the vibraphone, creating a distinct aural resonance from the instrument. The HFM enables musicians to alter the speed of the vibraphone motor without having to stop playing in order to turn a knob underneath the instrument. By providing a hands-free device to modulate the variable speed motor, the musician is empowered to explore entirely new expressive musical territory. The core of the innovation is centered upon creating a highly accurate and simple to operate gesture sensor-controller that will be used for nuanced body movements as they relate to setting a function in motion. This device, once perfected in the HFM, will be used in further musical applications as well as in areas such as medical assistance, automotive engineering, and virtual reality.