Homemade Cycling Power Meter

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The goal of this project was to create a cycling power meter comparable in accuracy to those currently on the market at a much lower cost. To do this strain gauges arranged in a Wheatstone bridge circuit were attached to a bicycle crank. The strain gauges were then calibrated to a known force, which allowed the device to measure any other applied force. Then a micro controller and gyroscope were used to calculate power (the rate of work). The micro controller was then able to transmit the power reading to a smart phone over bluetooth. To test this, the bicycle was ridden using the power meter. In order to determine the accuracy of the power readings, they were compared to predicted power values for given sections of road that the bike was ridden on using an existing calculator made for this purpose. It appears that the power values are relatively accurate. In the process, some mishaps did occur. For example, during some of the test rides, it had recently rained, meaning the power meter was soaked during use. This led to invalid data, as the strain gauges became shorted. Depending on which side of the crank was shorted, the meter either outputted extremely high values or zero. To combat this, silicone sealant was applied to insulate the strain gauges.

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