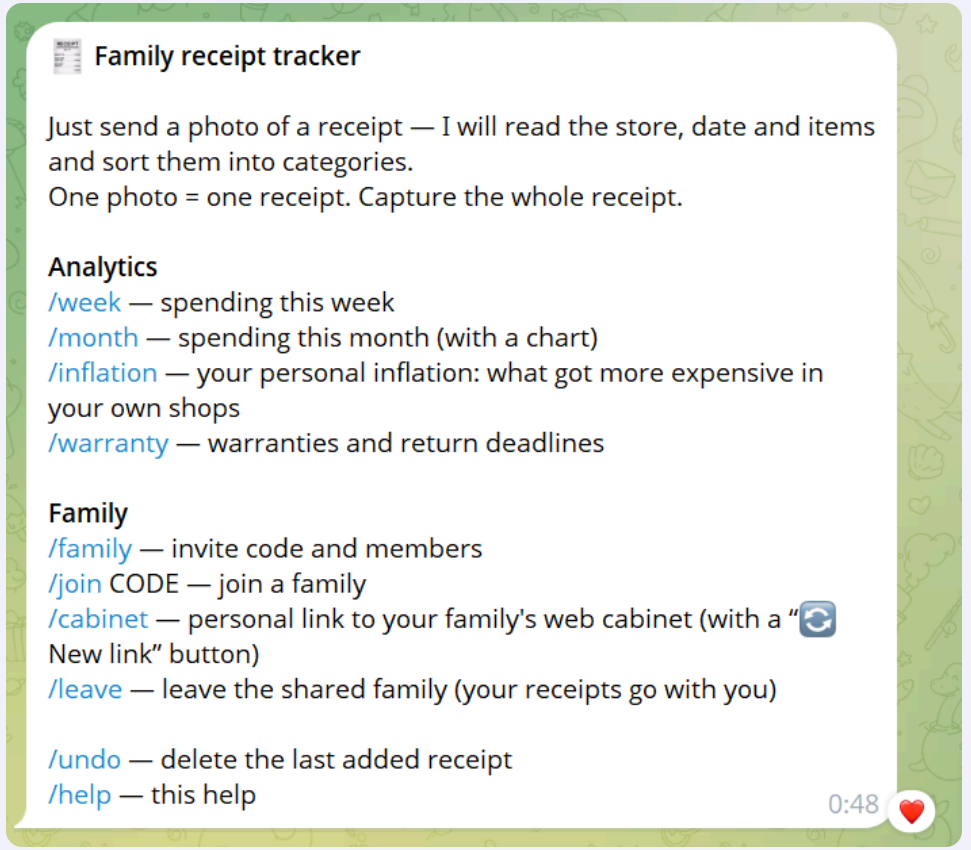
PORTFOLIO PROJECT · TELEGRAM BOT + WEB DASHBOARD

Family Receipt Tracker

Snap a photo of a receipt — the bot reads the store, date and every item with AI, sorts them into categories, tracks return deadlines and warranties, and shows the family's spending.

Python · aiogram 3 · Google Gemini vision · Pydantic JSON schema · SQLite · aiohttp · matplotlib · pytest

> Built for a family in Aarhus and tested on real Danish receipts: Lidl, Kvickly, Salling, Magasin, Løvbjerg.
> One code base runs two bots — Russian and English.



t.me/family_receipt_en_HL1907_bot

WHAT IT DOES

Six things the bot takes off a family's plate

Everything happens in a Telegram chat; a private web cabinet, opened by a personal family link from /cabinet, shows the same data in more detail.

📷 Photo → data

One photo = one receipt. AI returns strict JSON: store, date, items, prices after discounts, category of each item.

🗂 Categories by item

14 categories chosen by what the item is, not by the store — a supermarket receipt can hold shoes and food.

📊 Analytics

/week and /month with a chart, change vs the previous period, top stores, spending per family member.

↩️ Returns & warranties

Return period read from the receipt (or the store's known policy), 24-month Danish warranty. Reminders 3 days before a return window ends.

👨‍👩‍👧 Shared family budget

/family gives an invite link; everyone's receipts go into one budget and everyone gets the reminders.

📈 Personal inflation

Compares the unit price of products the family buys repeatedly, weighted by its own spending.

HOW IT WORKS

From a crumpled receipt to a clean record

The AI is asked for structured output against a Pydantic schema, so every answer is validated before it is saved.

1
Photo in Telegram
aiogram 3 handler. A SHA-256 hash catches the same file before any AI call.

→

2
Gemini vision
Prompt tuned for Danish receipts: rabat, pant, moms, card fees, weighed goods. Falls back across 4 models when the free tier is overloaded.

→

3
Validation
Pydantic schema; item names cleaned; duplicates by receipt number or date + total + store.

→

4
SQLite
Families, receipts, items, deadlines, learned store return policies, sent reminders.

→

5
Answers
Chat reply with buttons, hourly reminder loop, /month chart, web cabinet.

Bilingual from one code base: every text sits as a Russian/English pair; `BOT_LANG=en` starts the English bot with its own token and database.

Money and dates in Danish style: 1.041,84 kr. · 14.10.2026.

27 automated tests cover parsing fallbacks, duplicates, returns, reminders, the cabinet and both languages.

Runs on Railway: the bot and the web cabinet run as one service; the English bot is live in Telegram.

REAL RECEIPT · LIDL PLUS APP SCREENSHOT

Coupons and discounts land on the right items

The receipt has a Lidl Plus coupon on the eggs and 25% off the minced turkey.



