



23rd Elementz Fair

Project Code: SS23

Project Title Fast Fashion



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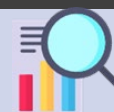
Research
Learning Point



Our Solution



Final Prototype



Analysis



Implication
of STEM

Introducing The Team

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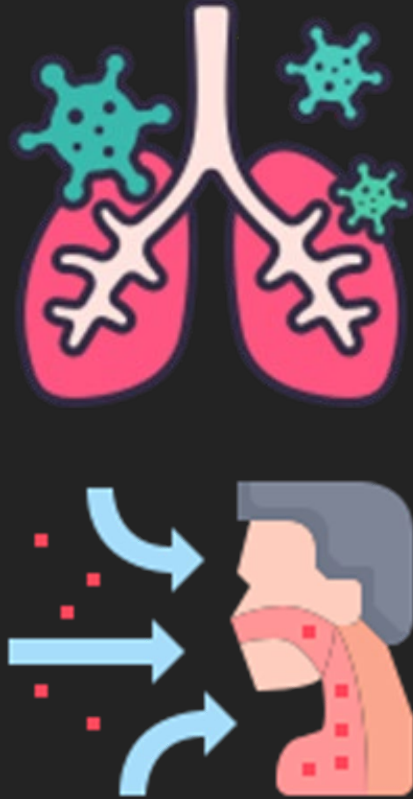


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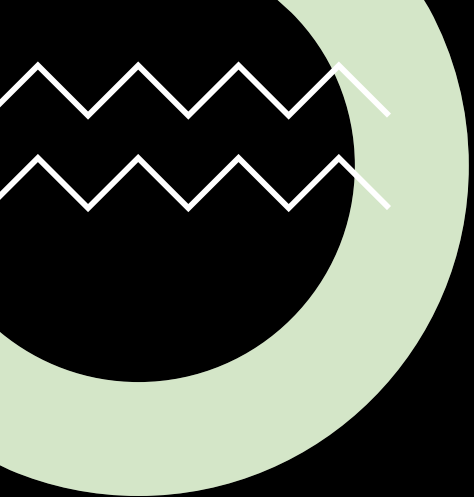


What is fast
fashion?
How does it
affect us
negatively?

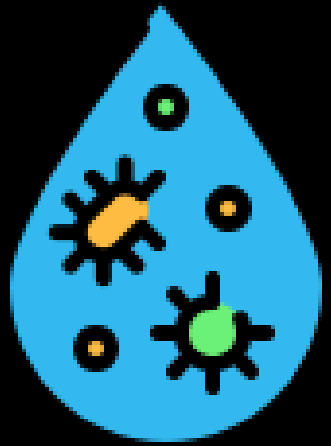

- Fast fashion is an approach of fashion design, creation and marketing that emphasizes high volumes of low-cost clothing and accessories using low-quality textiles and dyes, companies which support fast fashion can mass produce cheap clothing which are quickly pumped through stores to satisfy short-lived consumer fashion trends.
- Fast fashion moves from consumers' closets to the garbage just as quickly as it is produced. Whenever a new trend comes about, these shirts would just be thrown into waste as it is deemed as “outdated”. To meet consumers wants, companies would have to constantly make new shirts by unhealthy ways. Factories dump poisonous wastewater into rivers while releasing millions of tons of greenhouse gasses during production for clothing that end up burnt, in landfills and in oceans. Production of fast fashion uses 8000 different synthetic chemicals, most of these toxic chemicals are found in the dyes that colour the clothing, in the corrosive finishing and bonding agents, and in the synthetic textiles themselves, which are known to cause cancer and other diseases in humans.



Workers are constantly exposed to these toxic chemicals and are breathing in their fumes which negatively affects their health. Carcinogenic and hazardous chemicals are at the core of fast fashion. Inhaled plastic microfibers may persist in the lung and as a result, could cause inflammation. It has been hypothesized that this could lead to health effects including reproductive problems and cancer. Particle pollution such as asbestos and fine dust has long been known to damage lung tissues, leading to cancer, asthma attacks, and other health problems. If inhalation of microplastics is sufficiently high, these plastic particles may cause similar health problems. Multiple research reveals people working with plastic-based textiles and dust are at an increased risk of respiratory problems.



Clothes production produces wastewater which affects the environment (biodiversity). Contaminants in water bodies are toxic to aquatic life, often reducing lifespans and harming the ability to reproduce in aquatic animals. These contaminants can then spread to other animals up the food chain. Eventually, when these shellfish and fishes which contain microfibers gets sold at the market, it poses a threat to human health. It also acidifies oceans which makes it difficult for survival of corals. Nervous systems of sharks, clownfish and other marine life may be affected as well. 500 000 tons of microfibers are thrown into oceans each year. Even washing clothes releases 500 000 tons of microfibers into the ocean each year, the equivalent of 50 billion plastic bottle.





