Biomedical Imaging with DVD OPU

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State-of-the-art microscopes cost thousands of dollars, posing challenges to third world hospitals and interested students. Additionally, there is a growing problem of "e-Waste", where consumers throw away “old” technology to buy newer models. The rare earth materials used in those technological devices are valuable and hazardous, polluting the environment when thrown in landfills and potentially causing harmful effects on human, plant, and animal health. The overall goal of this project was to upcycle old computer parts to make a cheap, open source microscope to address these issues. Optical drives are designed to be very precise, in order to "read" data from very small spaces on CDs/DVDs. There is an objective lens to change the angle of the laser, and a very precise stepper motor to slowly change the position of the laser assembly to read different parts of the CD/DVD. These principles were applied to modern microscopy in order to construct a microscope for a couple hundred dollars, as opposed to thousands. Samples were placed to view magnified images to test the viability of the microscope. Magnification was calculated to be at least 150x, proving the viability of this prototype, as plant cells could be seen. All instructions and software will be uploaded to GitHub for cloning and open use. This will not only allow for greater access to microscopy for students and for those in developing countries, but also prevent any further deterioration of the environment.

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