MARKUS - Automatic Age and Identity Verification

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Introduction

Various services require verifying the age or identity of a customer. This tedious task is prone to human error. Machine learning has developed far enough to enable super-human quality and speed in identity and age verification. MARKUS makes this a reality.

Problems

- Human eye is not accurate enough
- Fraud
- Identity thefts
- Fake documents
- On-boarding process takes too long
- Errors in information input
- Workforce is expensive
- Penalties for faults

Solution

- Automatically detects the age of people from video feed
- Check validity of documents
- Conducts identity verification by comparing face with the one on the document
- Parses information from documents
- Speeds up the process

WINNER of Garage48

FINALIST at Ajujaht

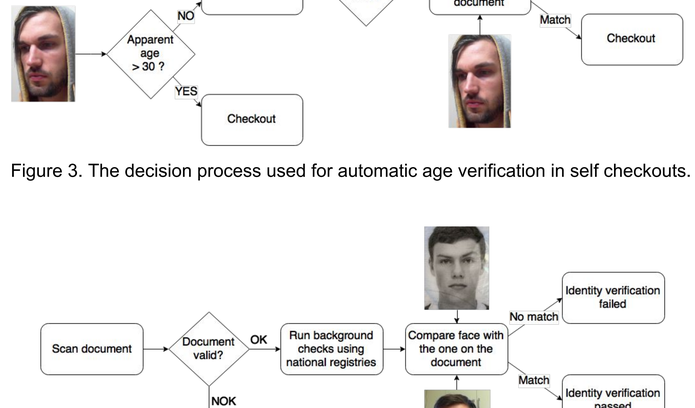

Figure 1. Neural network outputs a vector of each face which is then used for comparison.

Figure 2. Document templates are used to identify the document type and rotate/crop it.

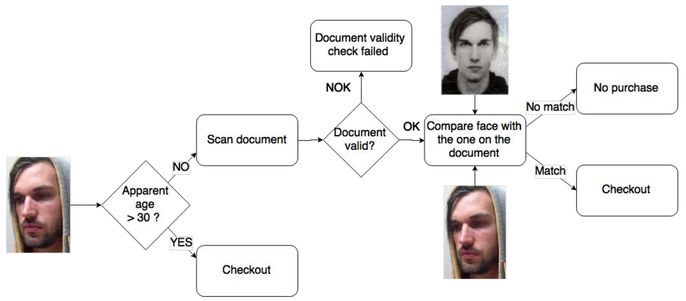

Figure 3. The decision process used for automatic age verification in self checkouts.

Figure 4. Process used in identity verification.

Technology stack

Multiple **convolutional neural networks** accelerated by **CUDA, cuDNN** and **GPUs** for **face localization**, **comparing facial similarity** and **age prediction**.

Feature matching and **homography** are used for initial document localization and document type validation. Security elements are found using **UV-imaging scanners** to verify the validity of documents.

Queries to national registries for doing **background checks**.

OCR technologies for parsing the document.

Third party solutions have been integrated for detecting facial movements as a **liveness** check.

The service is built using a **distributed message queue** to distribute workload between multiple **GPU** equipped machines.

Use cases

Identity verification:

- Customer service for contractual clients
- Financial sector
- Insurance sector
- Border points
- Airports

Age verification (purchasing goods illegal for minors):

- Self checkouts in supermarkets
- Vending machines
- Delivery robots

PROTOTYPE funded by VEGA FOND

Sample application with partial capabilities: https://markus.mindtitan.com/student_project