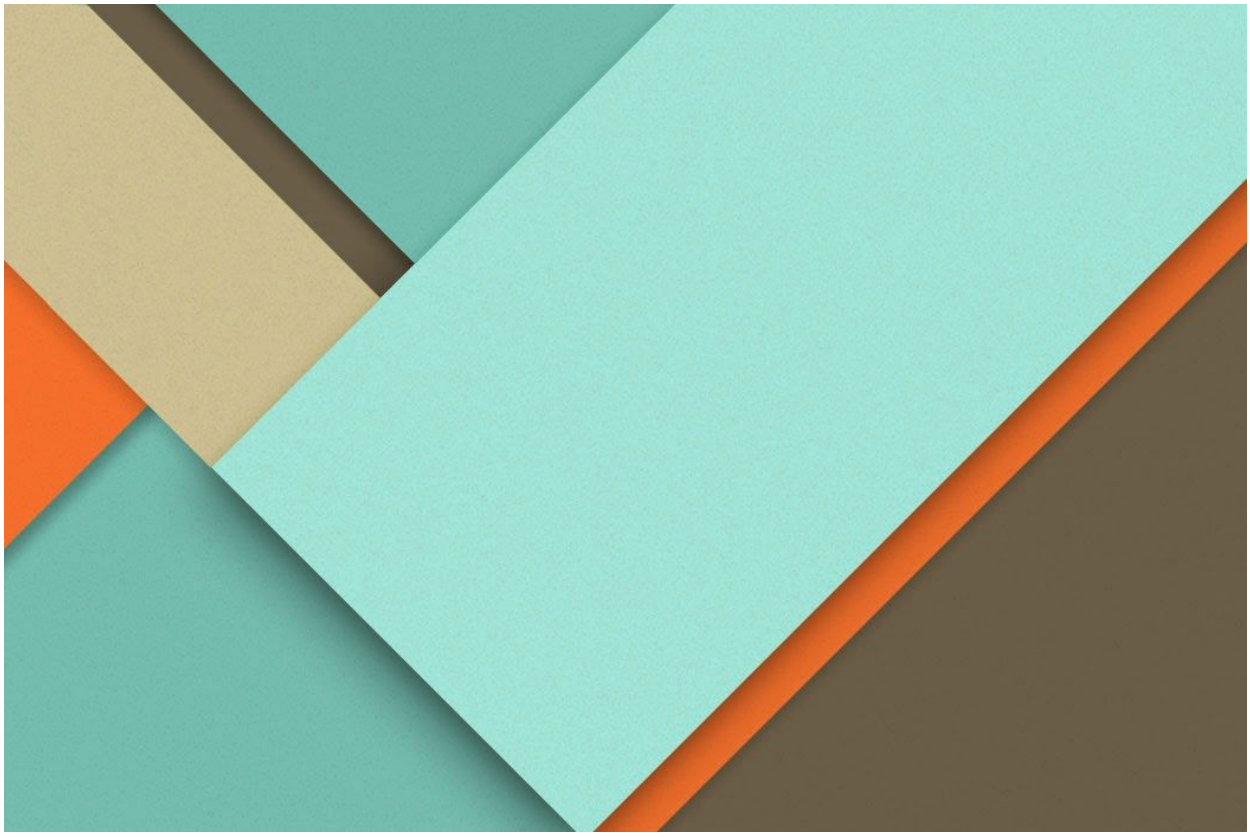

Automatic Eye-Glass Cleaner

Models And Robotics Section
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Contents

Overview

We have designed an automatic Eye-Glass cleaner which cleans the spectacles with ultrasonic cleaning technology, rinses with water and then dries it by blowing and wiping.

Project Motivation

In this fast and busy world, we fail to take care of our own minute personal cleanliness. But when we enter the professional world, all these small things get noticed. And also, these small things pile up to big issues which in turn affects us directly. In this, our spectacles take a major part because eyes are our index. An easily operable machine which can clean our spectacles during our coffee time will be of high use, especially in professional and public spaces.

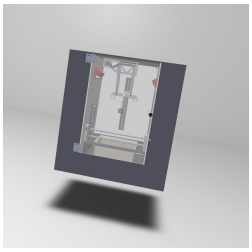

Fig. 1:Our Product

Other Products available in the market and their disadvantages

Ultrasonic Cleaners

- These cleaners cannot dry the glasses. So the glasses come out of the machine in a wet state and the person has to wipe it on his own.
- They can't remove smudges from the glasses.
- These cleaners cannot rinse and wipe the glasses.