The fashion industry emits 1.2 billion tons of carbon dioxide annually. Which is more carbon than international flights and maritime shipping combined. Fast fashion released 2.1 billion metric tons of greenhouse-gas emissions in 2018, about 4 percent of the global total. To put that in context, the fashion industry emits about the same quantity of greenhouse gas per year as the entire economies of France, Germany, and the United Kingdom combined.

Moreover, fast fashion affects children badly as 80% of apparel is made by young women between the ages of 18 and 24. To make matters worse, evidence of forced and child labour is present. Children are often forced to work 14 to 16 hours a day, 7 days a week. During peak season, they may work until 2 or 3 am to meet the fashion brand's deadline.



Our Solution

(Overview+
Application)

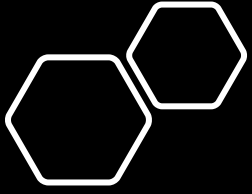


We plan to make a shirt as well as accessories like bags which can change its design using digital technologies and hardware such as using an Arduino to control the change in colour by the LED as well as a website that modifies the design. This allows our product to metamorphosis into different patterns based on the user's preference. With this, people would just need one shirt in their closet due to the ability to change patterns with the ongoing trend, stopping fast fashion and reducing its effects in the long run. Additionally, it saves on expenses. Best of all they would not need to have the hassle of having a dilemma in the shop of what design to buy because they can just print the design they want of the shirt. The user can draw or download their design on a website made by us, which will be processed by the Arduino board, which will cause specific LED lights to light up to show their design. The Arduino communicates with modules and sensors by switching on and off electrical current. As current technologies are still unable to effectively recycle textile fabric, especially because most fast fashion is made of a mix of synthetic, petrochemical-derived fibers such as polyester, this "one shirt fits all" approach would help to solve the problem.

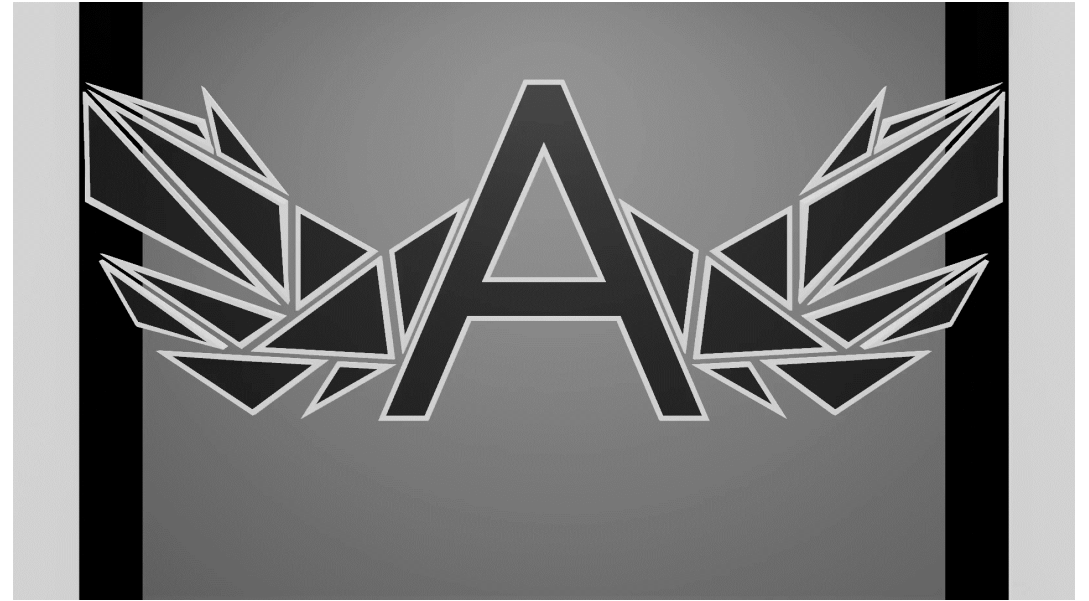
Our Prototype

- There will be 2 expected product.
 1. A rendered animation of a shirt which is a concept
 2. Prototype (Bag)
- For prototype one, we will create a frame-by-frame animation which will help to represent the shirt as it changes its design from one to another and different colour to sell the concept.
- Although our prototype is sold as a concept. We have made a prototype to illustrate what it means on a smaller scale and how it would look like. However, it is represented by a different accessory, a bag. The bag would be printed using a 3D printer. After the printing is done, we would add LED lights to it by soldering it onto a circuit board and then attaching it into the prototype. For users who want to make the LED lights change color, they would need to access the website that we build. By opening the website, users can either download premade templates or draw their design in the space provided. Next, users need to download the drawing into a file which will be sent to the Arduino board for processing. Once the drawing is processed the respective LED lights would light up showing the design. Allowing our product to metamorphosis into different patterns based on the user's preference

Our Prototype



Colour changing bag with the use of LED after lights being soldered, coded and processed by Arduino board.



