Project Title

Analysis and Visualization of Daikibo Factories' Telemetry Data using Tableau.

Objectives

To analyze Telemetry Data for the month of May, 2021 from four (4) different locations of Daikibo's Factories, to find out which location had the most machine breakdown and the type of machine that broke down the most.

Dataset Description

Source: Company's/Factories' Telemetry Data for May, 2021, from Deloitte Australia.

Size: 160704 rows and 11 columns

Key columns

- Document Index – Unique ID generated for the folder where the data is located
- Status – The status of the machine/device
- Device ID – Unique ID number for each device
- Device Type – Name of the device
- Temperature – Temperature at which the machine/device is running
- Country – The country where the factory is located
- City – The city where the Factory is located in the country
- Area – Area where the factory is located in the city

Definition of Terms:

- Unhealthy Status – When a machine/device is in a breakdown state/condition
- Downtime per machine – How many times the machine broke down, and it is the total sum of unhealthy status recorded for the particular machine/device type.
- Downtime per factory – is the total sum of unhealthy status recorded for all the machines/devices that broke down in a factory.

Initial observations

Data was already cleaned and organized by the factories' tech team and sent in a JSON zip file format type.

Tools used

Tableau

- Calculated measures using LOD for deeper insights
- Used charts for quick visualizations
- Interactive dashboards
- Advanced data visualization with filters.

Methodology

Data Preparation and Exploration

- Unzipped and imported the file into Tableau and updated it.
- Created a calculated measure “Unhealthy” using a level of detail (LOD) function
- Created two sheets, one displaying Downtime per Factory and the other displaying Downtime per machine/device type.

Exploratory Data Analysis (EDA)

- Detected causes of machine/device breakdown, with major causes being speed and usage for long periods.
- Detected the factory with the most number of breakdown by machine/device type, being Daikibo_Factory_Shenzhen having a total number of four (4) machines/device type that broke down.

Visualization and insights

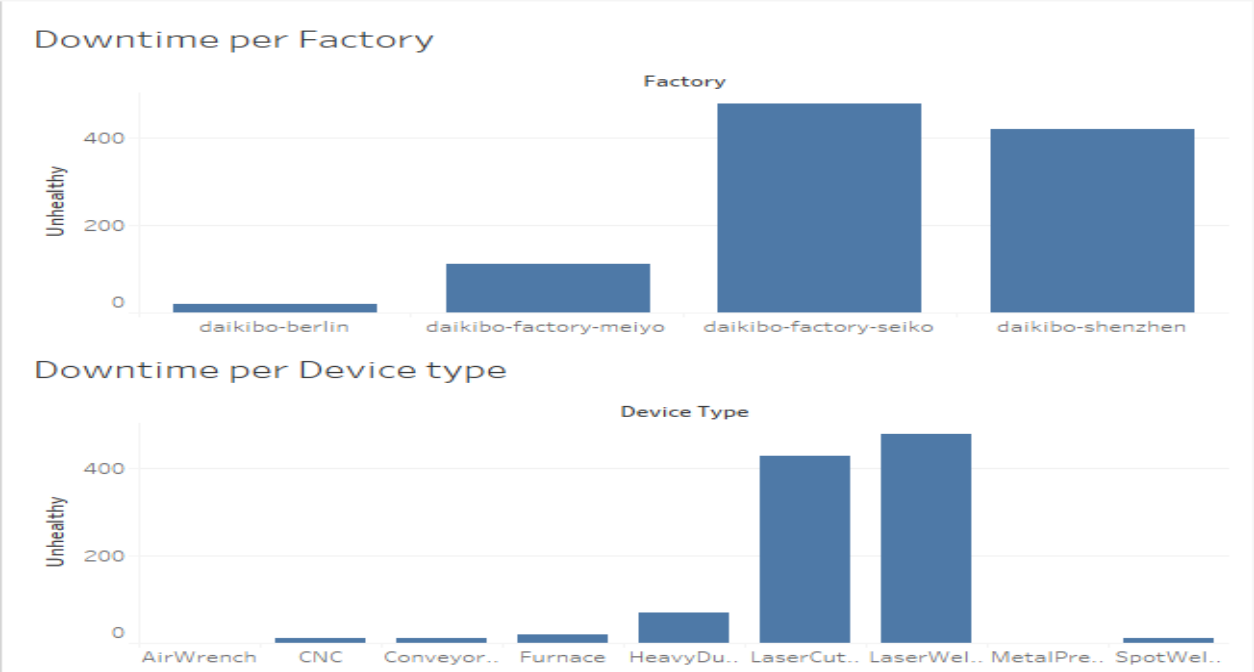
Created a Tableau dashboard with the following visuals

