SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Prize Winner

Computer Programming, Apps & Robotics

Year 5-6

Blake Hoendervanger

St Thomas School

Government of South Australia
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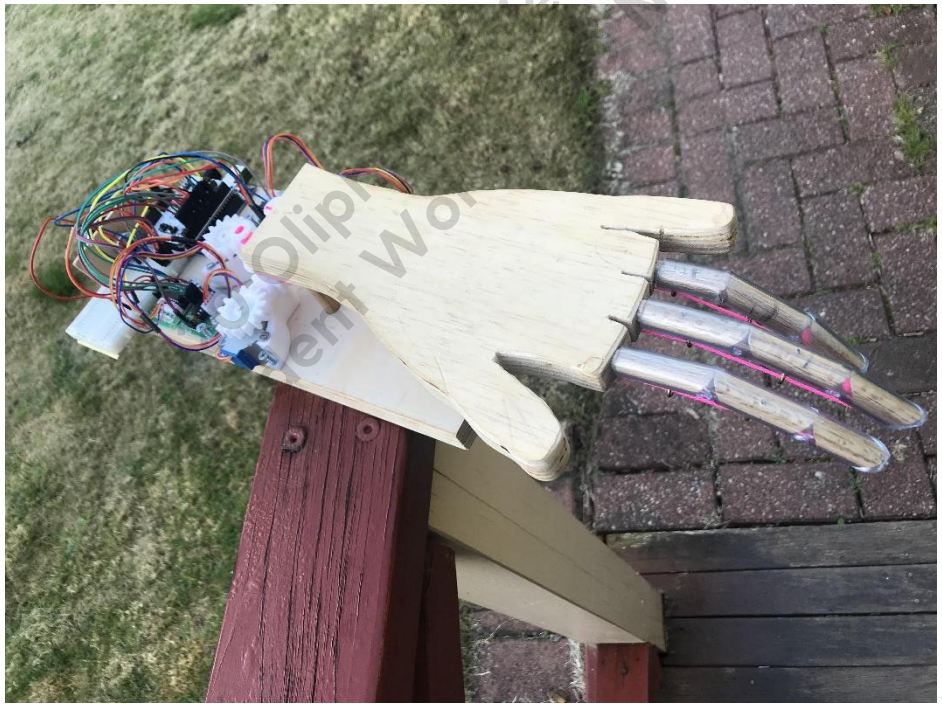
Parkinson’s disease simulation