The receipt as a screenshot from the Lidl Plus app, sent to the bot.

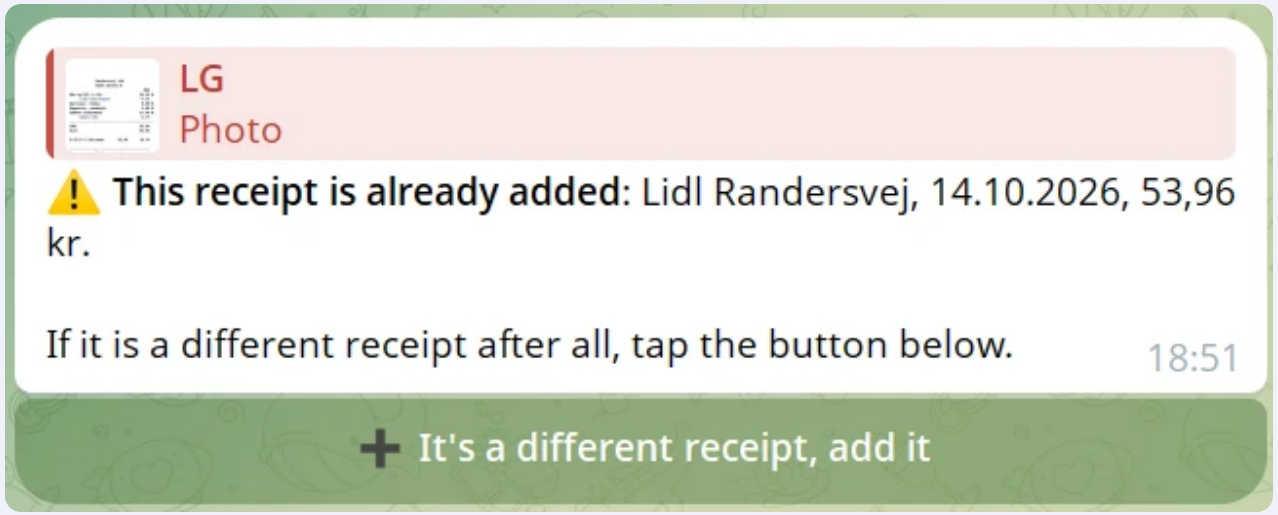


Parsed: eggs 29,95 − 9,95 = 20,00 kr., turkey 27,95 − 6,99 = 20,96 kr. Total 53,96 kr. matches the receipt.

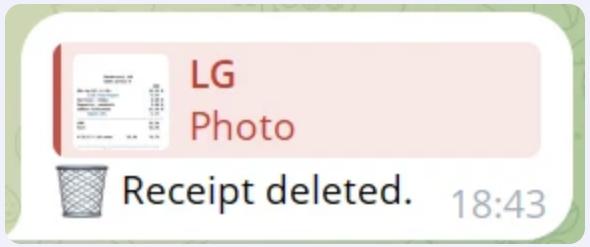
KEEPING THE DATA CLEAN

Duplicates are caught, mistakes are one tap away

There is no manual editing by design: a wrong receipt is deleted and photographed again.



Same receipt again: recognised and not saved. If it really is a different receipt, one button adds it anyway.

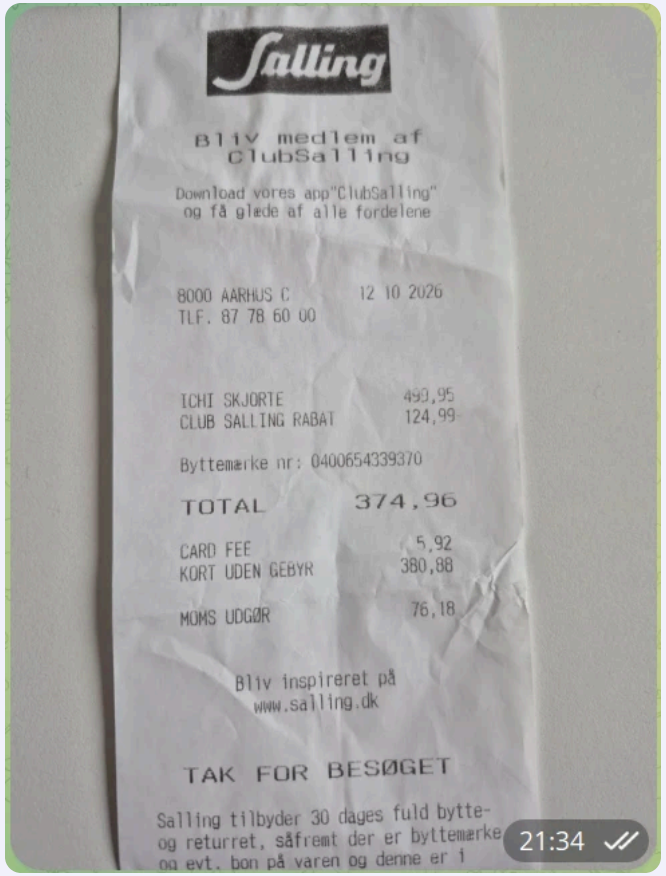


🗑 **Delete receipt** under every parsed receipt removes it with its items and deadlines.

