

# POWER PLATFORM & CUSTOM VISION

## HOW TO BRING AI TO THE BUSINESS

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Data & Artificial Intelligence

# WHO AM I?



## CARLO ROSSI

In Reply – Silea (TV) since 2016

Business Data Analyst with more than 5 years of experience in ETL creation, data analysis, and reporting.

Extensive knowledge of different BI platforms and SQL scripting.

Recently landed to Microsoft Data & AI ecosystem (since 2019!)

Hobbies: geek stuff, playing music, B-movies



[linkedin.com/in/carlorossi1984](https://www.linkedin.com/in/carlorossi1984)



[github.com/Stargatto](https://github.com/Stargatto)



# SUMMARY

- **Introduction**
- **App Components: Custom Vision**
- **App Components: Power Platform**
- **Demo**
- **Other User Cases: AI + Power Platform**
- **Conclusions**



# INTRODUCTION



# CONTEXT

- Low Code platforms **are gradually changing** the way the business applications are developed.
- These platforms provide a set of tools and connectors to easily **integrate apps** with data sources or other apps. Code reuse allows to **cut development times** and costs, and allows even faster business transformation.
- Standard AI features can now be added to a low code app **without extensive knowledge of machine learning algorithms** and without the costs of a dedicate AI infrastructure.



From This

To This

*Simplicity does not mean non-possibility*



# CASE STUDY: THE FASHION MARKET

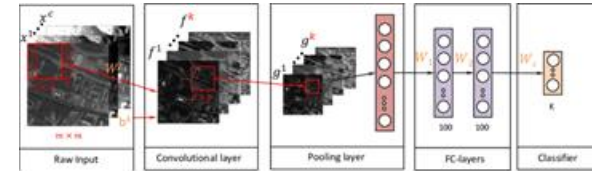


# TECHNOLOGICAL APPROACH 1/2

- Behind the scenes, the app works using Computer Vision algorithms that solve an **image classification problem**.
- **Any catalogue of products (images)** can be used as a training set for a supervised algorithm that takes as input the picture uploaded by the user and returns its classification.



The approach can be **applied wherever images are involved** (retail market, fashion, luxury, homeware, jewelry, etc).

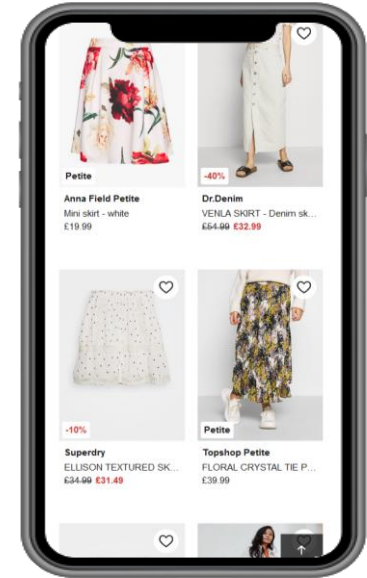


# TECHNOLOGICAL APPROACH 2/2

- The front-end app can be developed as a standard web-app or as a **Power App**
- **Power App** offers a connector to easily integrate Custom Vision models with the device camera. Many features such as **image collection**, **web searching** and **geolocalization** can be added to the app with almost **zero code**.



All data can be collected in a **Power BI** report to **analyze** and **understand** market trends

