Martial Art Force Gage

Introduction
The purpose of this project is to design a force measuring device that interfaces with a Microcontroller. A martial art Force gage is a type of Force sensor that measures the force in the threshold that causes damage to human, which is 100lb to 3000lb.

The primary goals of the Martial Art Force Gage design are:
- Real-time Data Display
- User Friendly Interface

Material and Methods

Hardware
- MSP432P111 Microcontroller
- Onboard ADC (analog to digital converter)
- Flexi force sensor (A502)
- MCP6004 chip

The force measurement is made with an A502 Flexi force sensor and an analog-to-digital converter. The microprocessor then calculates the force value. The value is immediately sent to the LCD display on the MSP432P111 Microcontroller.

Conclusion
The Martial Art Force Gage makes Force measurement more accessible and convenient for martial artist. Measuring Force with Force sensor has many applications including use in Martial Art schools, Personal use, as a progress tracking device, etc. This Force sensor will be a valuable tool for use in research and Physical fitness progress tracking. With the success of this project, Martial Art Force Gage will be improved to be interfaced with mobile App and Bluetooth ready for easy use.

Result
The Force sensor accurately measures force with a calibrated A502 flexible force sensor. Averaging is used to smooth the measurement. Low Energy Protocol has been used to extend battery life. Real-time data displayed on the LCD for a convenient user interface.