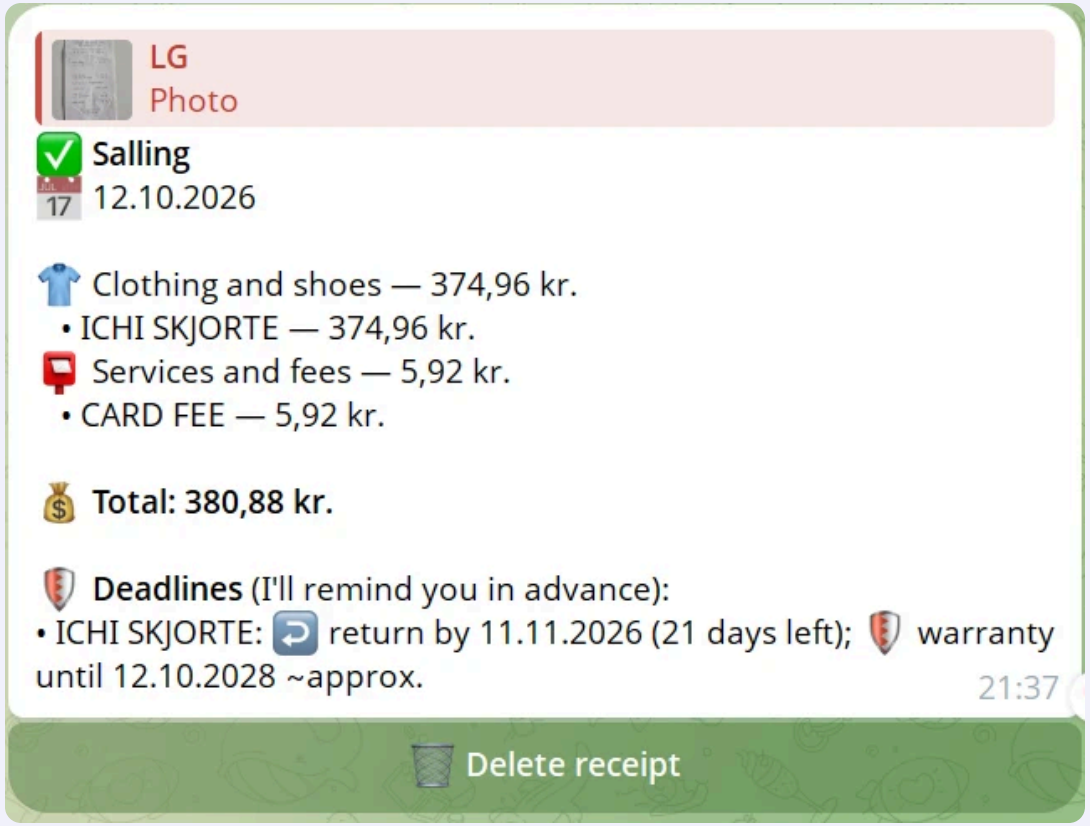
REAL RECEIPT · SALLING, CRUMPLED PAPER

A card fee is spending too

The total must equal what was actually charged, so the card fee becomes its own line in “Services and fees”.



The receipt: Club Salling discount, CARD FEE 5,92, and “30 dages fuld bytte- og returret” at the bottom.



Parsed: shirt 374,96 kr. after the discount + fee 5,92 kr. = 380,88 kr. charged. 30-day return taken from the receipt and remembered for the chain.

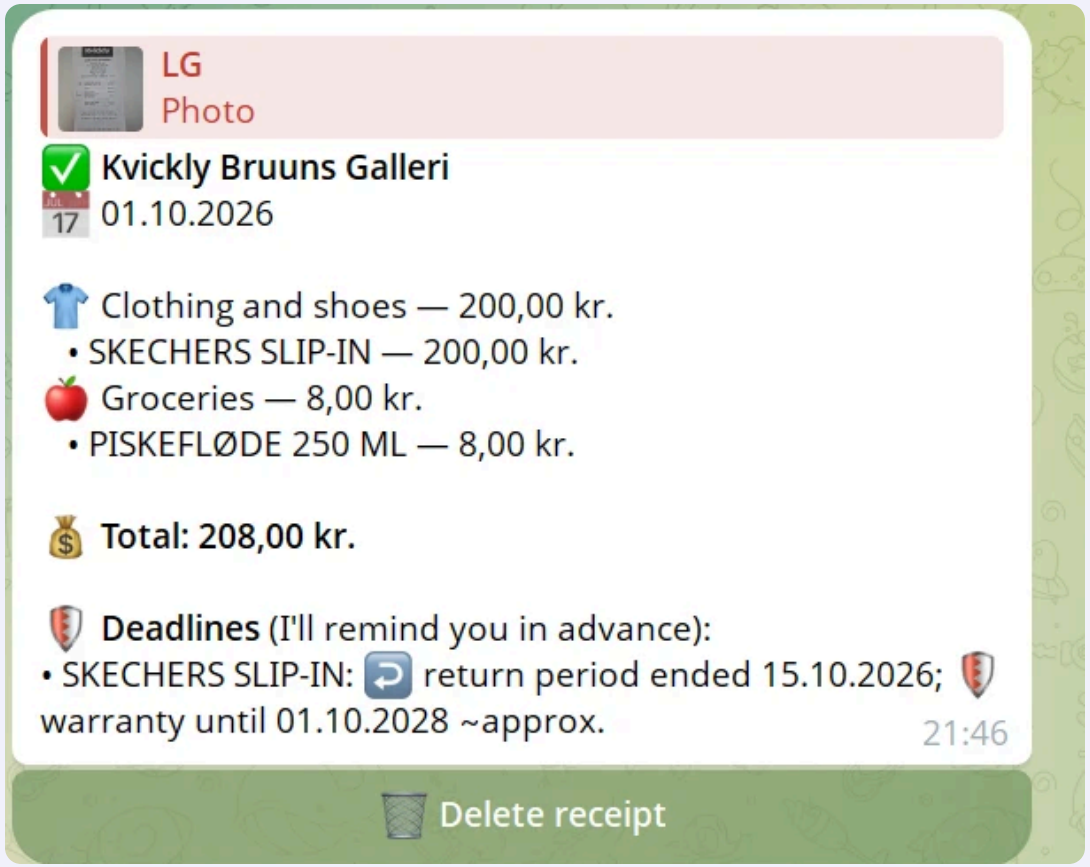
REAL RECEIPT · KVICKLY, PHOTO ON A TABLE

