**Analyzing Potential Influences on Seismic Sensor**

**Vibration Signals for Enhanced Detection Accuracy**

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| **ABSTRACT**  In the flied of seismic data collection, several factors influence the quality and accuracy of recorded signals. These factors include the nature of the data collection environment, including the speed of wave propagation and the resulting wave amplitudes. Noise, both from the instrumentation and the target of interest, It is a big challenge in signal fidelity. Additionally, the presence of false signals requesting rigorous data validation. Deploying sensors strategically to match their sensing capabilities is paramount. These considerations collectively shape the integrity and reliability of seismic data, crucial for object detection monitoring. This research delves into elucidating the prevalent factors responsible for signal distortion. It stems from an experimental investigation carried out across four distinct terrains – mud, soil, grass, and asphalt – on a farm setting. Within each of these environments, four distinct target types were identified: human, animal, motorbike, and car. Each target exhibited unique trajectories and movements tailored to its specific environment. This study closely monitored fundamental influences on seismic signal waves, revealing that the surface's elasticity resulted in wave amplitudes approximately as follows when compared to asphalt: (25% grass 90%, soil 40%, and muddy 65%). The variance in these values can be attributed to a multitude of factors that exert an influence on the signal that will explain in detail in this paper.  **References:**  [1] M. Mirshekari, S. Pan, P. Zhang, and H. Y. Noh, “Characterizing wave propagation to improve indoor step-level person localization using floor vibration,” in *Sensors and smart structures technologies for civil, mechanical, and aerospace systems 2016*, 2016, vol. 9803, pp. 30–40.  [2] A. Brandt, *Noise and vibration analysis: signal analysis and experimental procedures*. 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# Keywords: *Deployment of sensors, Environments, Noisy, False Alarms*.