

WHAT.Æ.BRICK

BAUER, HOFER, MAYR



TEAM



**Daniel
Bauer**



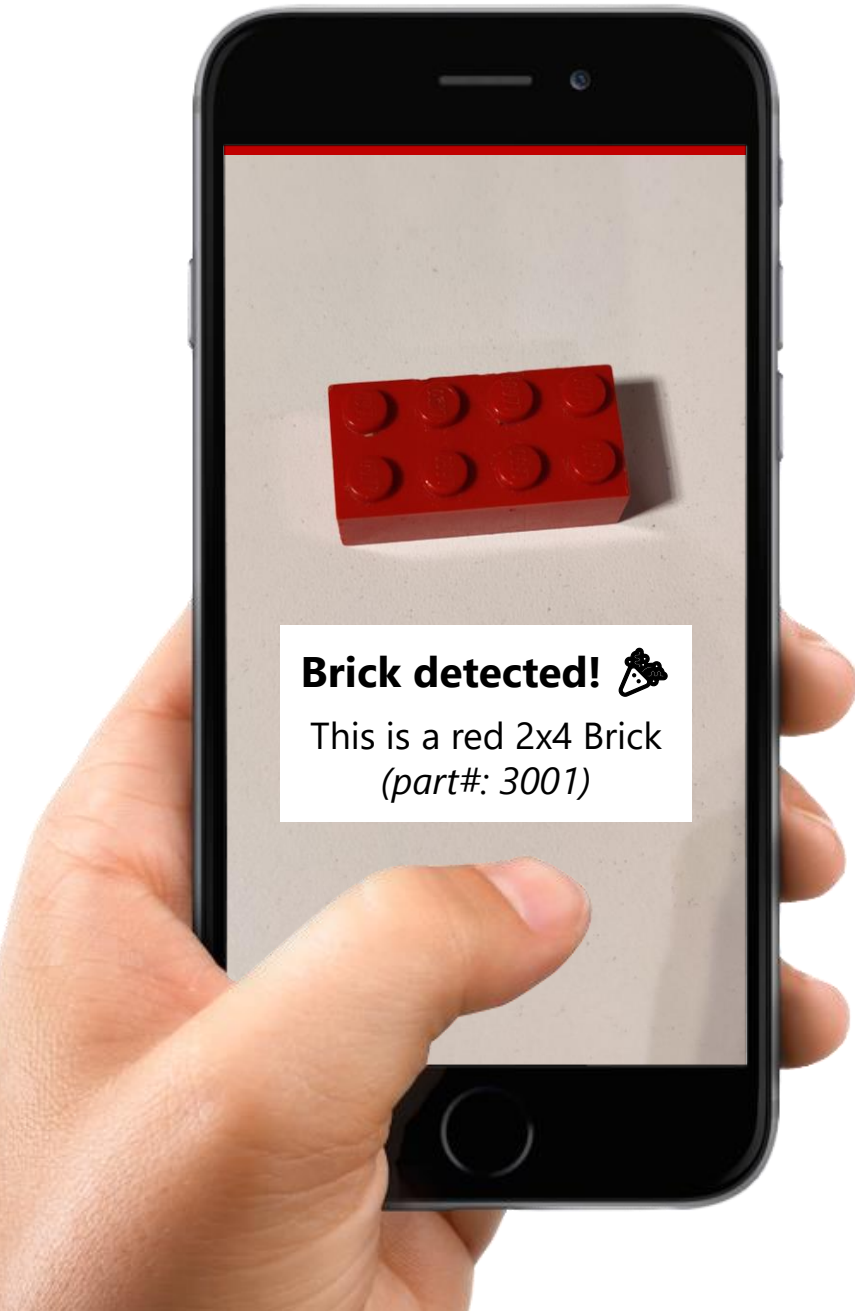
**Nikolaus
Hofer**



**Bernhard
Mayr**

IDEA

WHAT.Æ.BRICK



Detect following part characteristics:

Type (*brick, plate*)

Size (e.g. 2*2, 2*4)

Part ID (e.g. 3001)



TARGET PLATFORMS/TECHNOLOGIES



Used libraries/technologies



Proudly powered by **X**STATE



FULL OFFLINE CAPABILITIES



Preprocessing



Classification



Part data & history



Scan & Details



Scan & Details

10:56

65 %

3001

Brick 2 x 4 (3001)



Production
1979-2021

Prints
61

Sets
2991

Set parts
35264

GO TO BRICKLINK

GO TO REBRICKABLE

817

WHITE

5

CHROME SILVER

4

TRANS-CL
EAR

1

SAND RED

804

RED

248

REDDISH
BROWN

25

BROWN

33

MEDIUM
DARK
FLESH

142

ORANGE

4

DARK ORANGE

1

MEDIUM
ORANGE

224

TAN

40

BRIGHT
LIGHT
ORANGE

54

DARK TAN

2

METALLIC
GOLD

2

LIGHT
YELLOW

639

YELLOW

3

CHROME
GOLD

2

BRIGHT
LIGHT
YELLOW

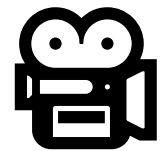
3

OLIVE
GREEN

HISTORY

SCAN

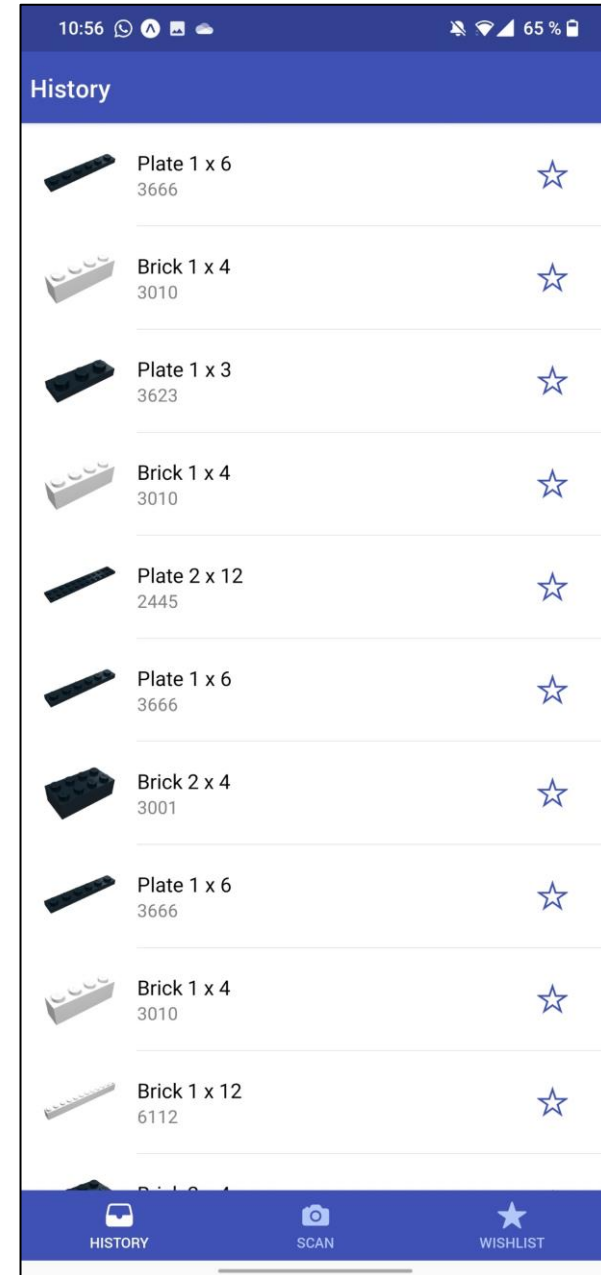
WISHLIST



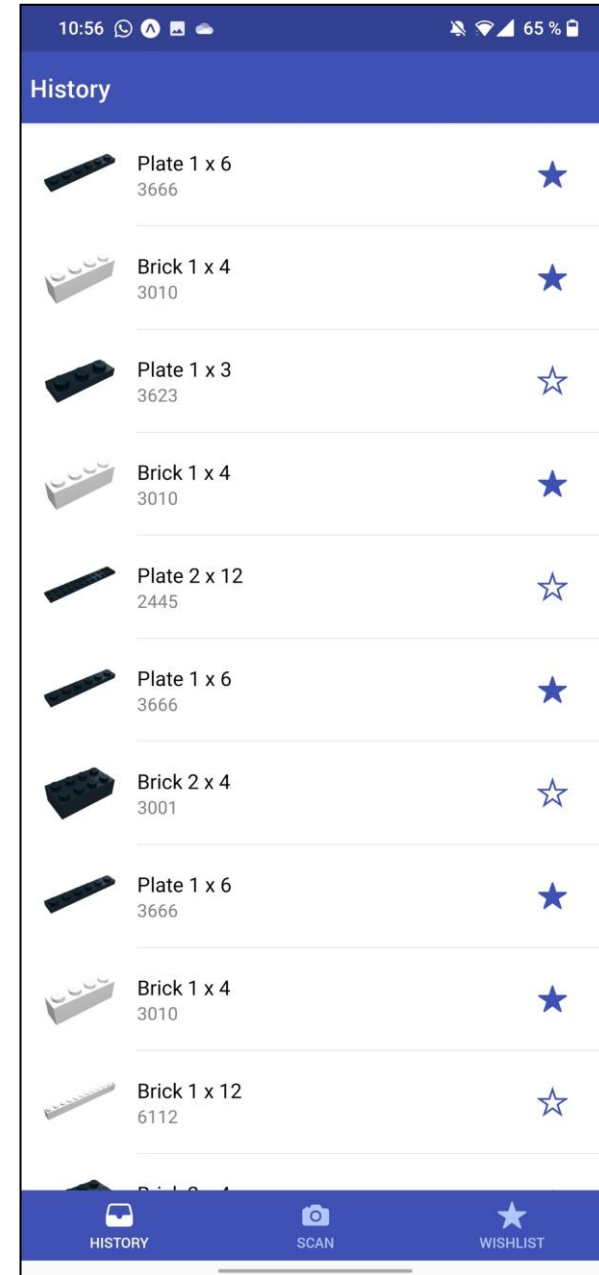
Scan & Details



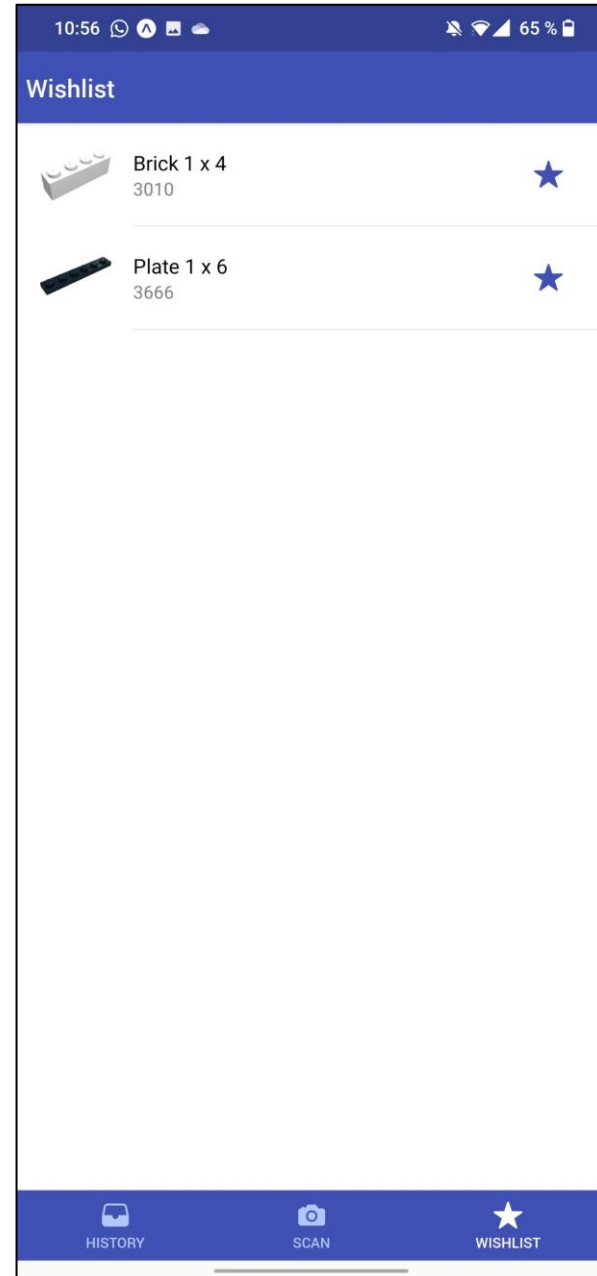
History & Wishlist



History & Wishlist



History & **Wishlist**

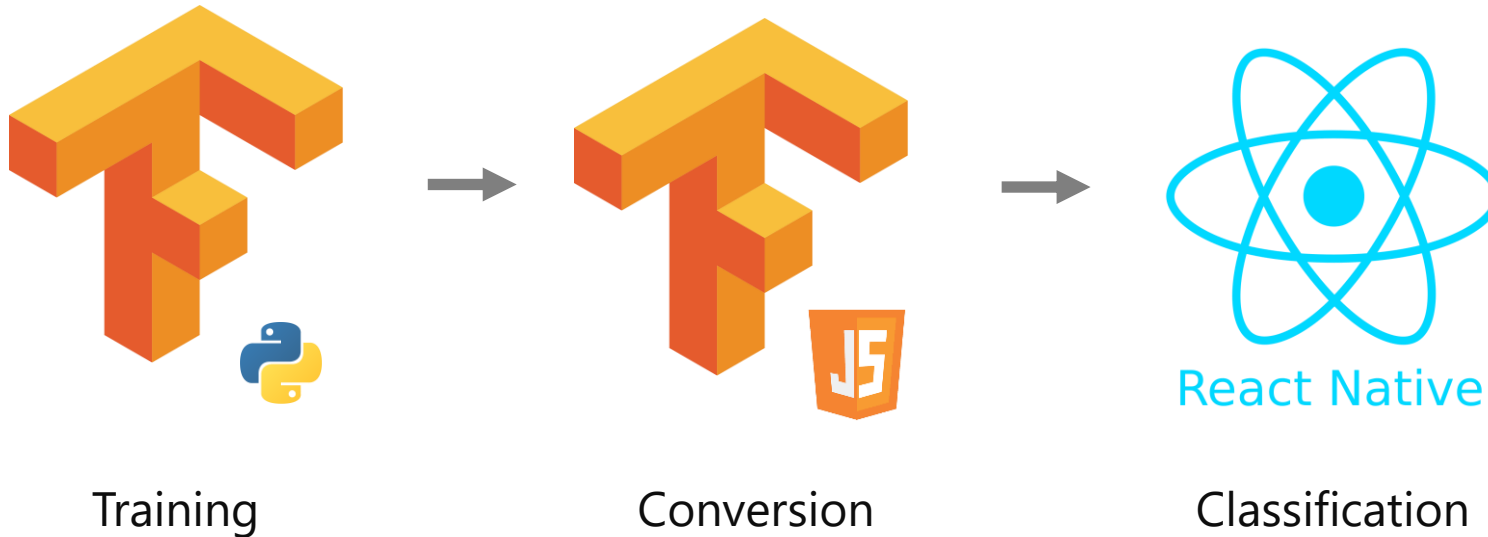




History & Wishlist



Tensorflow.js based classification



TensorFlow.js

TensorFlow.js for React Native is here!