Concept of shirt:
Please play the video to have a understanding of it.

A website for people to use to change the design of the shirt and know more about us.

Link to website

<https://avisfashion.netlify.app/>



Analysis



Strength

- Saves the environment
- Stops fast fashion and its negative effects on human health, community and earth making the world more sustainable.

Weaknesses

- Shirt cannot be washed
- LED may break upon impact

How is STEM used in our project

Science: Research on lighting of LED

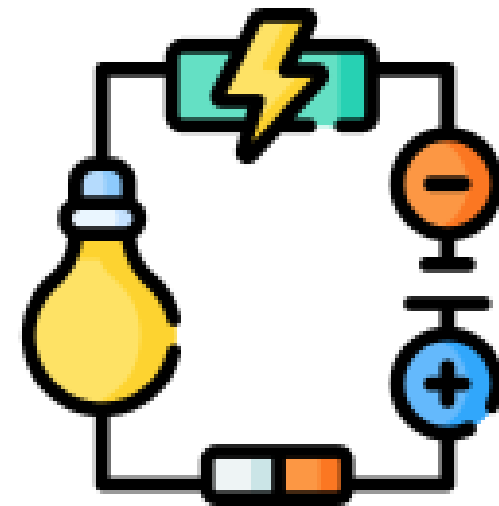
LEDs at their basic level are a latticework of Si. The nature of this atom when combined with other Si atoms forms a network of non-charged bonds between themselves. This non-charged state makes pure Si non-conductive meaning it will not carry an electrical current. Scientists have found a way to allow just a little amount of energy to pass through the lattice work of Si by replacing a minimal amount of Si with other materials and arranging them in a way that the energy flow is controlled. A diode, is a combination of different materials that does it and as a result light is emitted. As electricity passes through these materials the electrons in the compound become *excited* and emit photons of light. The materials used in the lattice work can control the different colors and intensities of the light emitted.

- Technology

Coding of Arduino board and web development.

Our team has made a website:

<https://avisfashion.netlify.app/>



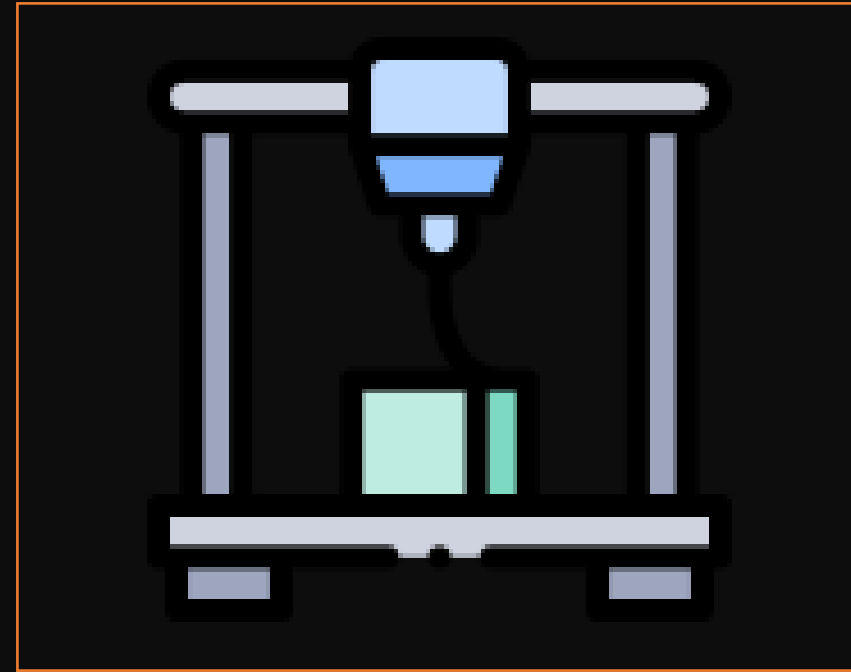
How is stem used

Engineering:

3D printing is a form of mechanical engineering that uses layer by layer design to print complex structures out of filament material. After the geometry has been designed, it is processed into layers that are 100-300 microns thick, also adding support structures where necessary to prevent overhanging areas from drooping during the upwards printing process. The design is therefore precise and can be made to contain other mechanical or electronic components.

Mathematics

- symbols used in coding
- (+, -, /, *, >, <, =)





- Thank you for your time and attention!