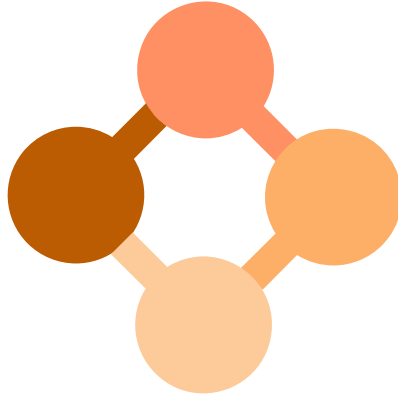




# THE GOALS

Finding alternatives to  
out-of-stock or expensive items

Find if similar items were  
present in an old collection



Suggesting items similar to  
what the consumer already has

Finding out if the good is an  
original product or a fake

**AI used within Business Applications has to add features and services in order to make the work simpler**

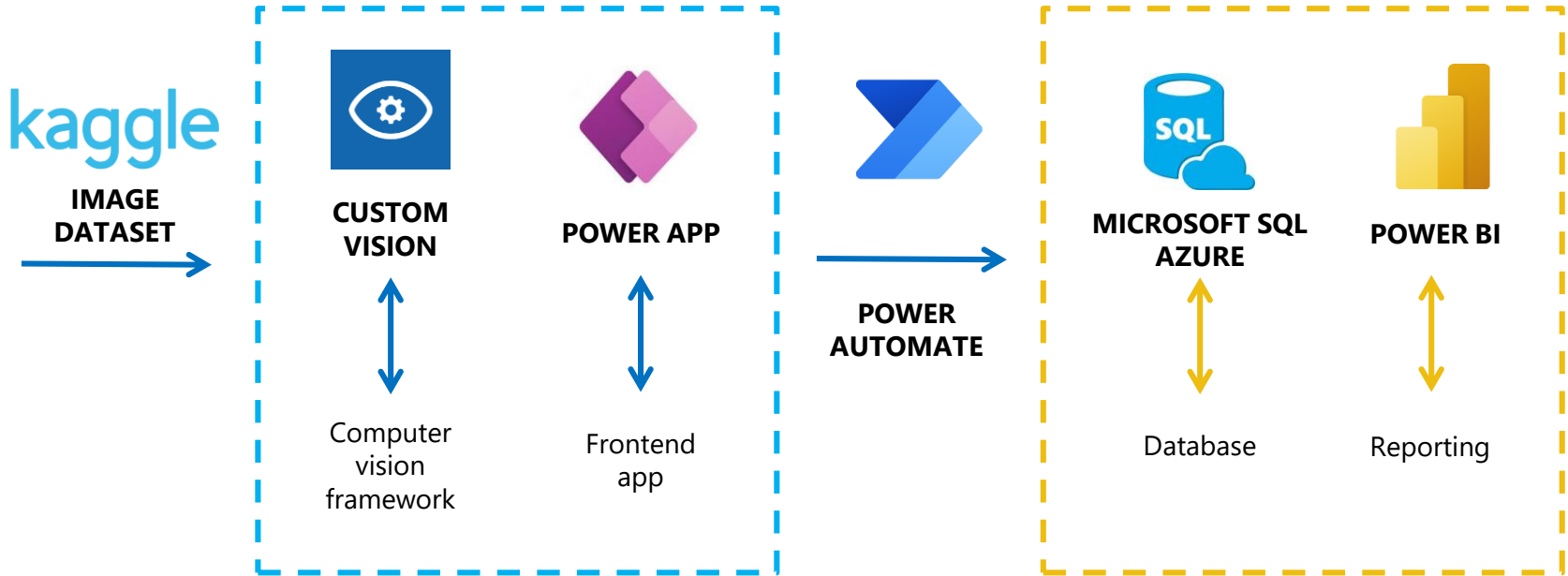


# **APP COMPONENTS: CUSTOM VISION**



# APP COMPONENTS

Microsoft Azure offers all the services needed to develop the app:



# AZURE COGNITIVE SERVICES



- Azure Cognitive Services are APIs, SDKs and services available to **help developers build intelligent applications** without having direct AI or data science skills. They enable developers to **easily add cognitive features into their applications**
- The goal of this Cognitive Services is to help developers create applications that can see, hear, speak, understand and even begin to reason



## DECISION

- CONTENT MODERATOR
- ANOMALY DETECTOR
- PERSONALIZER



## VISION

- COMPUTER VISION
- FACE
- INK RECOGNIZER
- CUSTOM VISION
- VIDEO INDEXER
- FORM RECOGNIZER



## SPEECH

- SPEECH SERVICES
- SPEAKER RECOGNITION
- SPEECH TRANSLATION
- SPEECH TO TEXT
- TEXT TO SPEECH



## LANGUAGE

- TEXT ANALYTICS
- TRANSLATOR
- QnA MAKER
- LANGUAGE UNDERSTANDING
- IMMERSIVE READER



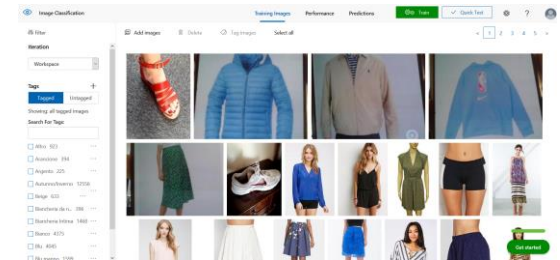
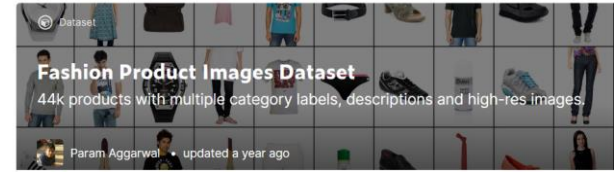
## SEARCH

- BING SPELL CHECK
- BING WEB SEARCH
- BING VISUAL SEARCH
- BING CUSTOM SEARCH
- BING ENTITY SEARCH
- BING VIDEO SEARCH
- ...



