



Automation roadmap report

HowToPasta

Food production

31.08.2020

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Connecting the World of Robots

Executive Summary

This report summarizes the processes observed for HowToPasta, providing an overview of the processes related to Food production 31.08.2020






By evaluating, describing and rating the processes through the Potential Finder tool at HowToRobot.com, it is ensured that these follow the standardized and proven way of assessing automation potential. However, the specific scoring as well as descriptions of processes must be considered in the context of the qualifications of the persons who input these into the tool.

This report presents 6 processes, for each describing the process and its potential for automation. In an appendix to this report, the automation potential of each observed process is quantified and arranged in a scoring table, enabling decisionmakers to get an easily accessible overview and prioritize automation projects.

Automating processes with high potential could lead to increased productivity, improved working environment, and free employees from strenuous or repetitive manual tasks, thus enabling them to focus on other, more valueadding processes such as supervision, quality control etc.

The observations featured in this report are made from a technical perspective. One must first determine if physical automation is possible at all. The financial gains from automating the observed processes can be calculated through the calculation tool on HowToRobot.com. Such calculation presents a crucial next step in securing the success of any robot investment and should be carried out for the most promising processes in this report.

Based on the provided scoring and prioritization of investment goals, the three observations rated with highest potential are:

					
Process name	Process type	Number of FTE	Units per week	Automation Impact	Automation Index
Wrapping cartons in foil	Material Handling	1	1500	14	A1
Emptying of bags with raw materials	Material Addition	2	1000	13	A3
Placing bags inside of the cartons	Material Handling	1	750	12	A2

It is recommended to focus on these processes and use the calculation tool on HowToRobot.com to estimate the potential gain by automating these processes.

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Background

The purpose of this report is to provide an initial overview of the identified automation potential at HowToPasta, serving as a baseline for further discussion on which manual processes should be prioritized for automation.

The observations featured in this report are made from a technical perspective. One must first determine if physical automation is possible at all. Therefore, the financial gains of automating the observed processes is not explicitly estimated in this report, as such calculation is an important next step in further analysis.

The Automation Index

In evaluating the risk of a given automation solution the Automation Index is used. It describes the complexity of the technology required to perform a given task, and it examines the current maturity of said technology. This helps estimate the risk or level of uncertainty involved in initiating an automation project.

The Automation Index identifies three levels of risk:



A1: A low-risk automation solution. Standard solutions are available in the market. The task to be automated is a known process which has been solved several times before.



A2: A medium-risk automation solution. Standard solutions are available in the market, but the task has a certain level of complexity which influences the level of standardization. Or, there are standard solutions in the market, but they are not yet sufficiently tested. Solutions may not be very robust.






A3: A high-risk technological solution. There are no tested standard solutions in the market and the task has a high level of complexity. This will likely be a high-risk innovation project.

In the report, each observed process has been assigned an Automation Index value. It is often recommended to have these verified by a robotics expert.

Observation overview

To provide an easy overview, each process description contains images related to the process as well as ratings on three key parameters on a scale from 1 to 5. The ratings summarize the process conclusions and quantifies the evaluation in an easily comparable format. On all three parameters, the higher the score is the better one.

The ratings estimate potential for:




 Productivity increase - reduction in required labor time spent on completing a task as well as increased efficiency.	 Working environment - improved working conditions, for example reducing heavy lifting, straining or repetitive tasks as well as manual work in hazardous areas.	 Quality / uniformity - higher quality of the resulting work and/or a more uniform level of quality, less dependency on the skills of the individual technician/operator.
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Note that the ratings indicate potential for further optimization compared to current manual procedures. Thus, a score of 1 or 2 is not necessarily a bad thing, it only indicates that the additional gain in these areas is not very high compared to the current situation. This may be because the standard is already quite high.