By Blake Hoendervanger from St Thomas Goodwood

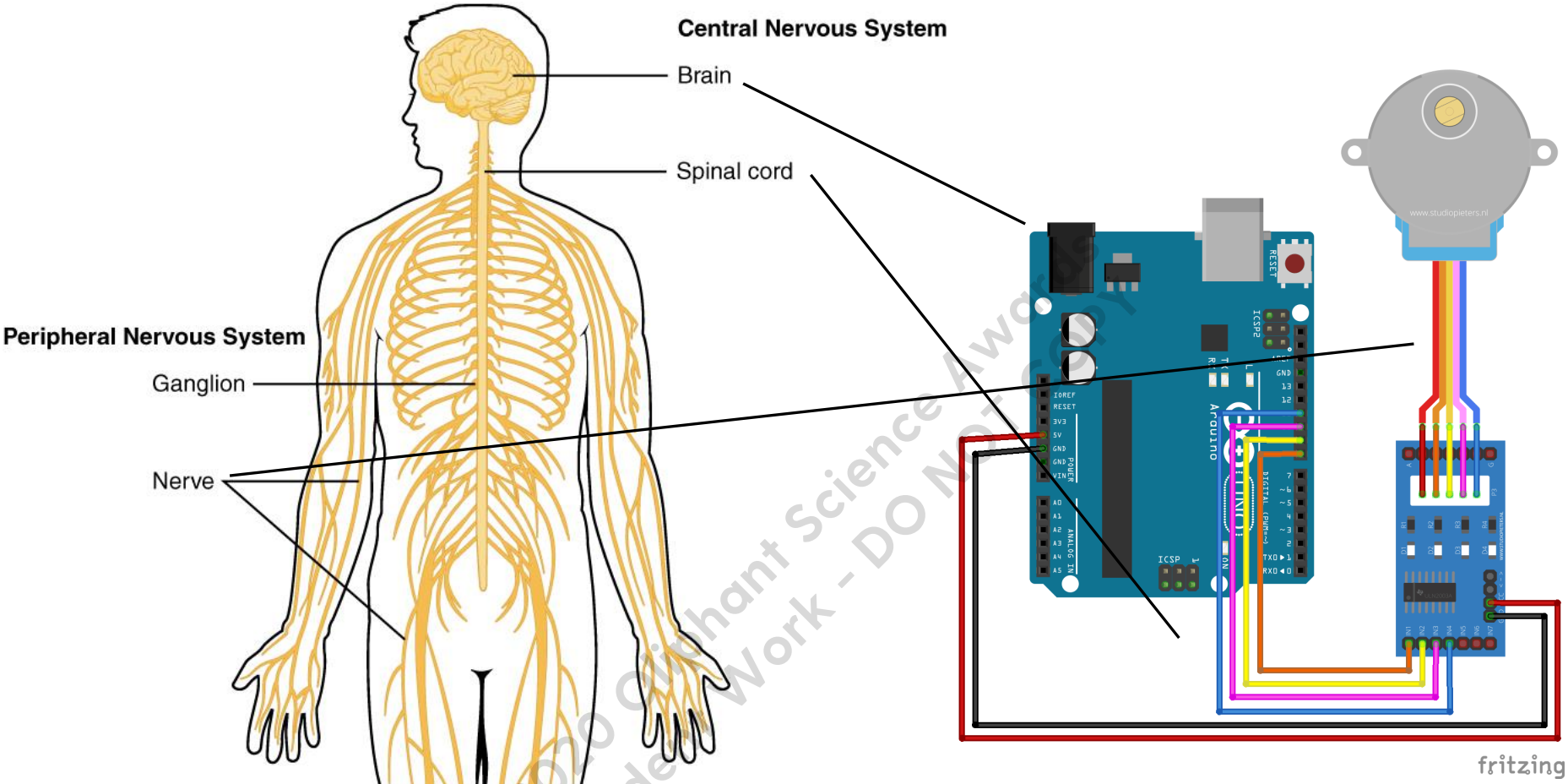


The idea for my model came from learning about the nervous system. I wanted to make an artificial hand that can mimic the way a hand would work. I also heard about Parkinson's disease and I thought I could add that to my hand. My robot works by using step motors to move the fingers of the hand. Twisting the potentiometer will add twitches to the movement like Parkinson's. You can see and hear the effect of Parkinson's as the hand plays the piano.

The type of robot and program I used was Arduino. Arduino is a simple computer that you can program to work with inputs such as switches and sensors and outputs such as motors and displays.

The science behind it my model is the nervous system. The nervous system is made up of the brain, the spinal cord, and a large network of nerves that covers all parts of the body. Together the nervous system helps the different parts of our body to communicate allows our brain to control what is going on. Without nerves we would be mush.

Sensory nerves are taste, smell, etc that send signals to tell us about the world around us. Motor nerves control your body by sending signals to you muscles to make them tighten. In my model the Arduino is the brain sending signals to the stepper motors to get them to turn which causes the fingers to bend and press the piano keys. The potentiometer gives different strength signals that cause the stepper motors to wind a little bit backwards and forwards making the fingers shake.



Parkinson's disease is a brain disorder that leads to shaking, stiffness, and difficulty with walking, balance, and coordination. Parkinson's symptoms usually begin gradually and get worse over time. People with Parkinson's may have difficulty walking and talking. Parkinson's is caused by the loss of brain cells in the part of the brain that controls movement.

The help I had was google and my parents. My dad helped with the hard bugs in the code and my mum helped me to do the research. My dad also watched me when I used the power tools. I used google for my research and for examples of code to learn how to make the different components work. I learnt about Arduino, stepper motors, 3d printing, potentiometers and an IO shield for my project. I also used an LCD screen and distance measurer while I was developing my ideas but I didn't use these in my model.

Resources used;

- arduino.cc
- Arduino forum
- YouTube
- Google