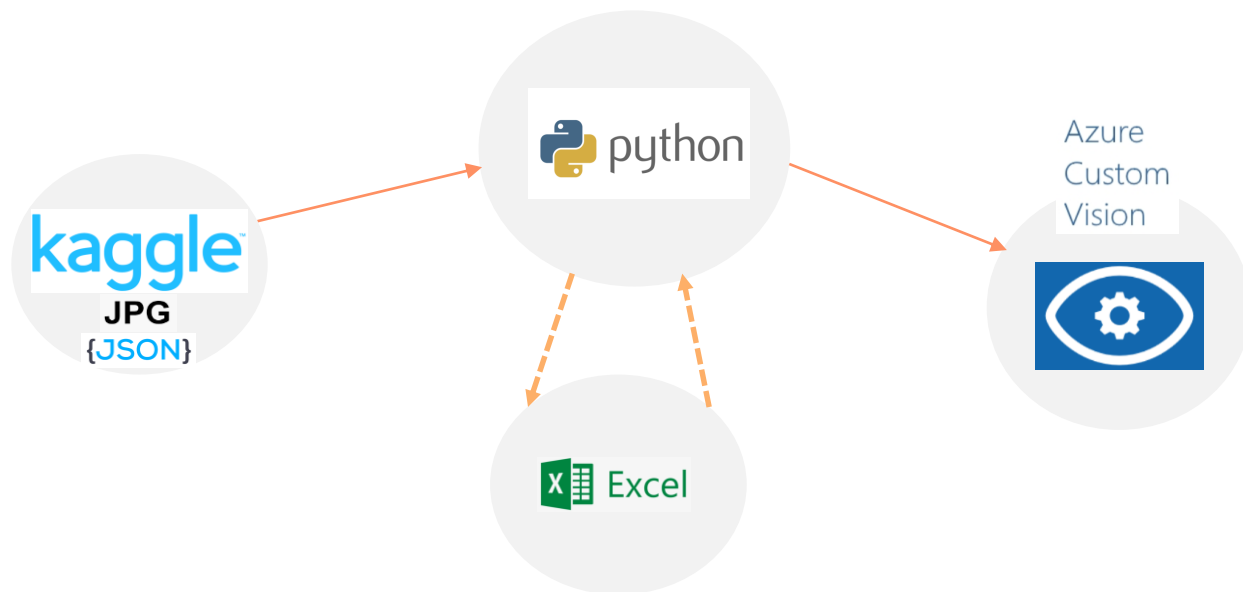
# MODEL STRUCTURE

- Use of fashion product images dataset taken from **Kaggle.com** with multiple label attributes describing the product in JSON format
- Create a **Python script** to build an image classification model using the Custom Vision SDK. Around **30.000** images are uploaded and 40 tags chosen to train the model
- Since classes of tags should not be **too unbalanced**, a data refinement step has been developed in R Studio before uploading the images and relative tags on Custom Vision
- The model is mapped with an **Excel file** that selects and standardizes all tags to receive in output



# TAGS MAPPING

The **Kaggle** dataset contains both *jpg* file for images and *json* file for tags. The images are **uploaded** and **correctly tagged** on Custom Vision by Python code. It read tags from json files and **correctly mapped them** with the standardized tags specified in an Excel table.



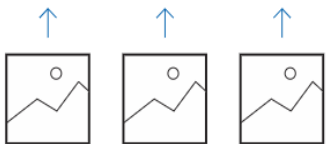
<u>Json Tag</u>	<u>Custom Vision Tag</u>
Spring	Primavera/Estate
Summer	Primavera/Estate
Tshirts	T-shirt
Tops	T-shirt
Jeans	Jeans
Jeggins	Jeans

Custom Vision receives back **40 standardized tags** useful for our app.



