MLRF Lecture 01

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Introduction to *Twin it!*

Lecture 01 part 03

Twin it! overview

A poster game

- X bubbles, all different but
- Y bubbles, which have 1 (and only 1) twin

Your goals:

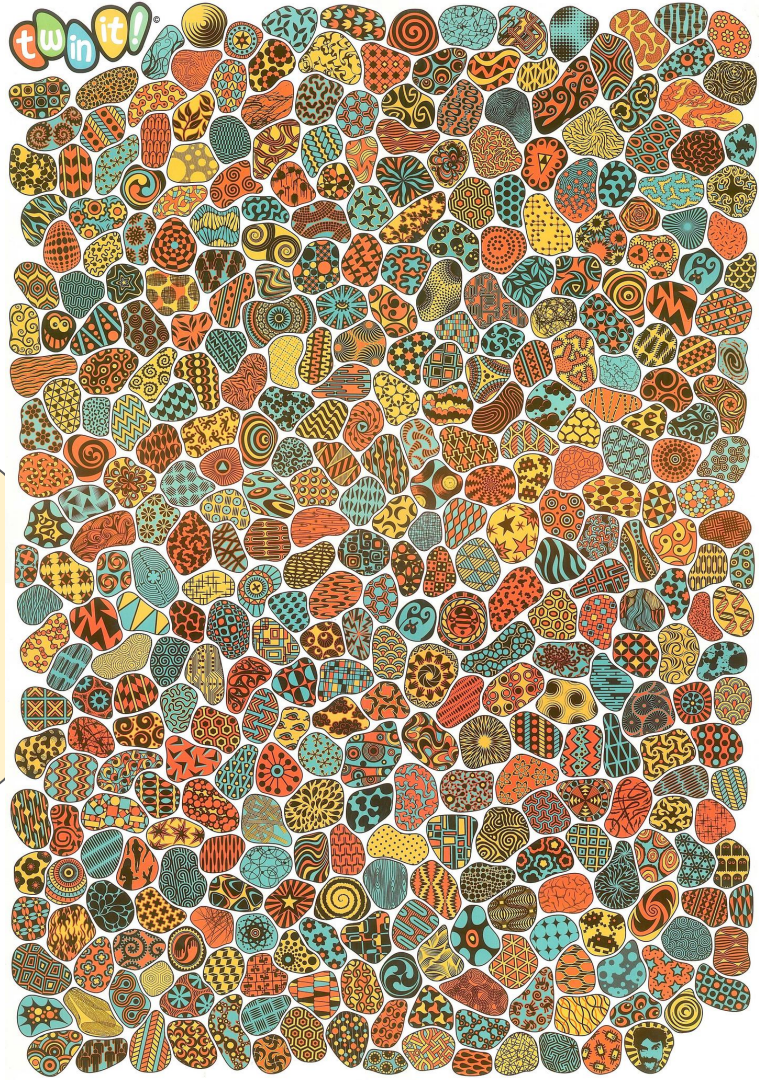
- Find the pairs

Already done

- Scan the poster
- Stitch the tiles
- Normalize the contrast

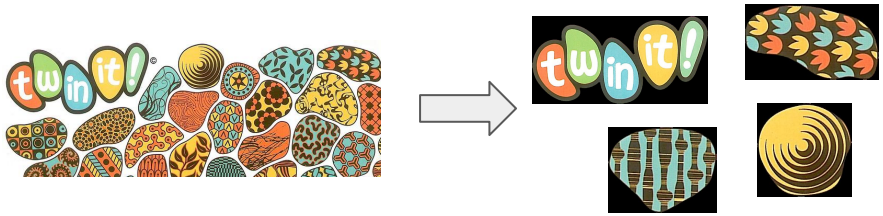
Discussion (3 minutes):

1. **How can we <u>decompose</u> the problem?**
2. **How can we make <u>sure</u> our solution works?**
3. **What should we <u>focus</u> on?**