Categories by item, not by store

One supermarket receipt with shoes and cream. Kvickly prints no return period, so the bot uses the safe minimum of 14 days.



The photo: crumpled thermal paper with register codes (“PR”) before item names.

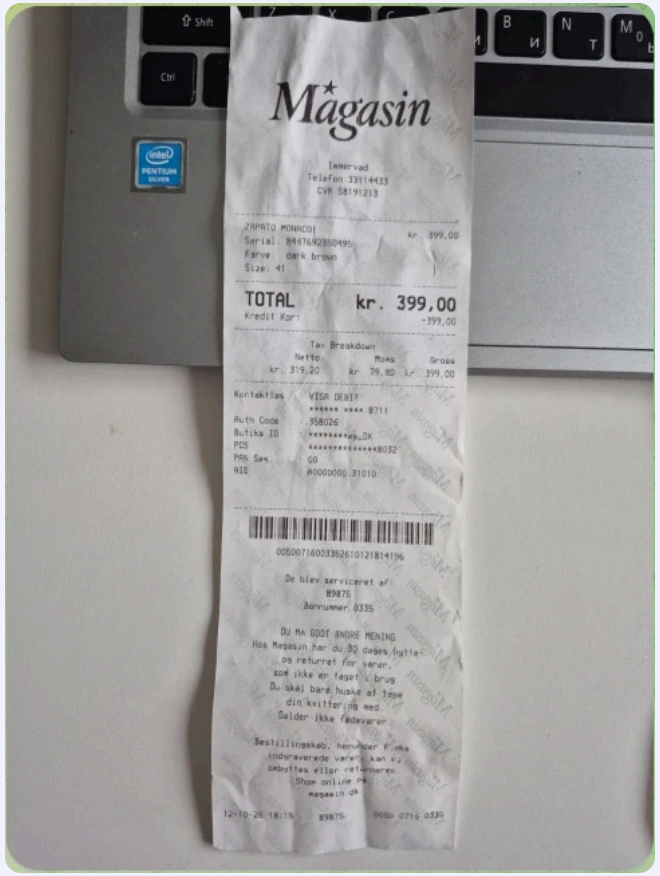


Parsed: shoes → Clothing and shoes, cream → Groceries, total 208,00 kr. Register codes are kept out of the names.

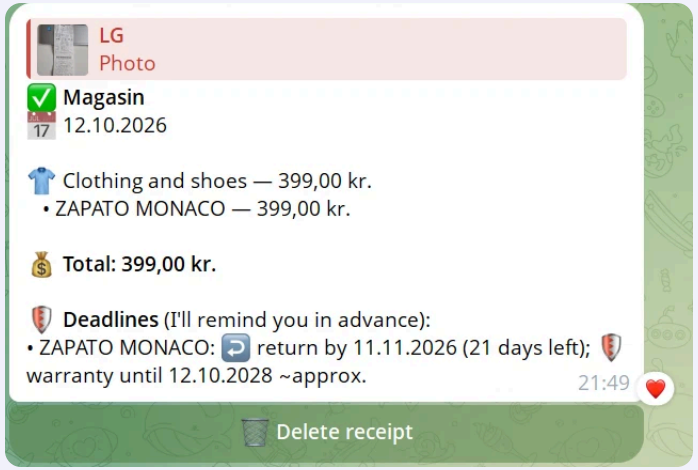
REAL RECEIPT · MAGASIN DEPARTMENT STORE

The details hide at the very bottom

Magasin prints the date and the return policy below the barcode. The bot reads them — and says so honestly when they are missing.



Whole receipt: date and “30 dages bytte- og returret” only at the bottom.



Parsed: 12.10.2026 from the bottom, return by 11.11.2026 (30 days), warranty 24 months.

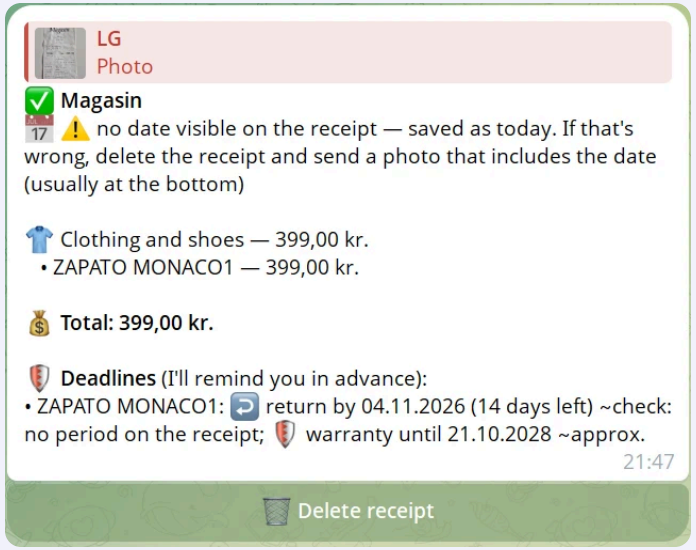


Photo cut short: the bot warns that no date is visible and marks the return period “~check”.