- Downtime per factory (Bar Chart)
- Downtime per Device type (Bar Chart)

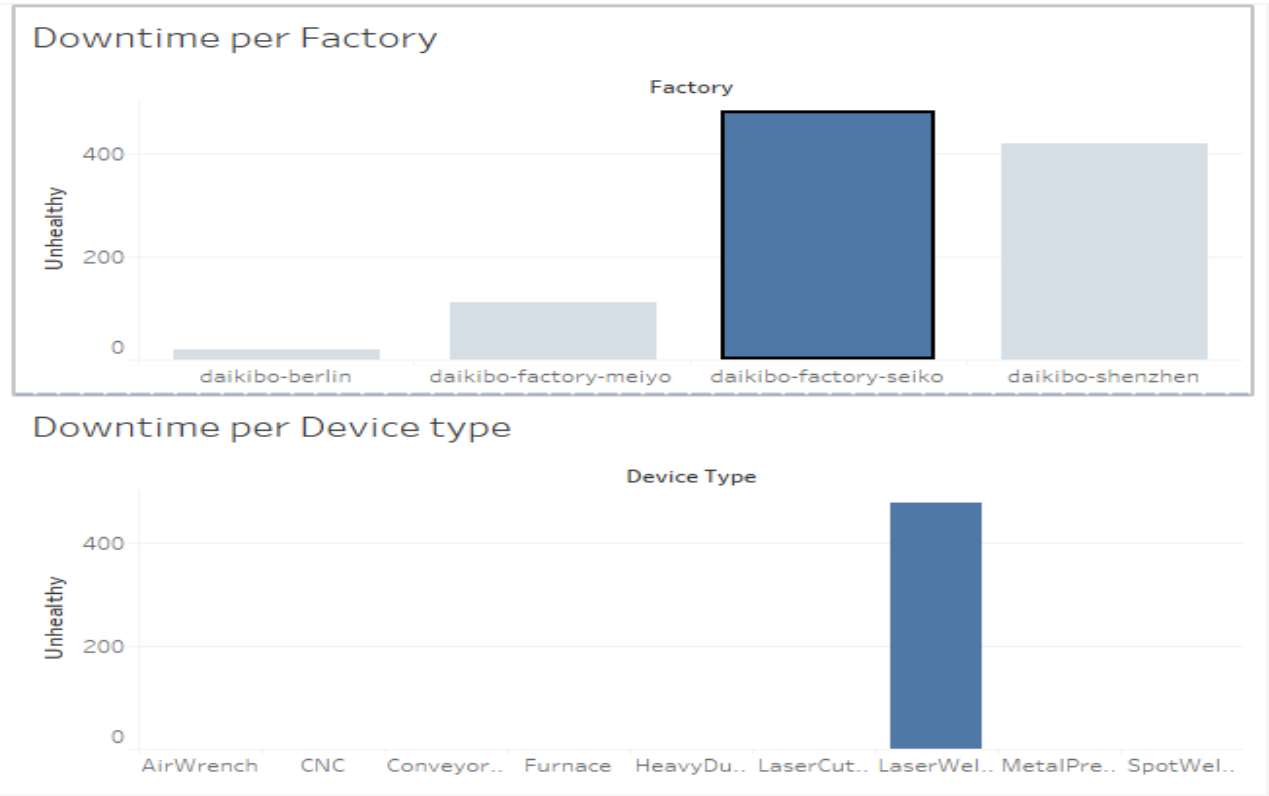
Recommendation

- Reducing/scheduling usage time/period for machines with the most downtime and further reducing the speed at which the machines/devices run will greatly reduce downtime and improve efficiency and productivity.