# CUSTOM VISION

A customizable web service that learns to **recognize specific content** in imagery



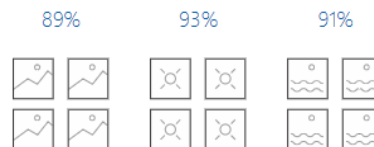
## UPLOAD IMAGES

Upload your own **labeled images**, or use Custom Vision Service to quickly **tag** any **unlabeled image**



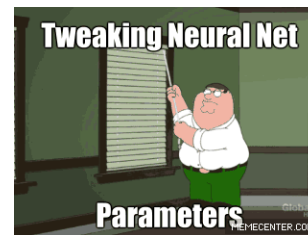
## TRAIN

Use your labeled images to **teach Custom Vision** the concepts you want it to learn



## EVALUATE

Use simple REST API calls to **quickly tag images** with your new custom computer vision model



## ACTIVE LEARNING

Images evaluated through your custom vision model become part of a feedback loop you can use to **keep improving your classifier**



# MODEL PERFORMANCE

Three adequate **metrics** to evaluate the model: a **k-fold cross validation** estimates how accurately will a classifier perform in the real case scenario.

## PRECISION

The percentage of the results that were likely to be right.

## RECALL

The ability of the model to find all the relevant cases within the dataset.

## AP

A function of a precision and a recall and is needed exactly for the purpose of finding a balance between those two metrics.





# LICENSING

There are **two tiers of keys for the Custom Vision service**.

You can sign up for a **F0 (free)** or **S0 (standard)** subscription through the Azure portal.

<b>Factor</b>	<b>F0</b>	<b>S0</b>
Projects	2	100
Training images per project	5.000	100.000
Predictions / month	10.000	Unlimited
Tags / project	50	500
Iterations	10	10
Min labeled images per Tag, Classification (50+ recommended)	5	5
Min labeled images per Tag, Object detection (50+ recommended)	15	15
Max tags per classification image	100	100

Pricing tier used in our app



# **APP COMPONENTS: POWER PLATFORM**



# POWER APP

## STEP 1

A dropdown menu will appear by clicking on the downward arrow. Here you can choose which camera you prefer (front/back).

## STEP 3

Here is your picture! Once you're satisfied with your picture, push the «Recognize image» button

## STEP 5

These are the tags resulted from the image identification and in which percentage each tag has been recognized.

## STEP 2

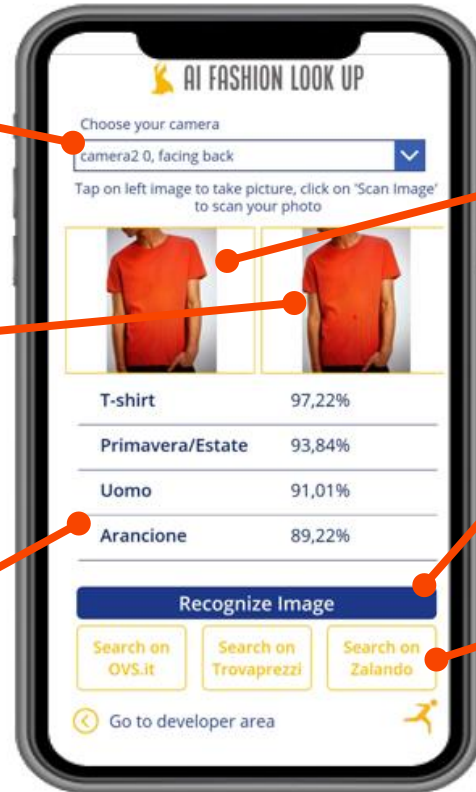
Choose the article of clothing you want to detect and tap on the left square once the image is well centered

## STEP 4

Once pushed the «Recognize image» button, your image will be analyzed.

## STEP 6

You have many possibilities of web searching in order to look for your favourite article of clothing.