REAL RECEIPT · LØVBJERG SUPERMARKET KIOSK

Not every receipt is a purchase

A PostNord parcel with customs paid at a supermarket kiosk: a service, 0% VAT, nothing to return.



LØVBJERG
TRØJBORG CENTER
OTTE RUDS GADE 98-100
8200 AARHUS N
TLF.: 96 13 20 60
KØBMAND: Mads Hoffmann
E-MAIL: MHO@LOVBJERG.DK
CVR: 17 88 87 49

ÅBNINGSTIDER:
ABENT ALLE DAGE 7:00 - 22:00

Bon: 0000020607000547394
Terminalnr.:20607
Eksped Kiosk Trans: 137266
Dato: 27-09-26 21:23

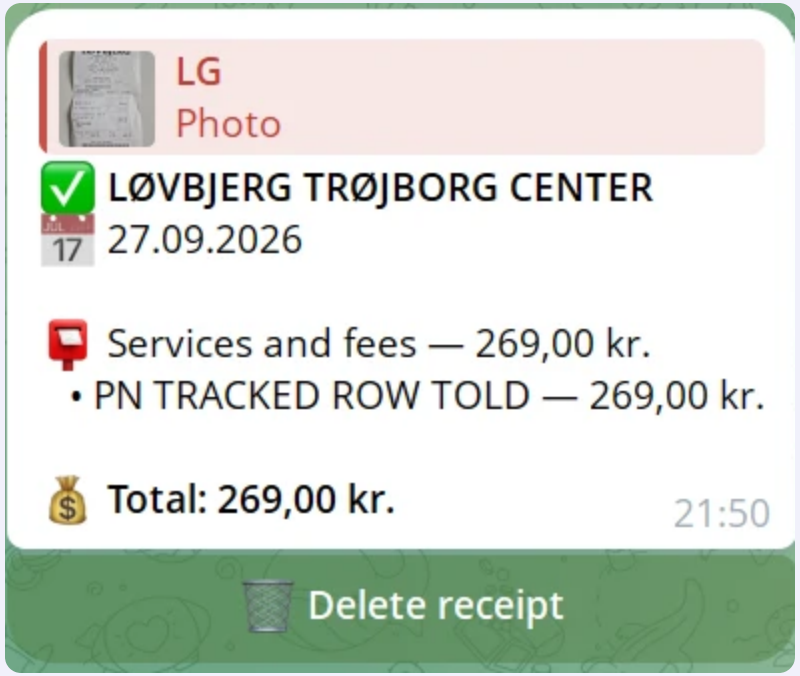
Beskrivelse	Beløb
PN TRACKED ROW TOLD	269,00

Bruttosubtotal: 269,00
Totalbeløb kr 269,00
Kort -269,00
MASTERCARD
8550

	Moms%	Nettobeløb	Moms	Beløb
A	0	269,00	0,00	269,00

TAK FOR BESØGET

T0607000137266



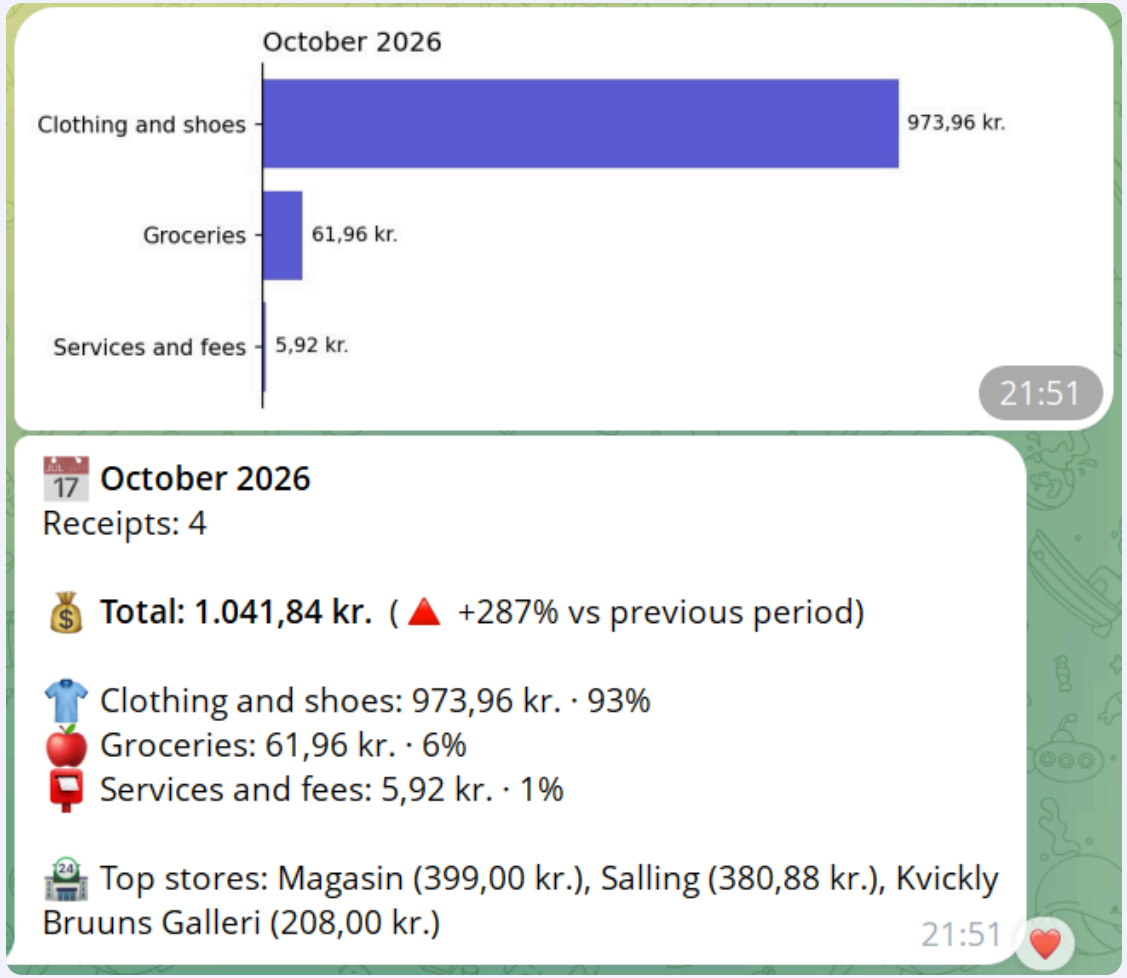
The receipt: “PN TRACKED ROW TOLD” — tracked parcel, customs (told).

