

Analysis and Implementation of Machine Learning of Built-in Inertia Sensors in Modern Mobile Devices

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January 25, 2020

Proposal

Independent Research Project in Science 360-RES-AB

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Keywords: accelerometer, inertia sensor, Python programming, accelerometric data processing, physics, software development, mechanical motions, designing experiments, computational data collection.

Modern smartphones are equipped with incredible tools and sensors that enable the user to perform most of their day-to-day tasks with ease, like communicating, navigating, and storing important data. However, there are more specialized ways to utilize such high-performing integrated tools than calling Uber or sending cat GIFs to a friend. People may depend most of their daily activities on the mobile devices that they carry daily, always within an arm's length, ready to use. Instead of stigmatizing our smartphone addiction, this research tries to discover more useful ways that one can squeeze more mileage out of their personal device.

With this in mind, our research team devises methods to locate the accelerometer in the devices by iterative data collections and holistic data analyses¹. We apply college-level knowledge in the fields of Physics, such as

¹C. I. Larnder. A Purely Geometrical Method of Locating a Smartphone Accelerometer. John Abbott College, Quebec. Canada. (2020, January). Published on The Physics Teacher (Ed. 58, p. 52).

circular motions and inertia, packaged with statistical analysis and computer programming in order to retrieve meaningful results. These results can range from the mechanical properties of movements through a three-dimensional space, deemed 'parameters', like linear/angular velocity/acceleration, to the inferential measurements of the host object's form or the estimation of where the inertia-sensing device is located on a random host device². In the future, the research will also look into designing experiments for use in college-level pedagogical laboratory settings.

As a team member of this research project, my role is to develop specialized computer software to process and analyze data collected from the experiments using the prominent and incredibly versatile Python programming language. As a team, we will implement statistical models and then graduate into machine learning models (using Tensorflow module) to thoroughly analyze inertia data and predict host object's movements.

²C. I. Larnder, B. Larade. On the Determination of Accelerometer Positions within Host Devices. (2019, January 17). Published on American Journal of Physics. Retrieved from <https://aapt.scitation.org/doi/full/10.1119/1.5082536>