# POWER AUTOMATE

- Power Automate easily saves Custom Vision results on a Azure SQL Server DB

The «Recognize Image» starts the flow

Rows are now inserted in the DB



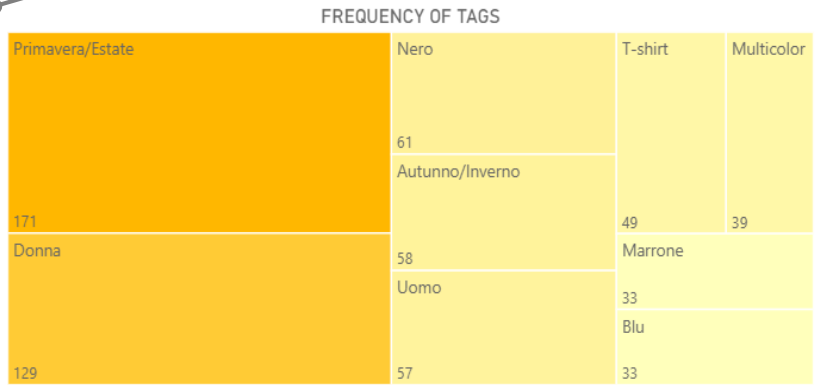
# REAL TIME REPORTING USING POWER BI



Number of times the app has been used today

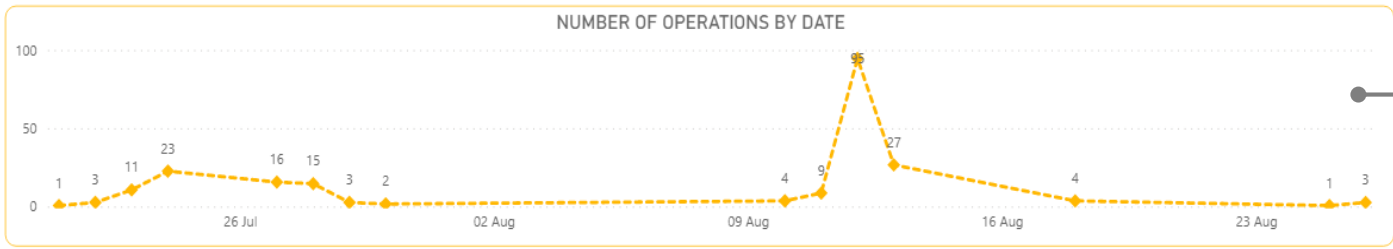
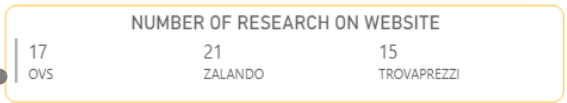
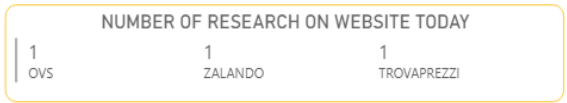


Total number of tags recognized by the app



Frequency of all tag names recognized by the app

Number of researches made today and in total on OVS, Zalando and Trovaprezzi websites, after image recognition



Time series of app uses with three days forecasting

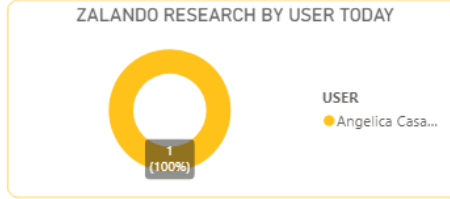
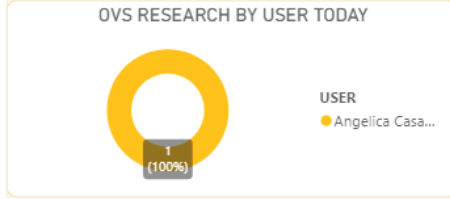


# REAL TIME REPORTING USING POWER BI

Number of researches on websites made by each user today



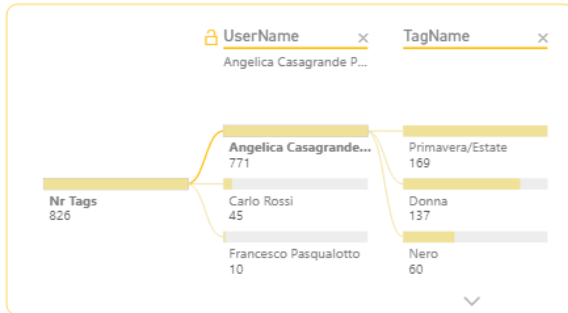
User Research



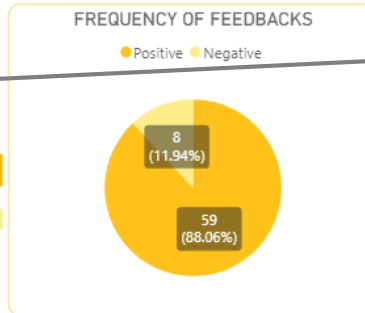
Detail of user researches on app

USER	EMAIL	# OPERATIONS	# OPERATIONS TODAY	# OVS RESEARCH	# ZALANDO RESEARCH	# TROVAPREZZI RESEARCH
Angelica Casagrande Paoloni	a.casagrandepaoloni@reply.it	191	3	13	19	13
Carlo Rossi	ca.rossi@reply.it	21		4	2	2
<b>Total</b>		<b>217</b>	<b>3</b>	<b>17</b>	<b>21</b>	<b>15</b>