Parsed: Services and fees 269,00 kr., no return period and no warranty.

ANALYTICS IN THE CHAT

/month — where the money went

A chart by category, the total, the change versus last month and the top stores.



1.041,84 kr. for 4 receipts in October — the same as adding the receipts by hand.

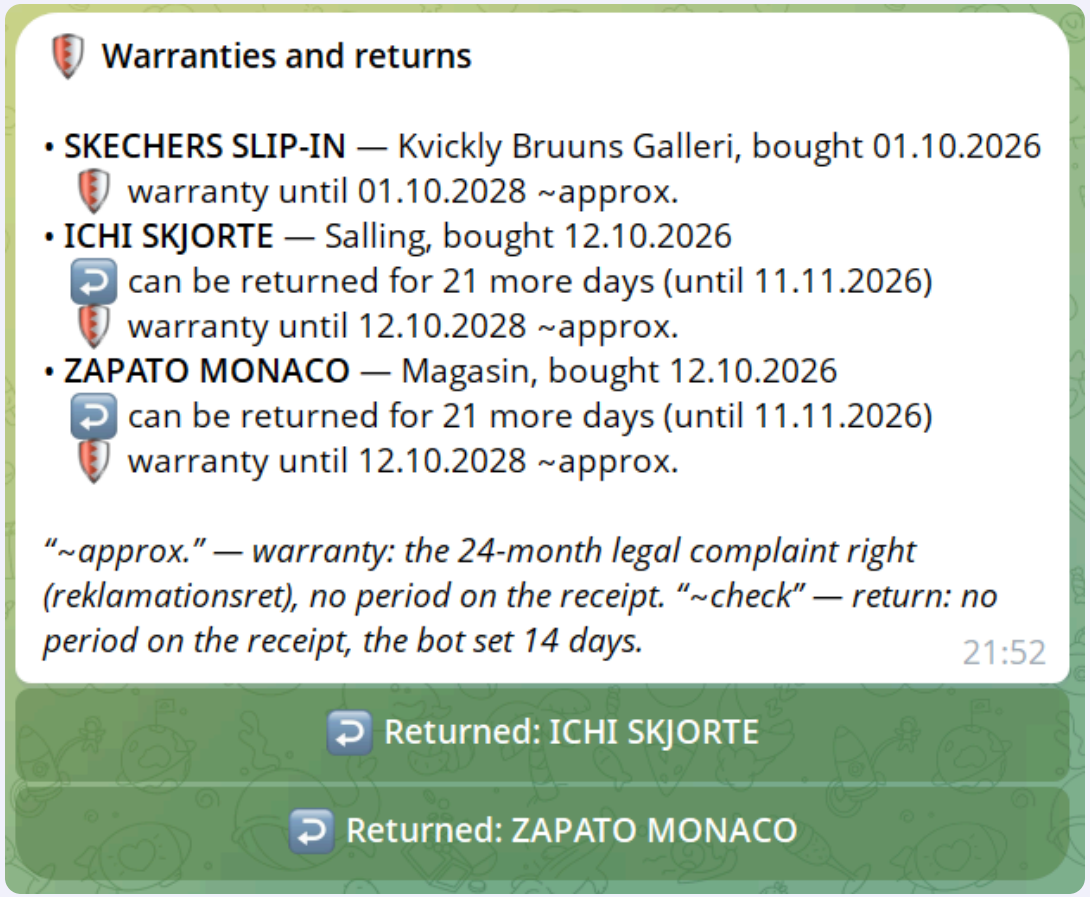
+287% vs September, which had a single 269 kr. parcel.

Categories add up to 100%; card fees and parcels are visible as **Services and fees**.