Fig. 2:Ultrasonic Spectacle Cleaner

Microfiber Handle Brush Tool

- This tool just cleans the lens. It does not help us with cleaning the frame especially corners.
- It has to be changed once in a while to get the same level of cleanliness.

Fig. 3:Microfibre Brush

OpticWash Machine

- It does not clean nook and corners as it just splashes water on the spectacles.
- Smudges do not get removed very efficiently as it is not wiping the lenses.

So, we have designed a machine which cleans with ultrasonic, rinses with water, dries by blowing air and wipes the glasses with foam so that user can use it directly out from the machine.

Fig. 4:OpticWash Machine

Our solution

I. Holding and Movement

In our solution, we have designed a unique spectacle holder which is easy for users to place their spectacle and also it is designed to be adjustable so that all kinds of spectacles can be placed in the holder with hassle free operation. This holder holds the spectacle at three points namely middle of bridge and starting edges of left and right temples. This holder is attached to a lead screw for easy and accurate actuation in vertical direction.

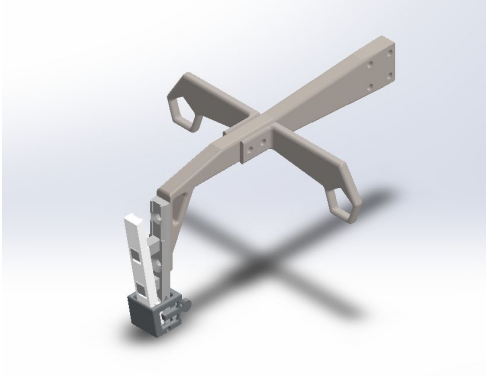

Fig. 5:Spectacle holder

II. Cleaning

In an ultrasonic cleaner, the object to be cleaned is placed in a chamber containing a suitable solution. An ultrasound generating transducer built into the chamber produces ultrasonic waves in the fluid by changing size in concert with an electrical signal oscillating at ultrasonic frequency. This creates compression waves in the liquid of the tank which creates cavitation in the liquid. These cavitation collapse with enormous energy, temperatures and pressures in the order of 5,000 K and 135 MPa is achieved. The circuit works if we drive the transducer from a square wave fed through a series LC circuit tuned to the transducer frequency. A piezoelectric ultrasonic transducer's equivalent circuit is a capacitor in parallel with a series tuned LCR circuit. With just half an H bridge square wave drive, the transistors must charge and discharge that parallel equivalent capacitor on each half-cycle.

Fig. 6:Our UltraSonic cleaner

III. Rinsing

After cleaning, the glasses have some chemicals solutions which need to be cleaned so we do this process by using a pump which is present in the water container. It pumps the water from container to hoes through pipes.

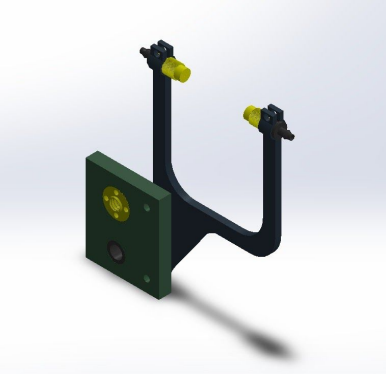

Fig. 7:Rinser

IV. Drying

After rinsing, the next process is drying in which water from the glasses are removed by blowing air. In our machine, this process is carried out by the compressor which blows air through a pipe which is connected to the blower.

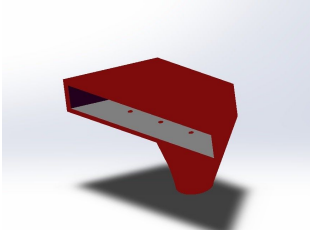

Fig. 8:Blower

V. Wiping

To remove smudges from the glasses, gentle wiping is applied by using foam which circulates on the glasses so that we get a crystal clean finish.

