



ICON^{PRO}

INTRODUCTION

AI IN MANUFACTURING



```
1 import pandas as pd
2 import os
3 import time
4 from memory_profiler import profile
5
6 def get_files(path):
7     from os import listdir
8     from os.path import isfile, join
9     return [f for f in listdir(path) if isfile(join(path,
10
11
12 def split_data(df):
13     Inspection_df = df[(df['element_name'] == 'Messungen')]
14     Inspection_df.to_csv("Inspection.csv", index=False)
15     production_df = df[(df['element_name'] != 'Messungen')]
16     production_df.to_csv("production.csv", index=False)
17
18
19 def groupby_materialid(df):
20     DataFrameDict = {}
21     for frame, data in df.groupby('material_no'):
22         DataFrameDict[frame] = data
23     return DataFrameDict
24
25
26 def groupby_manforderid(df):
27     DataFrameDict = {}
28     for frame, data in df.groupby('manufacturing_order_no'):
29         DataFrameDict[frame] = data
30     return DataFrameDict
31
32
33 def get_sample(material_dict, search_material_id):
34     for sample, material_id in material_dict.items():
35         if search_material_id == material_id:
36             return sample, len(material_dict.keys())
37     return None, len(material_dict.keys())
38
39
40 def groupby_manfchargeid(df):
41     DataFrameDict = {}
42     for frame, data in df.groupby('manufacturing_charge_id'):
43         DataFrameDict[frame] = data
44     return DataFrameDict
45
46
47 def is_sameStep(ref_step, current_step):
48     if len(current_step) != len(ref_step):
49         return False
50     for current_s, ref_s in zip(current_step, ref_step):
51         if ref_s not in current_s:
52             return False
53     return True
54
55 # SSH: aws-pk Python 3.8.10 64-bit @ 0 0 0 default @ Kubernetes
```

ThinkVision

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1. INDUSTRY 4.0 In Manufacturing

The Fourth Industrial Revolution, or **Industry 4.0**, becomes each day more relevant in **manufacturing**. This new wave of technology is very appealing to **producing companies** since it makes it very simple to **increase productivity** in operations.

With its rising popularity, manufacturers that fail to adapt to the newest technology in the industry will be at a disadvantage towards competitors that managed to **digitize** their production along the way.

AI and Machine Learning

work well with manufacturing data. Hundreds of variables influence the production process. While it is very complex for humans to analyze them, **machine learning models can forecast** the impact of individual variables in such circumstances. Machines still operate below human skills in other industries involving language or emotions, limiting them to adapt to the A.I. field.



2. USE-CASES

In Manufacturing

Predictive Maintenance

Predictive Maintenance techniques enable manufacturers to predict potential **machine downtime**. By **analyzing data** provided by sensor devices, manufacturers use **A.I. technology** to forecast when the machines will fail. This allows them to plan **optimal repair and maintenance** dates, in a way that assures equipment **efficiency**, as well as **avoids extra costs**.

Predictive Quality

Predictive Quality enables companies to make data-driven predictions of product- and process-related quality. The goal is to **optimize quality** by using predictions as a basis for deciding on actions. This includes not only action measures derived by the user himself, but also recommended actions provided prescriptively by a **machine learning data analytics model**. This results in **less scrap** and **reduces quality inspection costs**.



3. THE PROBLEM

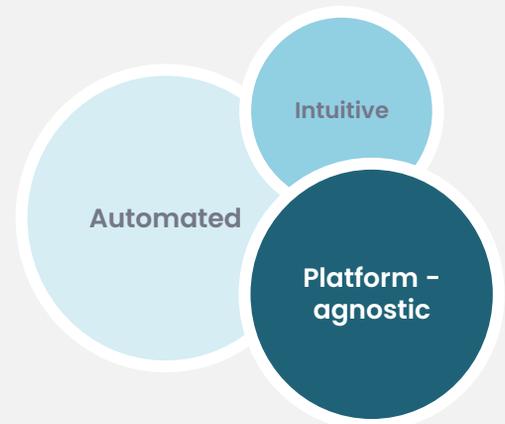
In the industry

The benefits of A.I. in manufacturing are widely known. However, producing companies still hesitate to adopt these technologies in their facilities.

Here is some data

Less than 14% utilize A.I. to increase **productivity** and **sustainability**. About 75% of these companies hesitate to use A.I. in production, due to the **missing software experts** that understand the use-case, or because the **return of the investments** is still unclear. Finally, they also worry about **data safety** and are also often conservative about **clouds**.

Production engineers need solutions that are:



This way, A.I. can be implemented faster and truly **drive productivity**.



4. ICONPRO Solutions



APOLLO SOFTWARE

For Predictive Maintenance



Easy Setup & Connection



Any Cloud & On-Premise



Reduce Maintenance Costs



Low-Code Platform



100% Automated Predictions



Track & Reduce Downtime

Our APOLLO software is for predictive maintenance of production units. It is easy to set up and connect machine tools, robots, or measurement systems. It is 100% automated, predicts downtime and optimal maintenance dates. It tracks operations, conditions, events, and alerts. Of course, it is a low-code platform that runs on-premise or in any cloud.



```

29 for frame, data in df.groupby('manufacturing_
30 DataFrameDict[frame] = data
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```

ARES SOFTWARE

For Predictive Quality



Loads from any Data Source



Live Predictions and Optimization



Reduce Quality Inspection Costs



Finds all Data Relations



Any Cloud & On-Premise



Reduce Scrap Rates

Our ARES software is for predictive quality and process optimization. You can load the data from any source. It automatically finds and utilizes all relations in the data. You can easily integrate predictions and optimizations into your live processes. Of course, it comes as a **no-code** platform that runs on-premise or in any cloud.



7. IMPLEMENTATION

• Process at IconPro



Introduction

Processes and Data Sources Analysis.

Test Study

Data Assessment and Feasibility Analysis.

Implementation

Software Interfaces Implementation and Validation.

Deployment

Results Deployment, Software Installation and General Recommendations.

Monitoring

Software / Algorithm Validity and Results Sustainability.

CONTACT US!

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Visit our website at:
iconpro.com

Or contact us at:
info@iconpro.com

