Zurich University
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Ecological intelligent torch

The goal of this bachelor thesis was to develop a torch, which works on the residual energy of used batteries and has a communication interface with which the parameters of the display modes can be changed. The communication interface consists of a computer monitor and an LED or photo diode. To send the data with the monitor, a java applet was developed that can easily be integrated in a web server. By working out a communication protocol, it was possible to translate the data received by the LED/photo diode back to the sent parameter.

In addition to the technical part, work to determine the ecological improvements made by replacing kerosene lamps through the torch was carried out. The influence of kerosene lamps on humans and the environment was also looked into.

At the beginning a receiver had to be found, with which it was possible to detect the difference between a black and a white screen in different room illumination. An estimate also had to be made to find out how much extra energy could be gained from a used alkaline battery, in order to compare the benefits to the additional costs. Then the torch and the web tool were designed and built. After completing the hardware, the firmware was written and programmed. When the torch was finished, measurements had to be made to find out the exact amount of power the it uses.

During the technical part, studies were perused, which included information about the influences of the different lamps running on fuel. With the torch it is possible to use a lot of the residual energy of used alkaline batteries. The running time of the torch increases from 42h to 98h.

Other features of the torch are a dim-, a blink- and a morse mode. With the web tool, the blink speed can be changed and a morse string of up to 10 letters can be transmitted to the torch.

Worldwide, $38billion per year are invested in generating light. A lot of this money is used to buy fuel for kerosene lamps, because 1.6 billion people have no access to electricity and thus have to use candles or kerosene lamps. Thereby 100-150 tons of carbon dioxide (CO_2) are generated per year.

The harmful carbon dioxide emissions can be reduced by replacing fuel lamps with the torch.

In developing countries the torch is ideal for replacing fuel lamps. There is no need to ship old batteries to these countries, because there are already more than enough batteries there.
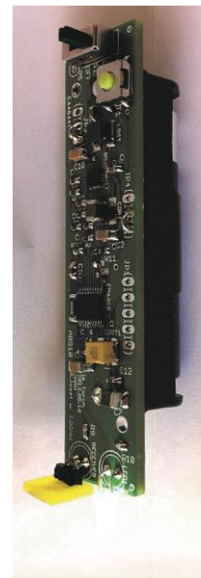
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Ecological Intelligent Torch