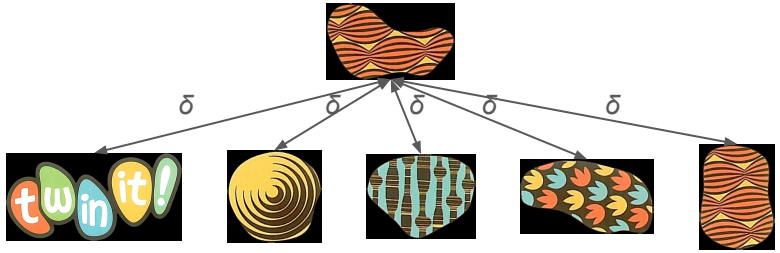
Twin it! underlying problems

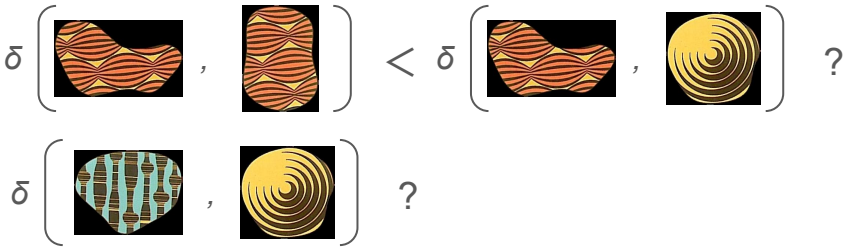
1. Isolate each bubble ⇒ **Segmentation**
   We provide pre-computed results for this step.

