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Senior Design Presentation

USB Charging System for Multispeed Bicycles

Abstract: In today's world, the need to remain connected to our world via cell phones, tablets, and other mobile devices is prevalent. This need does not cease even when we are nowhere near an available power supply. The popular hobby of bicycling (both road or mountain biking), provides one such instance where we must rely solely on our devices' batteries to remain in connection with family, coworkers, friends, and business partners. There have been a number of ways to tackle the problem of providing alternative energy when our standard chargers are not an option. Portable battery packs that connect to our devices provide a small amount of energy when needed; car chargers allow us to tap into the electrical energy converted by a car's alternator; there are even a number of advanced systems becoming more readily available, such as chargers that store energy for later, portable use. However, none of the solutions currently available attacks the problem from a source often overlooked: the bicycle drivetrain. This system consists of the bicycle crank set (pedals, crank arms, chain-rings), the chain, and the rear cassette (sprockets). A bicyclist produces a constant energy source that drives the chain at a predictable speed, and can be utilized to address the problem of portable device charging. By using a permanent magnet DC motor, this project seeks to implement a system that converts the bicyclists energy to an electric source, which may then be regulated and supplied to a standard USB port, which is then compatible with all devices capable of being charged via a USB charger

(which is nearly all modern cell phones and tablets). This system allows for the charging of a portable device, even if miles from a trailhead or the nearest power source, simply by using the energy of the bicyclist while riding the bicycle. This system would be extremely useful for anyone seeking to ride farther and longer without the need for an alternative power and with the peace of mind of remaining connected with their world.