

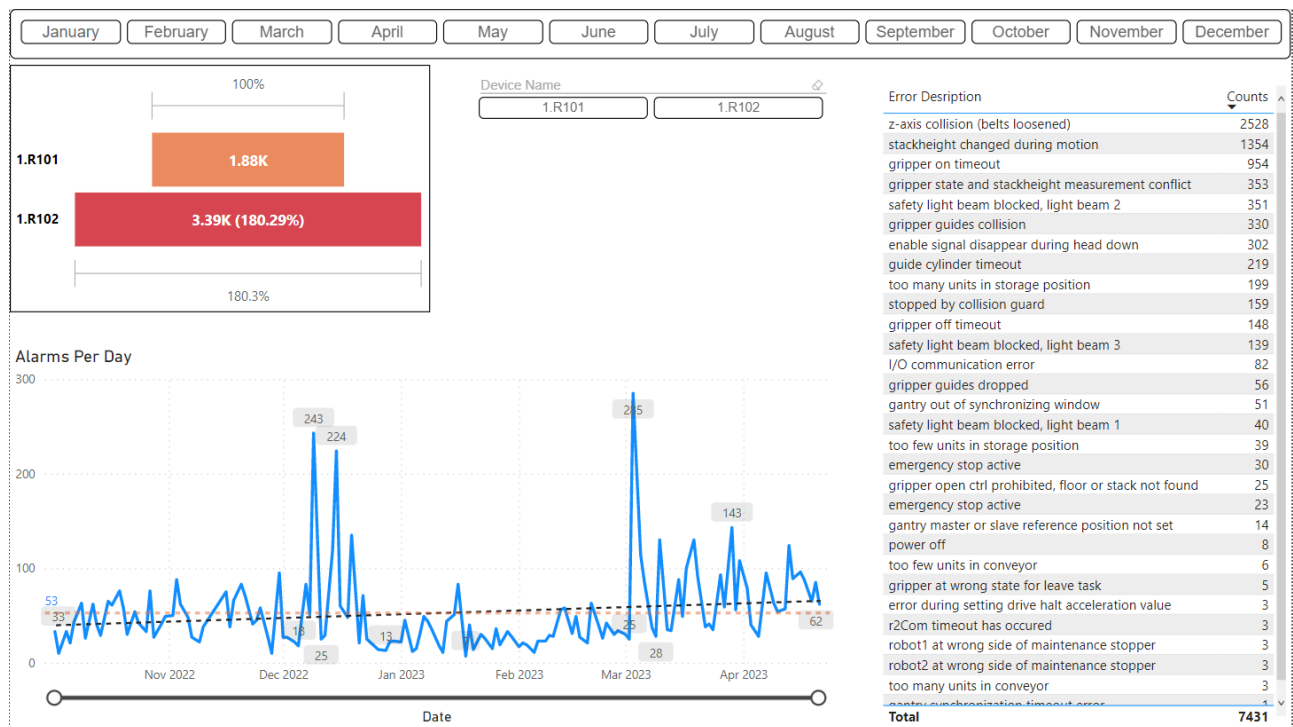
Introduction:

- An overhead gantry system is installed in a distribution centre of a bakery to store products from bakery and retrieve it according to sales orders
- Storage area has two zones, R101 and R102
- Each zone has their dedicated robots and only they can use it to store products, but they run with co-ordination and can exchange products to make a sales order

Business Task:

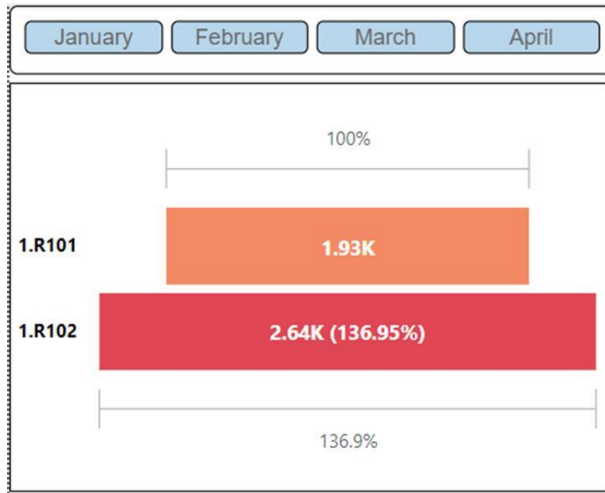
- Run a high-level analysis on performance of Gantry system as a whole vs Gantry Performance by Each Robot (R101 and R102)
- Find out any trends and see if there are any, and ways we can improve it even further

Results:



- Gantry system was running very smooth between January to March
- In December we had high downtime due to scheduled PM activities and in March, we had high downtime due to unexpected breakdown of gripper assembly
- After fixing the assembly, the downtime is still not back to the pre-breakdown levels
- Most common errors can be seen in the table along with count of instances
- R102 has almost double occurrence rate of errors since the beginning

As per manager's request, Independent Robot Performances since Jan 2023:



As shown above, after the PM, R102 still creates 37% problems than R101.

After doing further analysis, I found out the errors that differ the most in those two robots. (Shown below)

Error	R101	R102	Diff	Times Diff
z-axis collision (belts loosened)	639	1126	487	1.8
gripper guides collision	28	256	228	9.1
gripper on timeout	188	213	25	1.1
stackheight changed during motion	60	140	80	2.3
guide cylinder timeout	21	114	93	5.4
gripper state and stackheight measurement conflict	44	95	51	2.2
gripper off timeout	28	57	29	2.0
gripper guides dropped	10	26	16	2.6

- Overall R102 runs into more breakdowns than R101 with some exclusive errors that are more frequent in R102
- Highlighted alarms have much higher occurrence rates in R102 and they both are related to guides and share a same cause – uneven floor or nesting

Team Conclusion:

- It is possible that the floor is uneven on R102 side and causing stacks to lean after being stored
- If random positions are causing problems, then it could be due to something else but if certain positions are leading to these errors than we can block out those and see the progress
- I do not think blue trays have to do anything with more downtime

Business Task 2:

- Find out the positions that cause the problems and see if there are any consistency

Results:

Row Labels	E44	E43	E46	F41	J43	H44	C40	B41	D49	G44	B40	J40	K47
Sum of Cnt	19	16	16	13	13	10	9	8	8	7	7	7	7

Team Conclusion:

- Blocked the highlighted cells and will continue to monitor every month

Update as of May 1st:

- Gripper guide collision error frequency drastically reduced to one fourth
- Average instances for the period of 3 months (Jan to Mar) was 73 per month and now for April month, it is only 16 instances

Text	Counts	Device
safety stop active	238	R102
z-axis collision (belts loosened)	226	R102
gripper guides collision	16	R102
gripper on timeout	25	R102