Number of feedbacks received today by users



Detail of the total number of tags of the app gives back by User and TagName



Total frequency of positive or negative feedbacks received

USER	Negative	Positive	Total
Angelica Casagrande Paoloni	6	51	57
Carlo Rossi		5	5
Francesco Pasqualotto	2	3	5
<b>Total</b>	<b>8</b>	<b>59</b>	<b>67</b>

Distribution of feedbacks by app users



# REAL TIME REPORTING USING POWER BI



AI FASHION LOOK UP

Tags Distribution

TAG	Autunno/Inverno	Bianco	Blu	Borsa	Cappello	Donna	Gonna	Grigio	Marrone	Multicolor	Nero	Primavera/Estate	Rosso	Shorts	T-shirt	Unisex	Uomo	Vestito	Total	
Arancione						1						4	2		2		2		4	
Autunno/Inverno	58	5	15	3	6	20	1	4			3	26	49	7	9	20	8	39	3	58
Biancheria da notte			1			3	1	4			2		3						1	3
Biancheria Intima						1						1		1	1					1
Bianco	5	14				5	3				1	11			4		5	1	14	
Blu	15		33	4	6	14	1				2	17			10	6	8	1	33	
Blu marino	3		2			3					3	3			1		2		5	
Borsa	3		4	12		7					4						4		12	
Cappello	6	5	6		13							12					6	6	13	
Donna	20	3	14	7		129	14	7	33	39	37	116	4	21	8		6	15	129	
Giacca		1																	1	
Giallo	4					1						5			4		4	1	5	
Gonna	1		1			14	14			12	1	14						1	14	
Grigio	4					7		7			3	6					3		7	
Jeans	3		3			3						1							3	
Leggings			1			1					1								1	
Marrone						33			33			33							33	
Multicolor	3					39	12			39	19	39		19				4	39	
Nero	26	1	2	4		37	1	3		19	61	54		24	15	4	22	3	61	
Pantaloni						1					1	1							1	
Primavera/Estate	49	11	17	8	12	116	14	6	33	39	54	171	12	26	32	8	50	15	171	
Rosa	3					5				1		5	3					4	5	
Rosso	7			1		4						12	13		6		9	3	13	
Scarpe	2	1	1			1					1	3						3	4	
Shorts	9	1				21				19	24	26		26				6	26	
T-shirt	20	4	10			8					15	32	6		49		30		49	
Tuta	4					3		3			4	4					4		4	
Unisex	8		6	4	6						4	8				11	6		11	
<b>Total</b>	<b>58</b>	<b>14</b>	<b>33</b>	<b>12</b>	<b>13</b>	<b>129</b>	<b>14</b>	<b>7</b>	<b>33</b>	<b>39</b>	<b>61</b>	<b>171</b>	<b>13</b>	<b>26</b>	<b>49</b>	<b>11</b>	<b>57</b>	<b>15</b>	<b>215</b>	



# GDPR COMPLIANCE FOR APPS

As a mobile app publisher, it's necessary to be **aware of how to obtain, transfer, store, and handle the user data**. You should take some time to understand exactly how you currently **ensure data security for users** and what you can do to **improve** this in order to have a **GDPR-compliant mobile app**.

