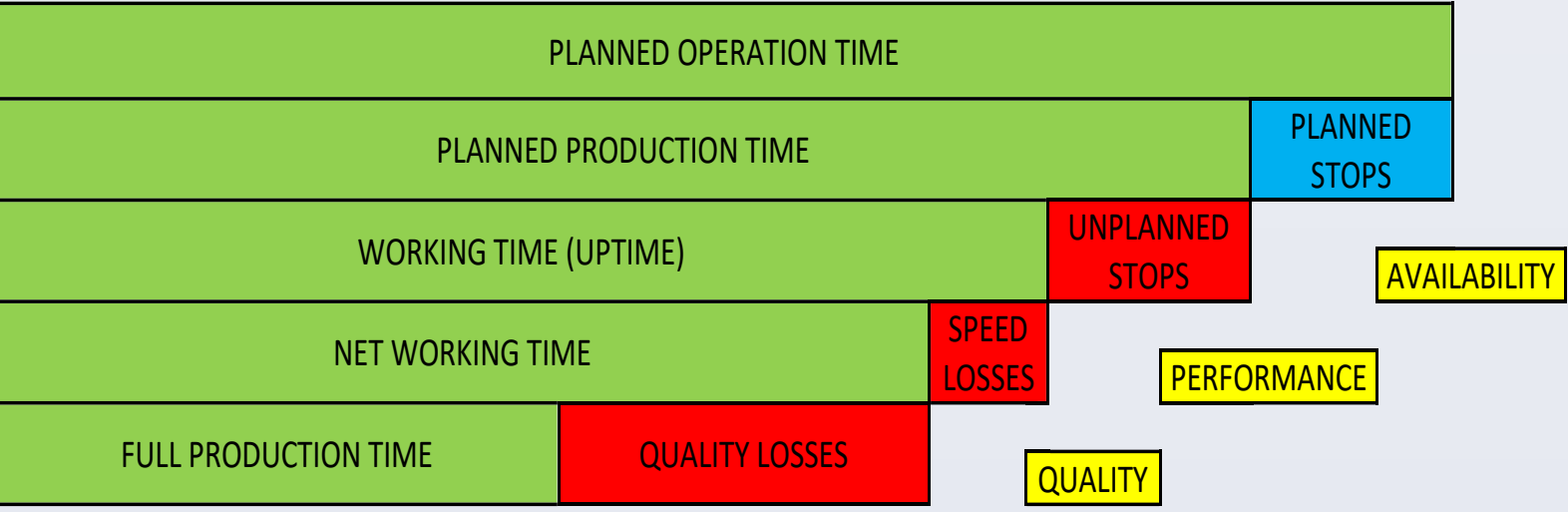




ABSTRACT

- This project is based on increasing the efficiency in EVYAP cream production lines.
- Examined various factors, agreed to study on workers’ efficiency and quality issues.
- Established an Arena simulation model of the process to observe and solve the problem which delivered miscellaneous statistics.
- By making small enchantments to the line, we have seen that a new storage unit added to beginning of the line increases workers’ efficiency
- Developed image processing module by Raspberry Pi to prevent wrong stamping issues on cream boxes.

