# Electric Transmission System for Bikes

Tianqi Liu (tliu51) Ruijie Qi (rqi2) Xinkai Zhou (????)

**Link to Idea:** https://courses.engr.illinois.edu/ece445/pace/view-topic.asp?id=22763

**Problem:**

Sometimes bikers might not know the optimal time and gear ratio to switch gear.

**Solution:**

We will design and build an electrical system that can automatically switch to the proper gear depend on the current condition.

**Competitor:**

1. SHIMANO STEPS: an electric powered fully automatic bike shifting system.
2. [Electronic Bicycle Shifting](https://courses.engr.illinois.edu/ece445/hall-of-fame.asp) Spring 2016 Senior project

**Design:**

The system consists of four main parts: sensing unit, control unit, servo and Android APP. The sensing unit is a group of sensors to collect data that assist control unit to make decisions. It has a Hall Effect sensor to measure the cadence. Two pressure sensors on the pedals to measure the force applied to transmission. The control unit is on a PCB board. It accepts the data from sensor and transmit it to an Android phone platform through Bluetooth. We will develop an APP on Android system to display the data, perform the control algorithms and send the switch gear commend to control board at the best time. The control unit will send a signal to servo and servo will pull the string to switch the gear. The whole system is powered by 5V Li rechargeable battery and could be mounted on any bike with a transmission system.

Compared to the competitors, the advantage of our system is the price, openness and upgrade potential.

**Components:**

USB to Serial Cable (already have)

# ATmega168 8-bit microcontroller  $3.99

HC 05/06 Serial Communication Bluetooth module $2.6

TAL220 Load Sensor (max 10KG) $6.95 \* 2

SPMSA5030 servo (50oz in) $16+3.5

Hall Effect (magnetic)Sensor $2

5V Li Battery Unknown