Scoring tables in Appendix A

A scoring table listing all observations from this report is included in Appendix A. The scoring table summarize the scorings provided for each process, providing a ranked overview of the processes. Ranking is done so that the process with highest total impact score (the sum of the three individual scores) is rated highest. If two processes are rated equally high, the one with the lowest automation index and thereby technical complexity is ranked higher.

Process 1: Internal logistics

 Process type:	Logistics
 Current FTE:	5
 Processed units per week:	3000






Process description: The internal logistics currently involves quite a lot of manual transportation of pallets by forklifts. 5 full-time operators are driving back and forth through the production floor to deliver finished goods, as well as, raw ingredients necessary for the production. It is both time-consuming and also creates the danger of accidents when the forklifts are being driven through the production floor, where other workers walk through the same paths.

By automating this process, there is a possibility of freeing operators and placing them in other parts of production. The floor in this area of production seems to be even and ready for an automated guided vehicles or mobile robots to deliver pallets. That could also enable more real-time delivery of goods.






Evaluated factors concerning automating the process

Below you see a list of the estimated effects an eventual automation could create on quality, productivity and work environment. You also see the estimated complexity of automating the process.

 Impact on productivity	★★★★★
 Impact on working environment	★★★★
 Impact on quality / uniformity	★★
 Total impact score	9
 Automation Index	A1

Process 2: Emptying of bags with raw materials

 Process type:	Material Addition
 Current FTE:	2
 Processed units per week:	1000

Process description: The bags with raw materials are handled manually in multiple places throughout the whole production. They are mostly picked up one by one, then manually cut open with a knife and the contents being emptied into the tanks. It takes around 2 minutes per each bag but since there are 1000 bags that need to be opened each week, it is a repetitive task that involves lifting a lot of heavy bags.

There are also risks are related to this process:

- Injury of the person handling the knife
- Dropping the knife or the bag into the tank

There is a potential in increasing productivity and improving the work environment by sparing the operators from manual, repetitive tasks and reducing the risk of human error.



Evaluated factors concerning automating the process

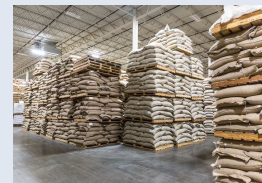
Below you see a list of the estimated effects an eventual automation could create on quality, productivity and work environment. You also see the estimated complexity of automating the process.

 Impact on productivity	★★★★★
 Impact on working environment	★★★★★★
 Impact on quality / uniformity	★★★★★
 Total impact score	13
 Automation Index	A3

Process 3: Storage of finished products

 Process type:	Logistics
 Current FTE:	1.5
 Processed units per week:	2000

Process description: Currently a lot of finished goods are stored on the production floor, next to the semi-automatic lines. There is a potential to save storage space in that area of production. Additionally, currently the operators put the bags with finished products on the pallets manually, one by one, which is related to heavy lifting and it is a repetitive task. During the time when the bags leave lines, operators cannot leave their stations, as the conveyor belts move continuously and a slowdown in unloading the bags would cause a stopover of the whole production line. There is a chance to improve productivity and work environment by automating the process of placing the bags on the pallets, it is not that time-consuming but involves a lot of repetitive movements and lifting, which could be easily done by a robot.






Evaluated factors concerning automating the process

Below you see a list of the estimated effects an eventual automation could create on quality, productivity and work environment. You also see the estimated complexity of automating the process.

 Impact on productivity	★★★★★
 Impact on working environment	★★★★
 Impact on quality / uniformity	★★★★
 Total impact score	10
 Automation Index	A1

Process 4: Wrapping cartons in foil

 Process type:	Material Handling
 Current FTE:	1
 Processed units per week:	1500

Process description: Before the outbound logistics takes place, and the goods can be delivered to customers, all the boxes with products need to be wrapped in foil in order to avoid any damages during transportation. It is done manually by one of the operators, which has to walk around the boxes with a roll of foil a few times. He needs to make sure that the foil is tight enough and that the whole sides of boxes are covered, which relates to working in straining, uncomfortable positions and a lot of bending. This has to be done after each batch is finished, which in total would be between 7-10 times a day.