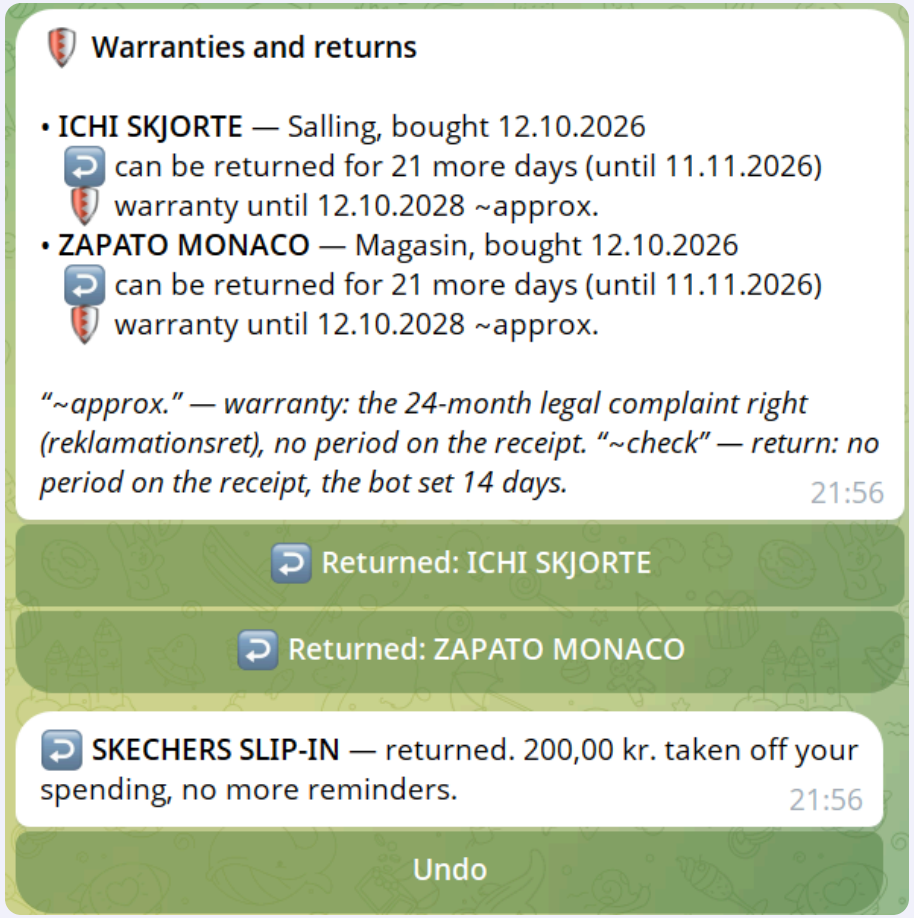
RETURNS AND WARRANTIES

/warranty — and a “Returned” button

The shoes from Kvickly were taken back to the store. One tap takes them off the spending and stops the reminders; “Undo” reverses it.



Before: every item with its return deadline and warranty, a button per item.

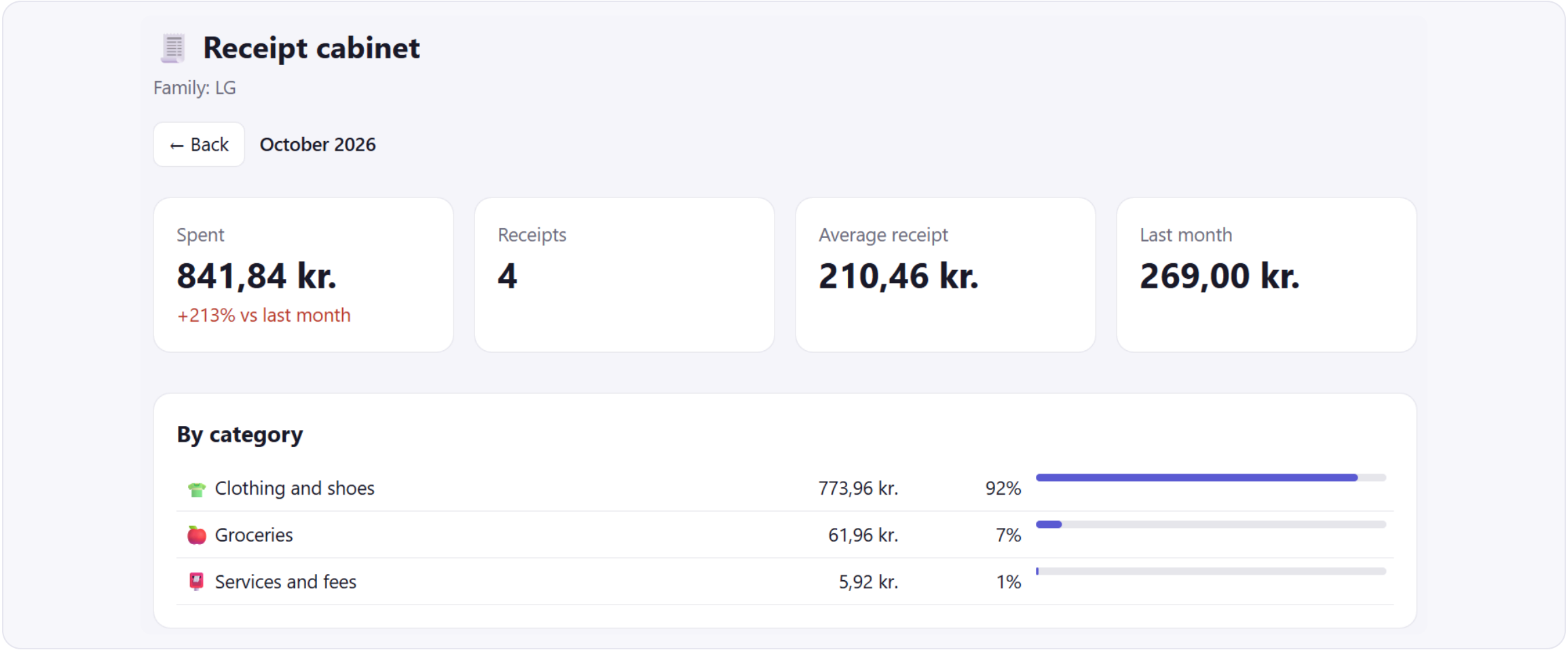


After: 200,00 kr. taken off the spending, the shoes leave the list.