1. Privacy by Design
2. Ask for Explicit Consent
3. Providing Visibility and Transparency
4. Respond to User Requests
5. The Right to Be Forgotten
6. Review services and SDKs you use
7. Data Breach Notifications
8. Appointing a Data Protection Officer
9. Encryption and data storage
10. Log and Justify Your Data Collection





# DEMO



# OTHER USES CASES

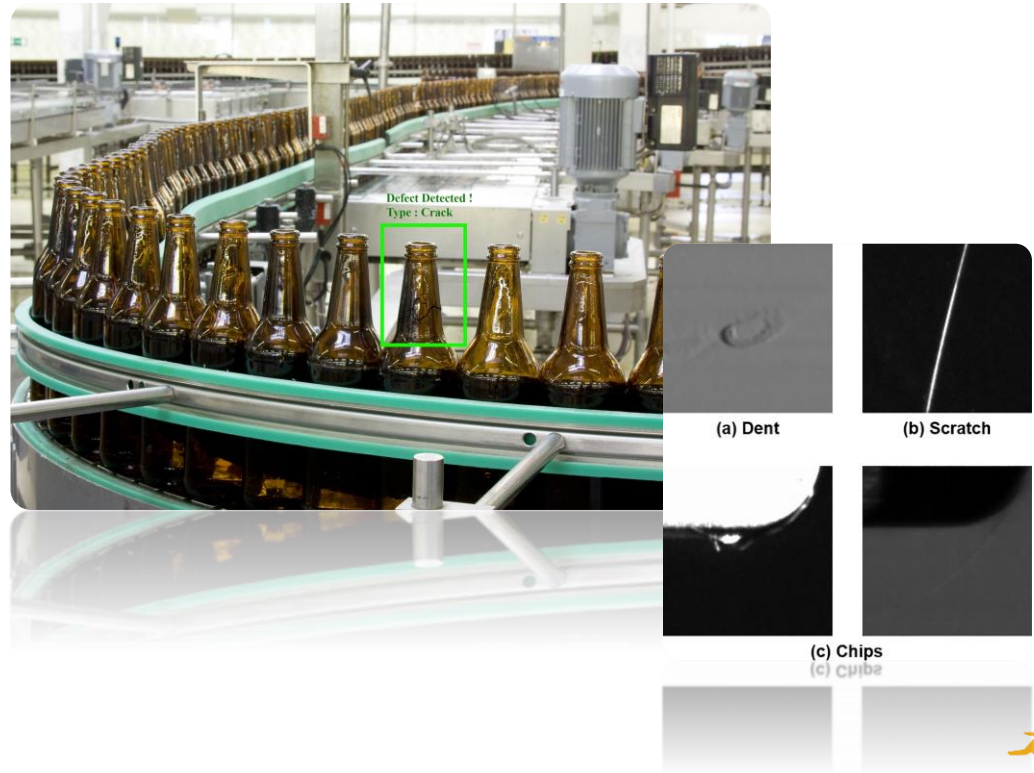
## AI + POWER PLATFORM



# MANUFACTURING

## DEFECT RECOGNITION SYSTEM FOR AUTOMATED INSPECTION

- Custom Vision could be used to create and automate a **visual defect recognition system** for the manufacturing process
- CV models could be trained using images of defects detected over the years
- Power Apps could add other logic to defect recognition (multiple angles ecc.)
- Power Automate could trigger an alert when a defect is found



# HEALTHCARE

## EMBEDDING AI INTO DIAGNOSTICS

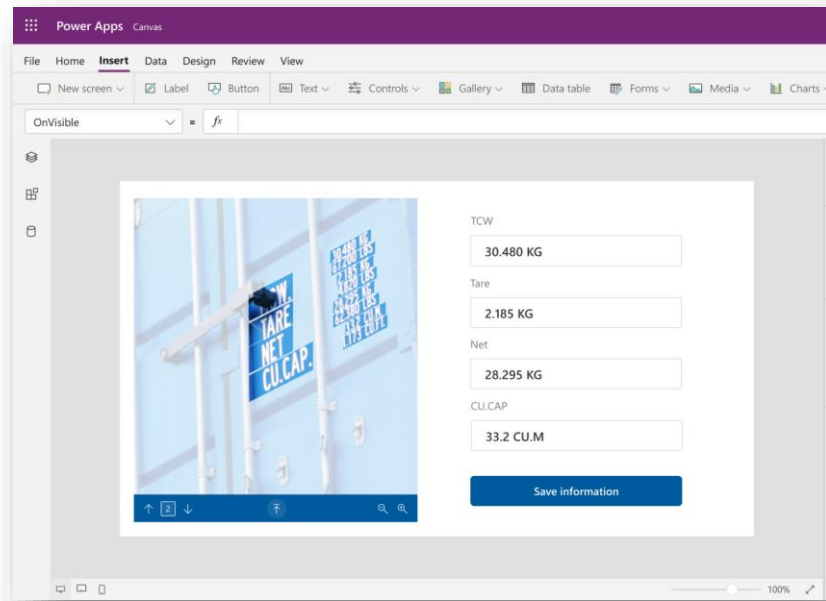
- The opportunity of using Deep Learning technologies to analyze images and recognize patterns opens up the potential for creating models to **help doctors diagnose specific diseases** faster and more accurately
- Custom Vision can be used to spot signs of a certain disease in medical images such as MRIs, x-rays, and CT scans
- Embedding AI into diagnostics removes opportunities for human error and saves clinical laboratories time and money