Evaluated factors concerning automating the process

Below you see a list of the estimated effects an eventual automation could create on quality, productivity and work environment. You also see the estimated complexity of automating the process.

 Impact on productivity	★★★★★
 Impact on working environment	★★★★★
 Impact on quality / uniformity	★★★★★
 Total impact score	14
 Automation Index	A1

Process 5: Placing bags inside of the cartons

 Process type:	Material Handling
 Current FTE:	1
 Processed units per week:	750

Process description: In order to protect the food products, there is a need to have a bag inside of the carton. Currently the bags are being placed inside of boxes manually. The employee standing at the beginning of a packing line needs to take the bag out one by one, the unfold it manually and make sure to place it over each side of the carton, so the bag will not fall in while the finished products will be emptied inside of it.

It takes 1-2 minutes per carton but there are 750 cartons on average leaving this line in one week, so there would be a chance of saving time as well as ensure homogeneous quality by automating this task. Having an automatic solution would also reduce human errors that may end up in damaging the finished products transported in the boxes.






Evaluated factors concerning automating the process

Below you see a list of the estimated effects an eventual automation could create on quality, productivity and work environment. You also see the estimated complexity of automating the process.

 Impact on productivity	★★★★★
 Impact on working environment	★★★★★
 Impact on quality / uniformity	★★★★★
 Total impact score	12
 Automation Index	A2

Process 6: Picking goods from the warehouse

 Process type:	Logistics
 Current FTE:	5
 Processed units per week:	1000

Process description: The warehouse is currently under the change into more automatic one, so right now the goods already have the unique numbers to make it easier for the forklift operators to find them. However, the wireless network inside of the warehouse is not yet prepared for that. Currently there are places where the signal is very weak, making it difficult for operators to scan the barcodes. In some cases the operator needs to go back to a place where the signal is better and then again to the shelf to scan the code again, using more time than necessary for this task.

There is a big variety of product dimensions and packaging types, therefore using completely autonomous picking up and transportation system might be difficult. However, having AGVs or mobile robots deliver goods would spare 5 operators working full-time on delivering goods, so that they would have time for other tasks important for the production process.



Evaluated factors concerning automating the process

Below you see a list of the estimated effects an eventual automation could create on quality, productivity and work environment. You also see the estimated complexity of automating the process.

 Impact on productivity	★★★★★
 Impact on working environment	★★★★★
 Impact on quality / uniformity	★★★★
 Total impact score	11
 Automation Index	A2

Conclusion

A total of 6 has been mapped and described in this report, through the Automation Roadmap tool on HowToRobot.com.

The processes have been rated on multiple parameters to achieve an indication of which processes will have the highest impact if automated.

This roadmap should be seen as an overview of the processes with potential for automation, as well as an initial indication of which processes are likely to provide the most impact if automated. This will enable pursuing of the highest scoring processes first.

Next steps

Before investing in automation solutions, it is highly recommended to proceed with a calculation of the financial benefits an automation solution would provide. With a business case, it is finally possible to decide if automating is feasible.






Once the financial frame is known, the next step would be to write up a requirement specification, describing exactly which tasks an automated solution shall solve.

With a known business case and a prepared requirement specification, it is finally time to engage potential suppliers and receive offers for an automated solution.

Appendix A: Scoring table

The following tables summarize the ratings of all observations, sorted with the highest impact on top.

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Process name	Process type	Number of FTE	Units per week	Automation Impact	Automation Index
Wrapping cartons in foil	Material Handling	1	1500	14	A1
Emptying of bags with raw materials	Material Addition	2	1000	13	A3
Placing bags inside of the cartons	Material Handling	1	750	12	A2
Picking goods from the warehouse	Logistics	5	1000	11	A2
Storage of finished products	Logistics	1.5	2000	10	A1
Internal logistics	Logistics	5	3000	9	A1