Fig. 9:Wiper

Cost Structure

Components	Cost
Transformer	Rs. 230
Relay	Rs. 100
Resistors	Rs. 900
Capacitors	Rs. 300
Inductors	Rs. 150
Fuse	Rs. 35
Ultrasonic Transducer	Rs. 800
Transistors	Rs. 100
Servo motors	Rs. 150
DC Motors	Rs. 1050
Cytron Motor Drive	Rs. 3000
Rotary Encoder	Rs. 1500
Water Pump	Rs. 700
DC Solenoid Valve	Rs. 250
Relay Module	Rs.450
Power Adapter	Rs. 1500
Air Blower	Rs. 1300
Aluminium Channels and Rods	Rs. 800
Hose,Pipes and brass connecters	Rs.450
Miscellaneous	Rs. 235
TOTAL	**Rs. 14000**

Market Analysis

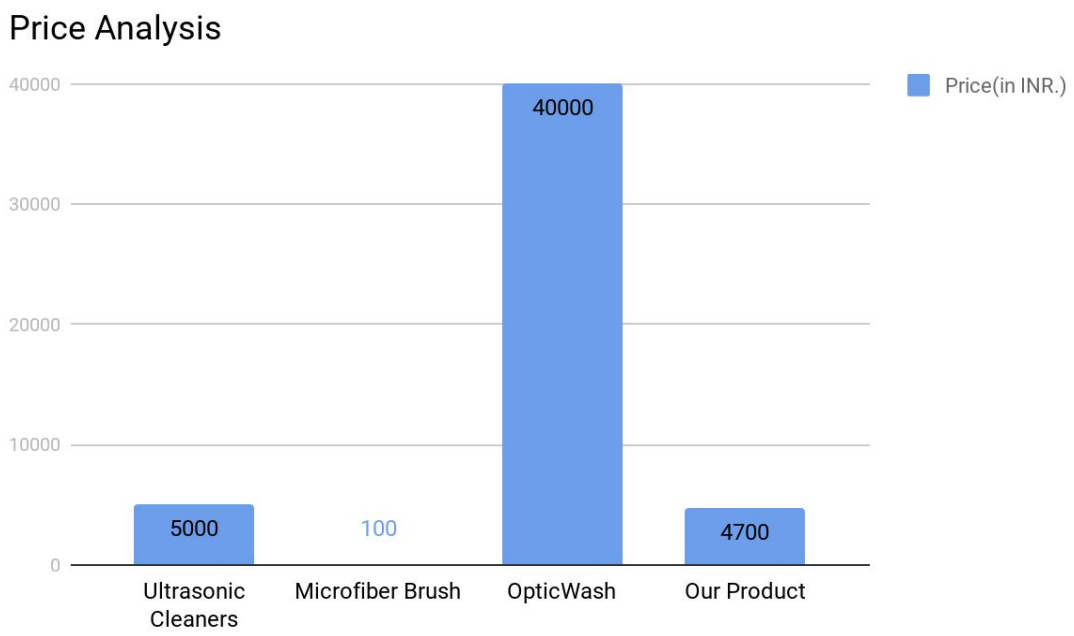

Table 1:Price Comparison

Ultrasonic cleaner currently available in market can only clean the eyeglass with ultrasonic mechanism which does not involve rinsing with water or drying it. OpticWash machine splashes water on eye glass and dries by blowing air but does not wipe which leave smudges on the lens. Microfiber brush can be used to wipe the lens to remove dust and smudges manually. But our product does all these things- cleaning with ultrasonic cleaner rinsing with water and drying by blowing air and also wiping it with wiper. But still we are able to produce it for around Rs. 5000. This would help our product to take a steady place in the market. Also, Rs.5000 is affordable for most of the corporate offices which is our primary target market.

Target Market

Our spectacle cleaner can be used at-

- Optical showrooms
- Eye clinics
- Offices
- Shopping Malls
- Theatres

Optical showrooms and eye clinics is obviously a “for-sure” target market because eye-glass cleaning is one of their major jobs but they do it manually. So now we have come up with a really cheap machine which would make their job easier, more professional and of course anything done with machine gives user satisfaction. In offices where they expect you to be neat and tidy to get a professional touch, these machines would be of great use as you can get your eye glasses cleaned very fast maybe during a cup of coffee. It can be coupled with Shoe polishing machine which is already there in the market which would make a nice pair in corporate offices. Not only in the professional world, casual places like shopping mall can also be targeted. Especially in theatres user’s own eye glass can also be cleaned as it gives a good movie experience and also 3d glasses which they use in theatres can also be cleaned.

As we can see we have a clear and versatile market scope in which we would get a stable place as our cost is really affordable.