# LOGISTICS

## CONTAINER & PACKAGE DETAILS RECOGNITION

- Custom Vision can be used to **read container and packages details** (es. origin, destination, weight and volume details, ...)
- These details can automatically fill a form in a Power App to easily collect the data coming from the operators
- Several AI features are available directly from Power App using *AI Builder*



# AI BUILDER

Power Platform provides a set of features to **add AI to Power App and Power Automate**

Components that use **prebuilt AI models** that are ready to use right away:

- Business card reader
- Receipt processor component
- Text recognizer component

Components that use **custom AI models** that you build and train:

- Form processor
- Object detector

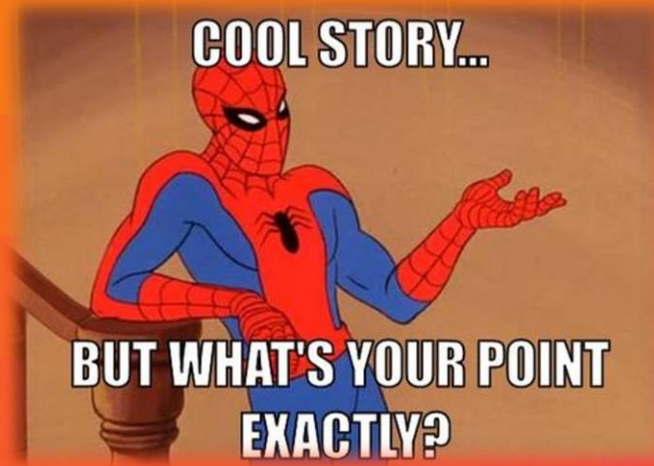
The screenshot displays a Power App interface for a form processor. The main form is titled "SCHOOL OF FINE ART" and contains a form titled "INTERNATIONAL UNDERGRADUATE APPLICATION FOR ADMISSION". The form fields are populated with data, and several fields are highlighted with green boxes, indicating they have been recognized by the AI model. A "Career objective" dropdown menu is open, showing "3D animator" as the selected option. On the right side, a "Select fields" panel is visible, showing a list of 3 fields selected: "Name (on your passport)", "Number and street", and "E-mail address". The "Name (on your passport)" field is highlighted in blue, and the "E-mail address" field is highlighted in red. The "Number and street" field is highlighted in green. The "Select fields" panel also includes a "Deselect all" button and a "Done" button.

Form fields and values:

- 1. Name (on your passport): Morgan Mooney
- 2. Application for (only one): 2019-20
- 3. Intended major: Graphic Design; Career objective: 3D animator
- 4. Have you previously applied to or ever attended the SFA? No
- 5. Mailing address: (All mail and documents will be sent to this address)  
Number and street: 345 Second Ave  
City: New York; State/Province: NY; Postal code: 98052; Country: USA
- 6. Telephone: 718 555 0184
- 7. E-mail address: morganmooney@schooloffineart.com
- 8. Gender: Female; Date of birth: Month 10, Day 23, Year 1997
- 9. Place of birth City: New York; Country: USA
- 10. Country of citizenship: USA; Country of legal permanent residence: USA
- 11. Sources of financial support: Personal and family funds



# CONCLUSIONS



# CONCLUSIONS

- Despite the **hype** for Machine Learning and AI, sometimes it's **difficult** to find use cases or suitable applications in order to bring AI to the business.
- Low-code platforms **cut out development times and costs**, allowing easier and faster transformation processes than traditional programming. The ROI is estimated in 188% in three years.
- Low-code platforms allow building cognitive intelligence into applications **without having** direct artificial intelligence (AI) or data science **skills or knowledge**.
- AI can **simplify** and **automatize all business processes**, from production lines to administration.
- Start from the problem, and not from the solution!





# THANK YOU



**For any further information feel free to contact:**  
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