WEB CABINET · AIOHTTP, PERSONAL FAMILY LINK

The same numbers on a big screen

Month by month: spent, receipts, average receipt, last month, categories, who spent what, stores. Also works on a phone, with a dark theme.

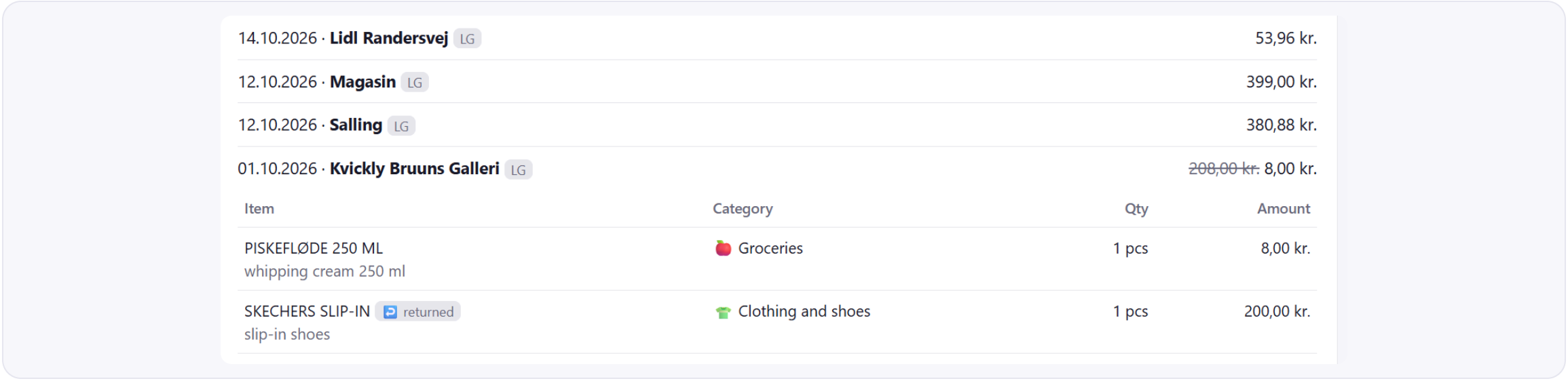


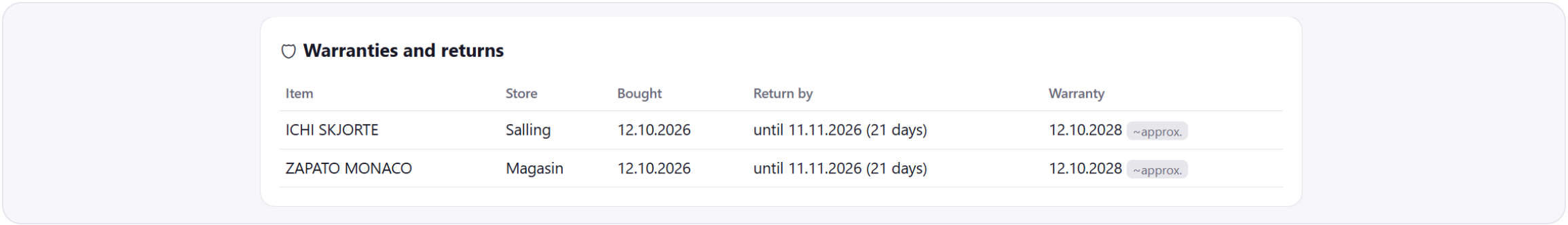
October: 841,84 kr. — already without the returned shoes — and the split by category.

WEB CABINET

Every item, every deadline

Each receipt opens into its items: the name as printed, a generic English name and the category.





Top: Kvickly's printed 208,00 kr. struck through — 8,00 kr. really spent; “PISKEFLØDE 250 ML” → whipping cream; the shoes marked “returned”. **Bottom:** what can still be returned and until when.

ENGINEERING NOTES

What real receipts taught the code

Each problem below came up while testing on real receipts and is now covered by a test.

Discount lines glued to names. The AI sometimes appended “Lidl Plus-kupon” to the item above → the schema keeps only the product line.

Register codes in names. Kvickly's “PR” column ended up in “PR SKECHERS” → prompt rule for column codes.

Same receipt, different store name. “Lidl” vs “Lidl Randersvej” slipped past the duplicate check → stores are compared by brand.

Free-tier AI overload. Gemini returns 503 at peak times → fallback across four models, and a “Retry” button that keeps the photo.

Unknown return periods. Danish returns are a store policy, not a law → printed period wins and is learned per chain; otherwise 14 days marked “~check”.

Late returns. People mark a return after the window → the “Returned” button stays available.

6
real Danish stores tested

2
languages from one code base

4
AI models in the fallback chain

27
automated tests