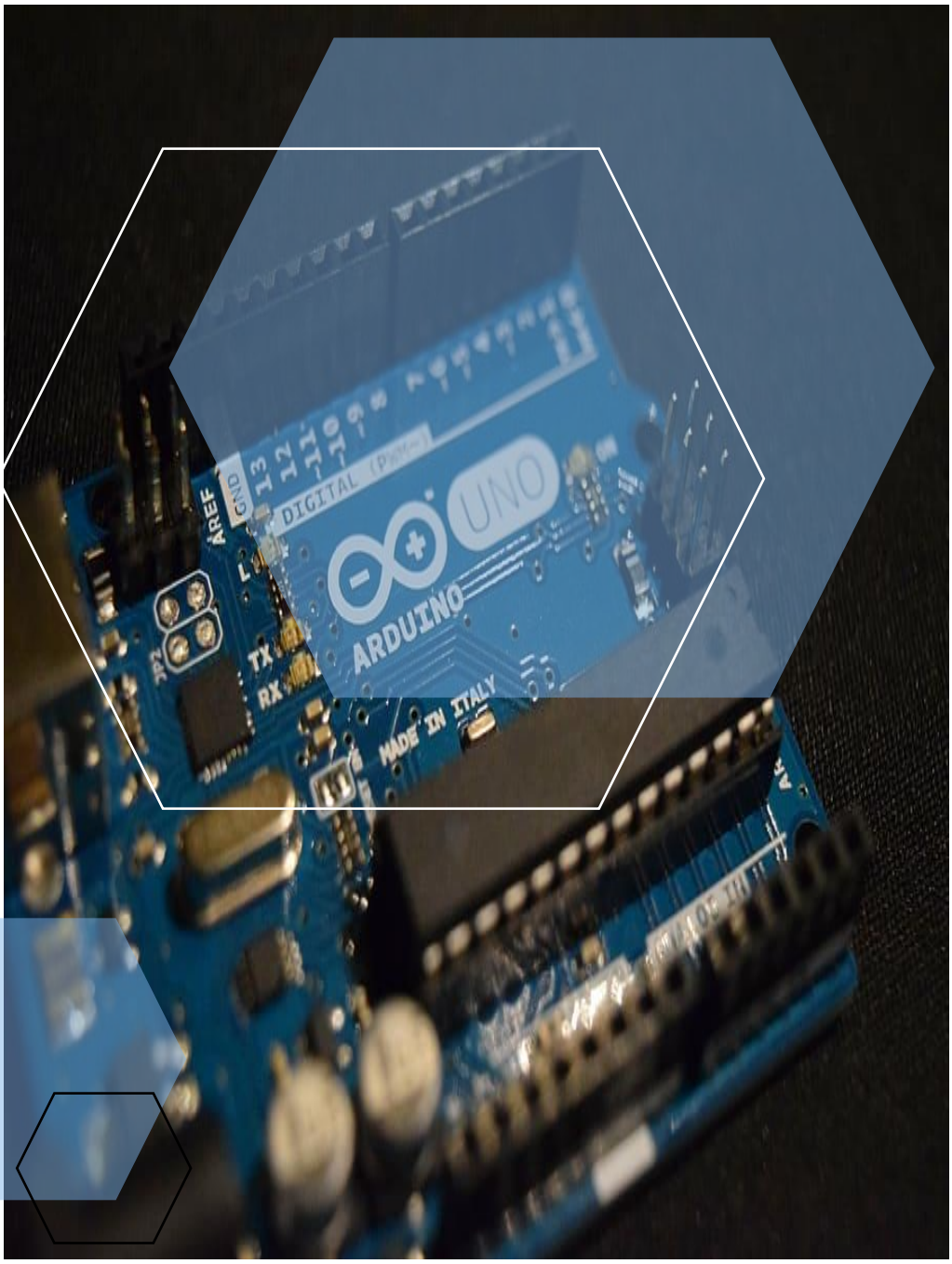
HEARTH



GROUP 09 – PROJECT PROPOSAL

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HEARTH

PROBLEM

Given the shortage of gas cylinders in Sri Lanka, most households have now turned to either using electricity or hearths to cook. While electricity is the more sustainable solution, that solution can be quite costly, so most people use hearths, powered by either charcoal or firewood. The issue with these hearths is that users will have to keep blowing into it to control the fire levels.

SOLUTION

Our solution to this issue, would be to design a hearth in which a fan is used to control the fire levels. The hearth will be fully enclosed, and a fan would be attached to the enclosure that would regulate the wind supplied to the fire. Heated charcoal would have to be used as the fire supply and once the heated charcoal is added into the enclosure, it would be covered with a metal plate. Cooking utensils can be placed on this plate to cook. A temperature sensor would be attached to the metal plate that would read the temperature of the plate and a PCB can be used to regulate the fan speed according to the temperature of the plate to avoid overheating. If time permits, this can also be improved to provide the user with 3 options of having a high, medium, or low temperature.

In summary, we use a temperature sensor to regulate the fan and thus the cooking temperature required by the user. This would effectively automate much of the procedure done when using hearths. This solution also has the added advantage that in the case where just charcoal would be used, the maximum temperature attainable is approximately 400 °C. Whereas if there were a good supply of air, the heat can go up to more than 500 °C.

OTHER IMPORTANT CRITERIA

1. Cost – Since this product is an alternative for the costly electric cookers, the cost of the product cannot be very high. The target cost would be around Rs 5,000 – Rs 7,500, depending on the added features.

2. Heat sensitivity – Normal hot plates have a maximum temperature of 750 °C. Therefore, the sensor we use needs to withstand such a high temperature. As of now, we plan to use a PT100 temperature sensor which has a range of up to 750 °C. We can start our cooling process at a lower temperature in order to avoid damaging the sensor.

3. Smoke and debris – Since we use charcoal, it is likely that there will be a good amount of smoke produced. Therefore, we aim to make our enclosure in such a way that there is minimum effect on the PCB and sensors by the smoke.