Results and Insights



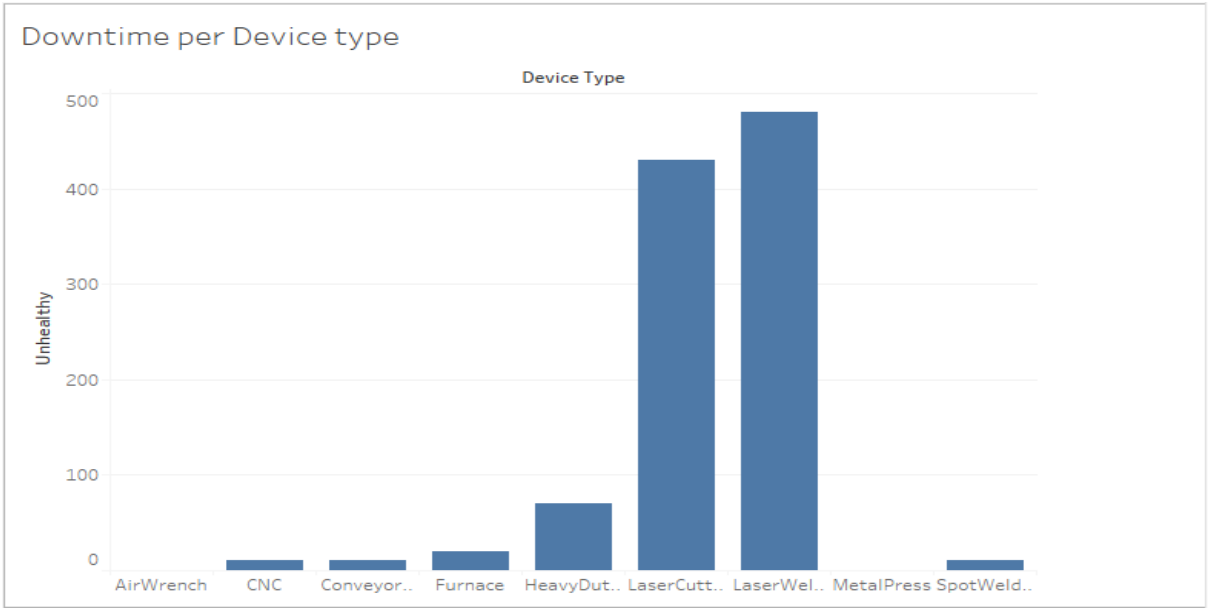
Downtime per Factory:



- Daikibo_Factory_Seiko recorded the most down time per factory, with a downtime value of 480. Laser welder with a downtime value of 480 was recorded as the machine that often broke down in this factory location.
- Daikibo_Factory_Berlin recorded the least/lowest downtime value of 20. Furnace was recorded as the machine that often broke down in this factory location.
- Daikibo_Factory_Seiko and Daikibo_Factory_Berlin are the factories having the least number (just one) of breakdown by device type - Laser-Welder and Furnace respectively.
- Daikibo_Factory_Shenzhen recorded the most number of breakdown by device type with four (4) different machine/device type breakdown, which includes: Laser Cutter – 390, Conveyor – 10, CNC – 10 and Spot welder – 10, giving it a total downtime value of 420. It is also the factory with the second highest downtime value/unhealthy status.

Downtime per Machine:

- Laser-Welder machine recorded the highest unhealthy status/downtime value (480)
- CNC, Conveyor and Spot-Welder recorded the least downtime value (10 each)
- Laser-Cutter machine/device is the device type that broke down in more (two 2) factories while other device types broke down only in one factory.
- Air-Wrench and Metal-Press are the two machines/device types that recorded no downtime.



Analysis Summary:

Factory	Number of Device breakdown per factory	Device type and downtime value	Total Downtime value
Daikibo_Factory_Seiko	1	Laser-Welder (480)	480
Daikibo_Factory_Shenzhen	4	Laser Cutter (390), Conveyor (10), CNC (10) and Spot welder (10)	420
Daikibo_Factory_Meiyo	2	Heavy Duty Drill (70) and Laser-Cutter (40)	110
Daikibo_Factory_Berlin	1	Furnace (20)	20

Conclusion

The analysis identified that Daikibo_Factory_Seiko recorded the highest unhealthy status with downtime value of 480. It also revealed that Laser-Welder is the machine with the highest downtime value (480). It was observed that, Laser Cutter with a total unhealthy status/downtime value of 430 broke down in more (two 2) factories (390 in Daikibo_Factory_Shenzhen and 40 in Daikibo_Factory_Meiyo) than other machine/device types which broke down in just one factory. It is recommended to reduce/schedule usage time/period for machines with high downtime value and further reduce the speed at which they run to reduce downtime.