FLAIRBIT
DATA CENTRIC SOLUTIONS

Accelerating IoT Big-Data Analytics
and
Enabling insights Engineering in Industry 4.0
with

SENSEIOTY

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INTRODUCTION

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Company

- Established in 2015, based in Genoa – Italy
- 10 permanent engineers in FlairBit R&D team
- Exponential growth since its inception year
- Founders with extensive, international experience in the Industrial Internet of Things, Big Data and Analytics
  - Products, consulting, business knowledge and capabilities coming from tens of complex projects leaded and delivered for many international customers in Europe and the US

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A software platform to **collect data** from heterogeneous sources (e.g., devices, CRM, ERP, MES, SCADA), to securely and reliably **store and distribute data**, and to **process data** with **advanced analytics** (e.g., AI, machine and deep learning) to **generate insights** for the industrial IoT and Industry 4.0

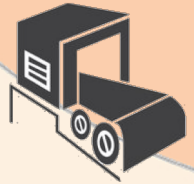
Senseioty platform

AWS IoT

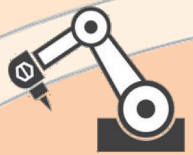
BACnet

CoAP

OPC

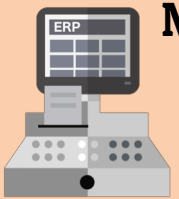


Azure IoT



MQTT

SNMP



Modbus

LoRa

Big-Data and
Data Distribution Systems

Anomalies detection

Reduce rework loops

Predictive Maintenance

Reveal frauds and misuses

Some key features

- Authorization filters for big-data and data analytics
- Data quality and semantics
- Edge analytics and data processing
- Fast, multi-channel data access:
  - APIs
  - Batch / Reporting
  - Bulk (e.g., Apache Spark integration)
- Operational data and IT data integration

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THE DATASET

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The dataset

- Data related to professional coffe machines
- Dataset categories
  - Counters
  - Cleanings
  - Faults
- One file per category per day
  - `type_YYYYMMDDHHMMSS-an.csv (e.g., faults_20190103020001-an.csv)`
- Common dataset feature
  - Machine serial number
  - Machine model
  - Timestamp (YYYY MM DD hh:mm:ss and week number)

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Counters

Serial	YYYY	MM	dd	hh:mm:ss	Week	Model	LabelCounter	AbsoluteCounter	RelativeCounter
1535632	2016	11	29	04:00:07	49	model 31	numcaffegenerale	179112	0
1535632	2016	11	29	05:00:07	49	model 31	numcaffegenerale	179120	8
1535632	2016	11	29	06:00:07	49	model 31	numcaffegenerale	179158	38
1535632	2016	11	29	07:00:07	49	model 31	numcaffegenerale	179228	70
1535632	2016	11	29	08:00:07	49	model 31	numcaffegenerale	179327	99
1535632	2016	11	29	09:00:07	49	model 31	numcaffegenerale	179427	100
…	…	…	…	…	…	…	…	…	…
1535632	2016	11	29	06:00:07	49	model 31	numcaffegr1	33266	0
1535632	2016	11	29	07:00:07	49	model 31	numcaffegr1	33275	9
1535632	2016	11	29	08:00:07	49	model 31	numcaffegr1	33298	23
1535632	2016	11	29	09:00:07	49	model 31	numcaffegr1	33321	23
…	…	…	…	…	…	…	…	…	…
1479635	2016	11	29	03:00:17	49	model 20	numcaffegenerale	243719	0
1479635	2016	11	29	04:00:17	49	model 20	numcaffegenerale	243722	3
1479635	2016	11	29	05:00:15	49	model 20	numcaffegenerale	243727	5

Cleanings

Serial	YYYY	MM	dd	hh:mm:ss	Week	Model	ErrorCode
1527654	2016	11	29	01:00:13	49	model 10	1
1496767	2016	11	29	00:00:00	49	model 7	1
1557536	2016	11	29	08:00:49	49	model 10	2
1558474	2016	11	29	01:00:35	49	model 9	1
1553390	2016	11	29	00:01:17	49	model 13	1
1554639	2016	11	29	00:00:24	49	model 9	2
1554639	2016	11	29	01:01:24	49	model 9	1
1570989	2016	11	29	01:00:11	49	model 14	1
1558472	2016	11	29	20:00:39	49	model 11	1
...	...	...	...	...	...	...	...

Faults

Serial	YYYY	MM	dd	hh:mm:ss	Week	Model	ErrorCode	Description
1496700	2016	11	29	16:57:00	49	model 62	285	WARNING
1458460	2016	11	29	19:54:00	49	model 20	185	WARNING
1528607	2016	11	29	14:44:00	49	model 20	185	WARNING
1528607	2016	11	29	17:34:00	49	model 20	185	WARNING
1425579	2016	11	29	17:19:00	49	model 20	185	WARNING
1432646	2016	11	29	19:26:00	49	model 20	185	WARNING
1468215	2016	11	29	15:24:00	49	model 20	185	WARNING
1468215	2016	11	29	16:31:00	49	model 20	185	WARNING
1468215	2016	11	29	17:43:00	49	model 20	185	WARNING
1517618	2016	11	29	18:15:00	49	model 20	185	WARNING
1517618	2016	11	29	18:59:00	49	model 20	185	WARNING
1472332	2016	11	29	19:50:00	49	model 20	185	WARNING
1531375	2016	11	29	05:13:46	49	model 32	66	CRITICAL
1531375	2016	11	29	05:52:38	49	model 32	66	CRITICAL
...	...	...	...	...	...	...	...	...

Let’s query the CSV files

- How many connected machines?
- Counters types
- Faults distribution per model
- Cleanings misses distribution per model

THE CHALLENGES

Forecasting

- Predict faults occurrences based on counters patterns and cleaning misses

Root cause analysis

- Find correlations between machine usage (counters and cleanings misses) and faults

The data set

https://bit.ly/2SEHK2q

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