Using Engineering Design to Develop a Touchless Fluid Dispenser for Variable Cooler Sizes

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Team Freeflow Drinks from the University of Indianapolis Design Spine course, presents a new and innovative strategy of adding more value to health safety in our indoor and outdoor interactions. Throughout the world, people are having difficulty refilling their drinks in public due to the high risk of contamination involved in using public water fountains. As such FreeFlow drinks present the use of a contactless drink cooler as a means to minimize infections and contamination. The years 2020-2021 has been a period that the world suffers the effects of a great pandemic which increases our awareness of the importance of contaminations across common touch surfaces. Through over 35 interviews, an understanding of what an ideal solution to this problem was found. The most desired feature found from the customer interviews is that the product needs to be one-hundred percent touchless. Another desirable feature was that the product should be able to fill a 32 oz water bottle in less than or equal to twelve seconds. The design for a prototype is for the product to be attached to any cooler that has an outlet diameter size of ¾ in. The product will consist of a one level, 3D printed housing unit containing the plumbing, solenoid valve, circuit board, rechargeable battery, and the ultrasound sensor. The ultrasound sensor will read and check for an object interference every 500 ms and once an object has been detected, the solenoid valve will open to allow the fluid to flow and refill the user's drink. As the drink flows, the ultrasound sensor will check for the object to be removed every 100 ms until there is no more interference, and the solenoid valve will close, stopping the fluid flow.