OEE = Availability x Performance x Quality

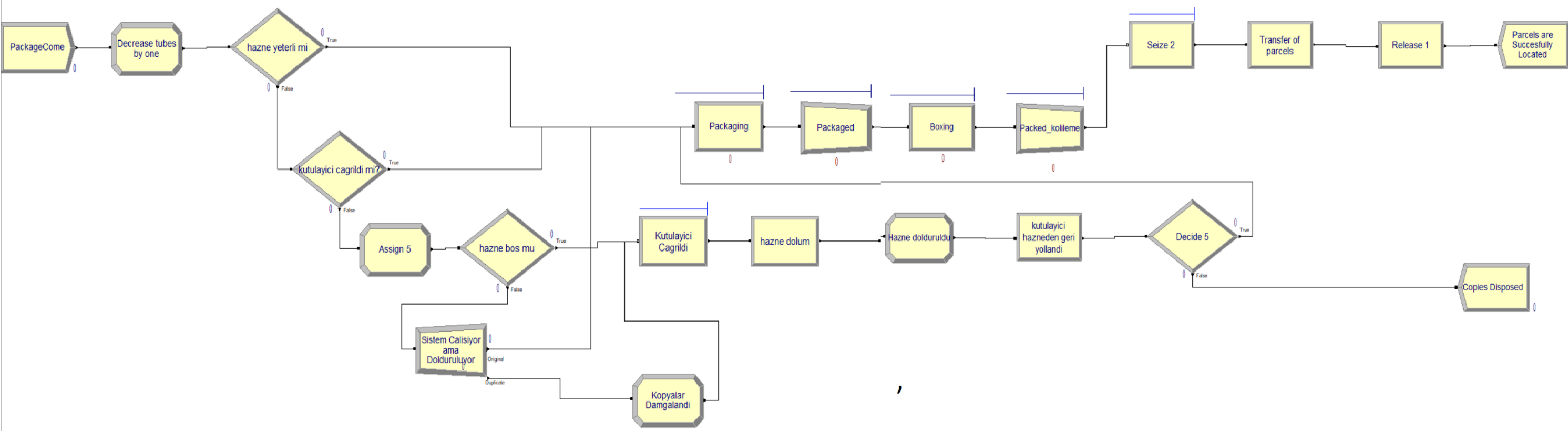


Machine Data	Values	Explanation
Shift Time (8 hours)	480 minutes	
Working Time	375 minutes	Production Time of the Shift
Break (pause) Time	60 minutes	Break Time of the Shift
Setup Time	15 minutes	Setup Time of the Shift
Stopping (down) Time	30 minutes	Stopping (down) time of the Shift
Total Time	420 minutes	
Ideal Cycle Time	1 piece per 63 seconds	
Total Production	360 pieces	Total Produced Items of the Shift
Quality Production (total)	355 pieces	Number of Sufficient Quality Pieces Produced on that Shift
Targeted Production	400 pieces	Expected Number of Production for that Shift

OBJECTIVES

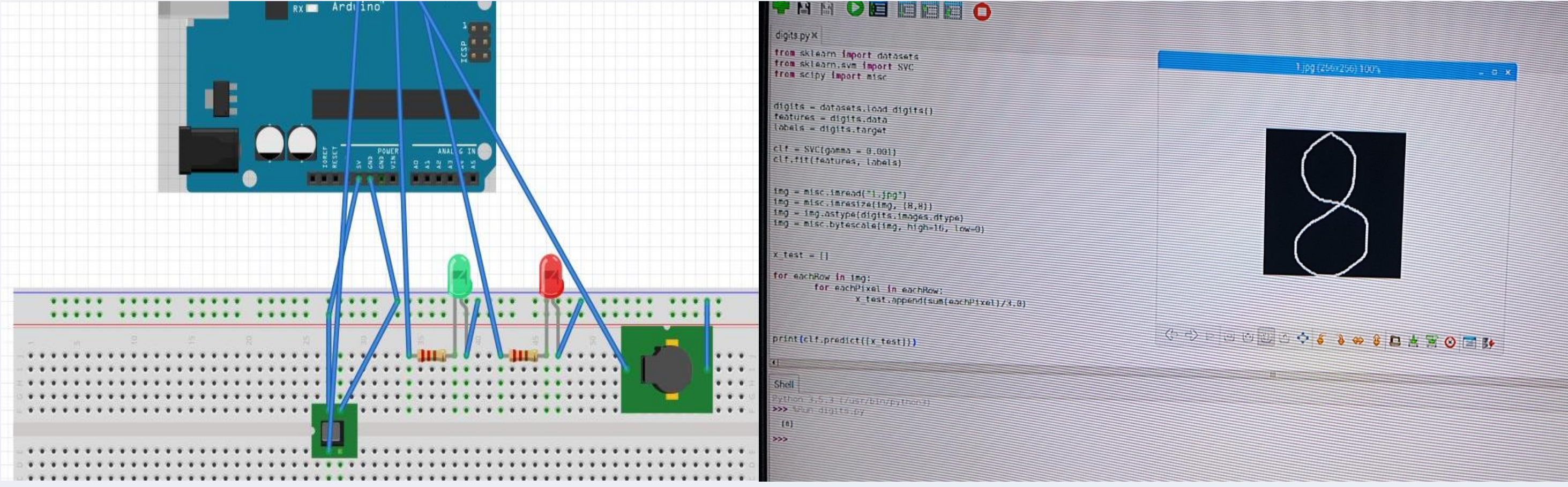
- ✓ In depth analysis and simulation of the production line
- ✓ Proposing improvements for the production line
- ✓ A level measuring system for raw material tanks
- ✓ Eliminating the expiration date error
- ✓ Applying pump system to liquid transferring process
- ✓ Measuring values that are related to efficiency of workers
- ✓ Developing the automation process instead of manual labour to decrease waste time in oil cream production line
- ✓ Calculating the cost of the new system and perform a feasibility analysis