February 04, 2020



Posted by Yannick Assogba, Software Engineer, Google Research, Brain team



React Native Learnings

- Expo Camera: laggy and not well supported
- UI elements/styling not that “straight forward”
- Online first approach in most tools and guides (e.g. Firebase)
- Typescript support not for all 3rd party packages



External APIs Learnings

✗ **Brick Data:** Rebrickable API **limited** and obviously not reachable offline

Rebrickable

BuildMOCsSetsPartsDiscussOtherMy LEGOAccount

SearchAll LEGO

LEGO Database Downloads

Downloads

LEGO Database Download

The LEGO Parts/Sets/Colors and Inventories of every official LEGO set in the Rebrickable database is available for download as csv files here. These files are automatically updated daily. If you need more details, you can use the [API](#) which provides real-time data, but has rate limits that prevent bulk downloading of data.

You can use these files for any purpose. If you publish any articles please [let us know](#) and maybe we can help promote it.

- This database stores only official LEGO items - Sets, Parts and Minifigs (no B-Models, Sub-Sets, MOCs)
- Sets and Minifigs contain one or more Inventories (inventories.csv)
- Inventories can contain Sets (inventory_sets.csv) and/or Parts (inventory_parts.csv) and/or Minifigs (inventory_minifigs.csv)
- Part Relationship rel_types are: (P)rint, (Pai)R, (Su)B-Part, (M)old, (Pa(T)tern, (A)lternate

part_categories

part_num varchar(20)
name varchar(200)

parts

part_num varchar(20)
part_cat_id int4
name varchar(250)
color_id int4
quantity int4
is_spare bool

colors

id int4
name varchar(200)
rgb varchar(6)
is_trans bool

inventories_parts

inventory_id int4
part_num varchar(20)
color_id int4
quantity int4
is_spare bool

inventories_minifigs

inventory_id int4
fig_num varchar(20)
name varchar(256)
num_parts int4

minifigs

fig_num varchar(20)
name varchar(256)
num_parts int4

inventory_sets

inventory_id int4
set_num varchar(20)
quantity int4

sets

set_num varchar(20)
name varchar(256)
year int4
theme_id int4
num_parts int4

themes.csv.gz (4.5 KB)
colors.csv.gz (2.1 KB)
part_categories.csv.gz (740 bytes)
parts.csv.gz (692.1 KB)
part_relationships.csv.gz (111.2 KB)
elements.csv.gz (434.4 KB)
sets.csv.gz (238.9 KB)
minifigs.csv.gz (138.0 KB)
inventories.csv.gz (160.7 KB)
inventory_parts.csv.gz (3.6 MB)
inventory_sets.csv.gz (10.3 KB)
inventory_minifigs.csv.gz (65.8 KB)

June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.
June 4, 2021, 7:08 a.m.

✓ Preprocessed into a JSON

```
[
  {
    "id": "3005",
    "name": "Brick 1 x 1",
    "category": "Bricks",
    "productionFrom": 1954,
    "productionTo": 2021,
    "setParts": 59197,
    "sets": 3543,
    "prints": 142
  },
  {
    "id": "14716",
    "name": "Brick 1 x 1 x 3",
    "category": "Bricks",
    "productionFrom": 2014,
    "productionTo": 2021,
    "setParts": 997,
    "sets": 244,
    "prints": 0
  }
]
```

OpenCV Learnings

- `react-native-opencv3` code not compatible with expo
- Usage of `opencv.js` via `react-native-webview` and `wasm`
- Communication via `injectJavaScript` & `postMessage`
- Problems with Webview not rendering when hidden
- Webpage has to be bundled as a string and passed to `react-native-webview`, because of cross-platform Issues



ML/Tensorflow Learnings

- Tensorflow.js – reduced feature set
- Not up to date react-native dependencies
- Limited documentation
- Fast after initial loading



WHAT.Æ.BRICK THÆNKs

BAUER, HOFER, MAYR