SIMULATION ON ARENA SOFTWARE

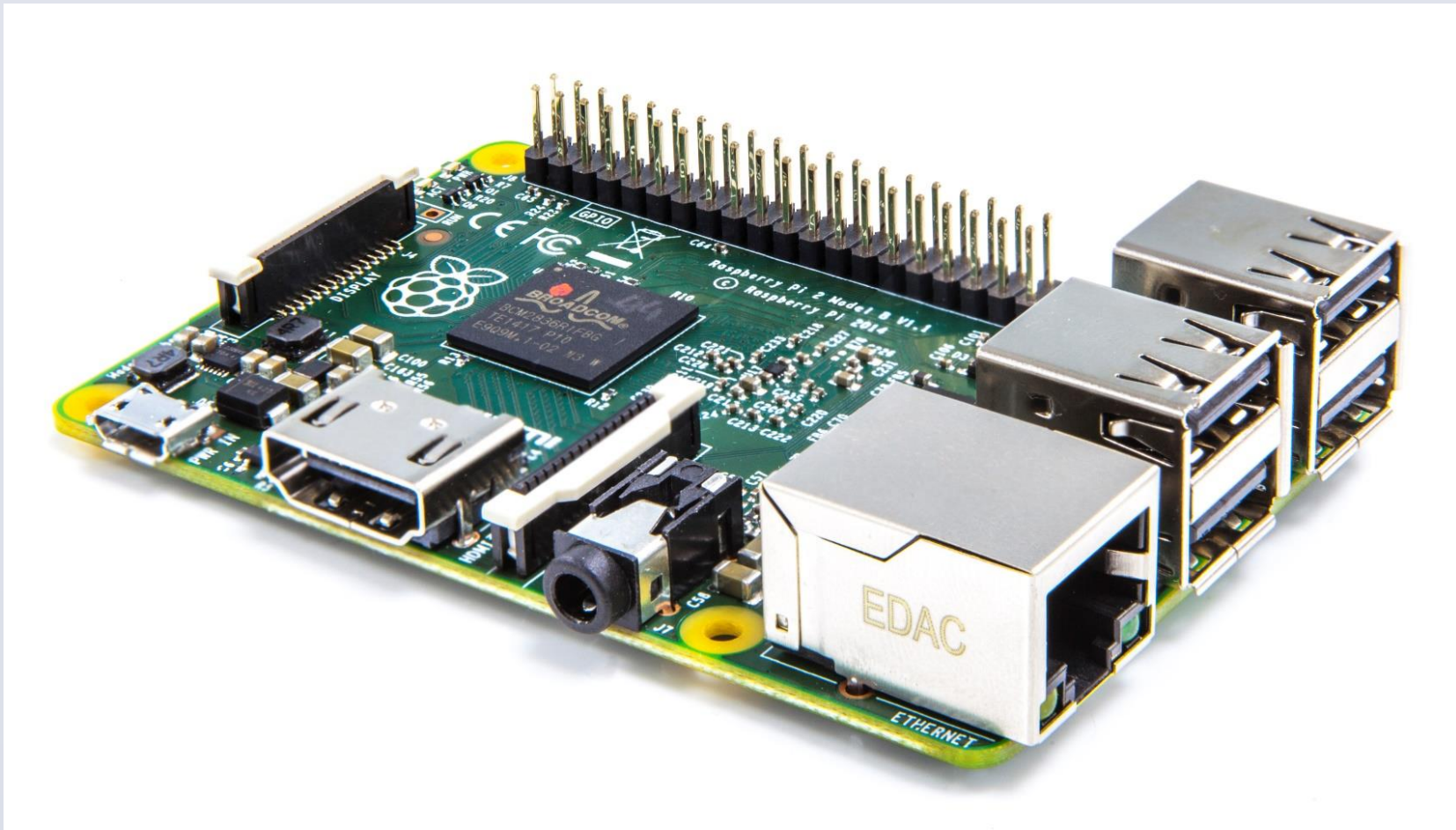


- ❖ Decreasing labor power on cream manufacturing line, achieved by adding a storage unit to the production line.
- ❖ One mobile worker could be assigned to fill the empty storage unit when necessary.
- ❖ A detection system such as an alarm is implemented to prevent empty chamber thus line failure.
- ❖ The mobile worker is still going to be able to complete his main tasks. We have seen that there is no need for extra labor on the production line of the machine who adds empty tubes to the line.

TANK LEVEL DETECTION AND BOX DATE CHECK



- ❖ If the level of the oil cream tank would fall below a certain value and if not noticed, the machine would suck the cream with some amount of air which would cause the product to be rejected.
- ❖ The level of the tank is observed and it is prone to cause problems. We have suggested that a simple device based on “Arduino Uno” which would check the level of the tank and warn the operator visually and audibly.
- ❖ Both production and expiration dates are being printed on boxes of creams can be dislocated after a period of printing. Since there is not any system checking this fault, this error keeps happening which leads to reproduction of batches of cream boxes for several times a year.
- ❖ Image processing system checking if dates on those boxes are as desired or not. We have decided to use a Raspberry Pi 2 Model B.



CONCLUSION

- ❖ We have planned to put a storage container for the tubes to the first part of the production line. After the implementation of the container, worker can work on other duties thus the overall contribution of this worker to the production increases tremendously.
- ❖ 70% of the quality problems are originated from wrong stamping on the cream boxes. The camera module that we developed from Raspberry Pi eliminated this issue.
- ❖ Lastly, management wants readjustments which redeem itself utmost in two years. If these limitations had changed, we would have concentrated more on production lines, so that the line can be formed in a more automatic way by using less workers with more complex upgrades to the production line.