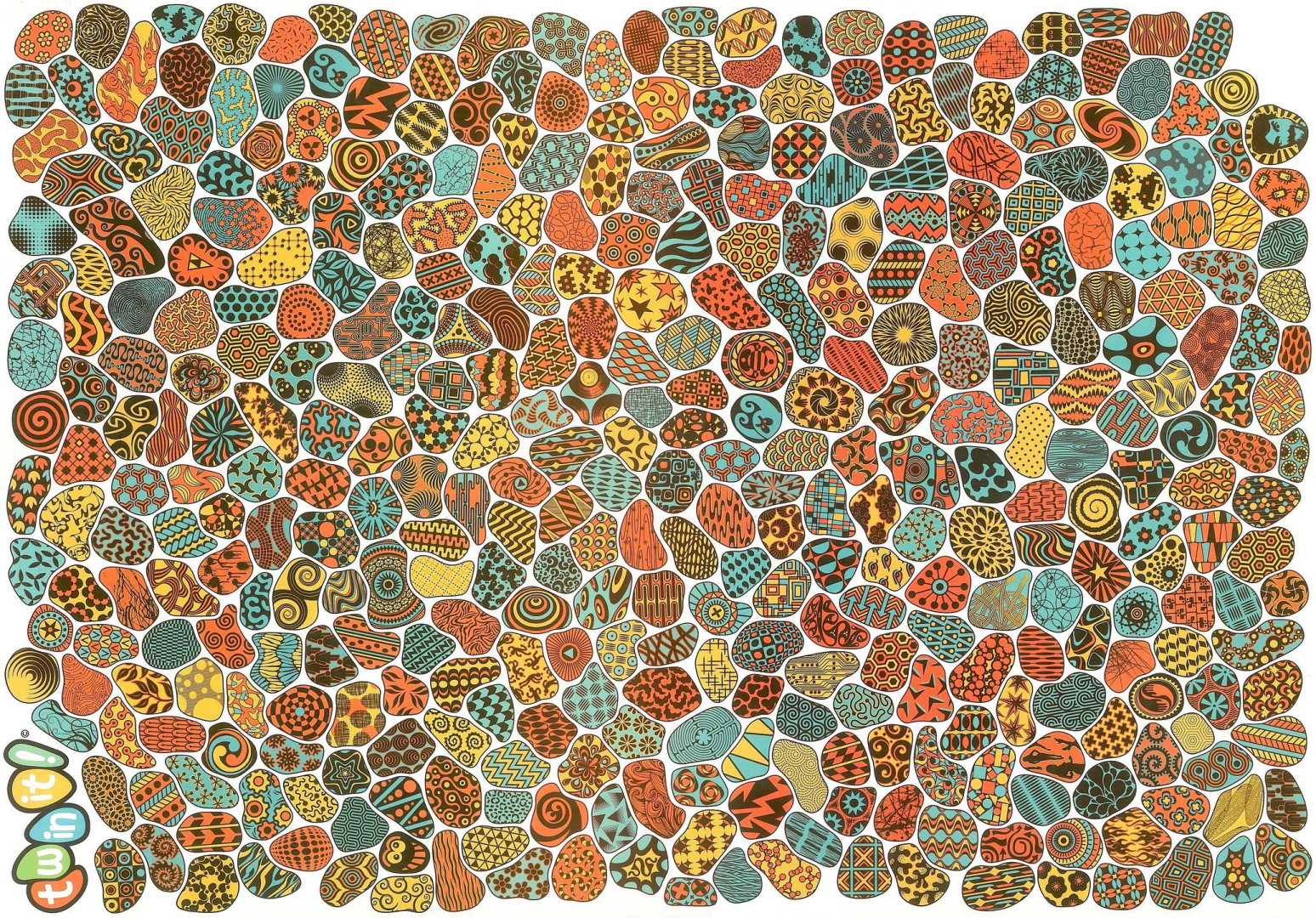


2. Compare image pairs ⇒ **Matching**
   We will focus on this one.
   We will use ~~***Template Matching***~~ ***color descriptors.***

3. Identify pairs ⇒ **Calibration**
   We will understand the challenges of this one.

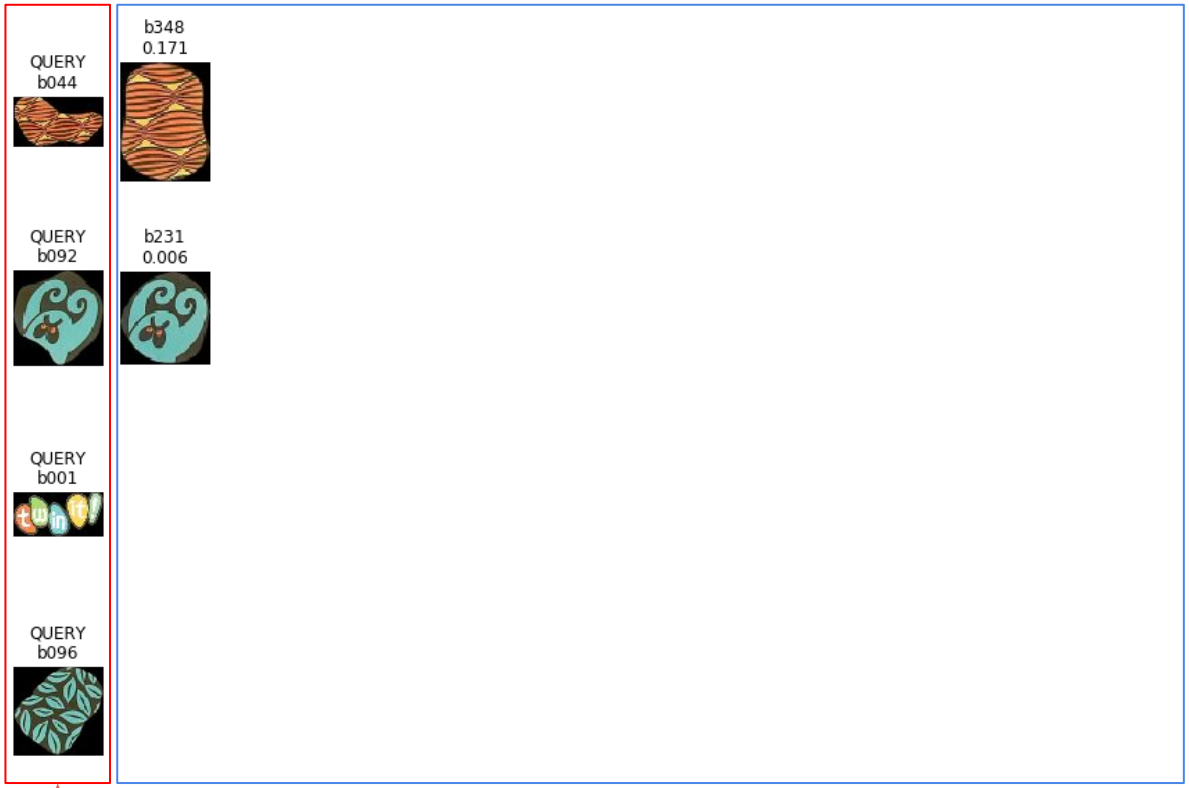





twin it!

Ideal goal

For each bubble, return only a matching pair, if it exists.

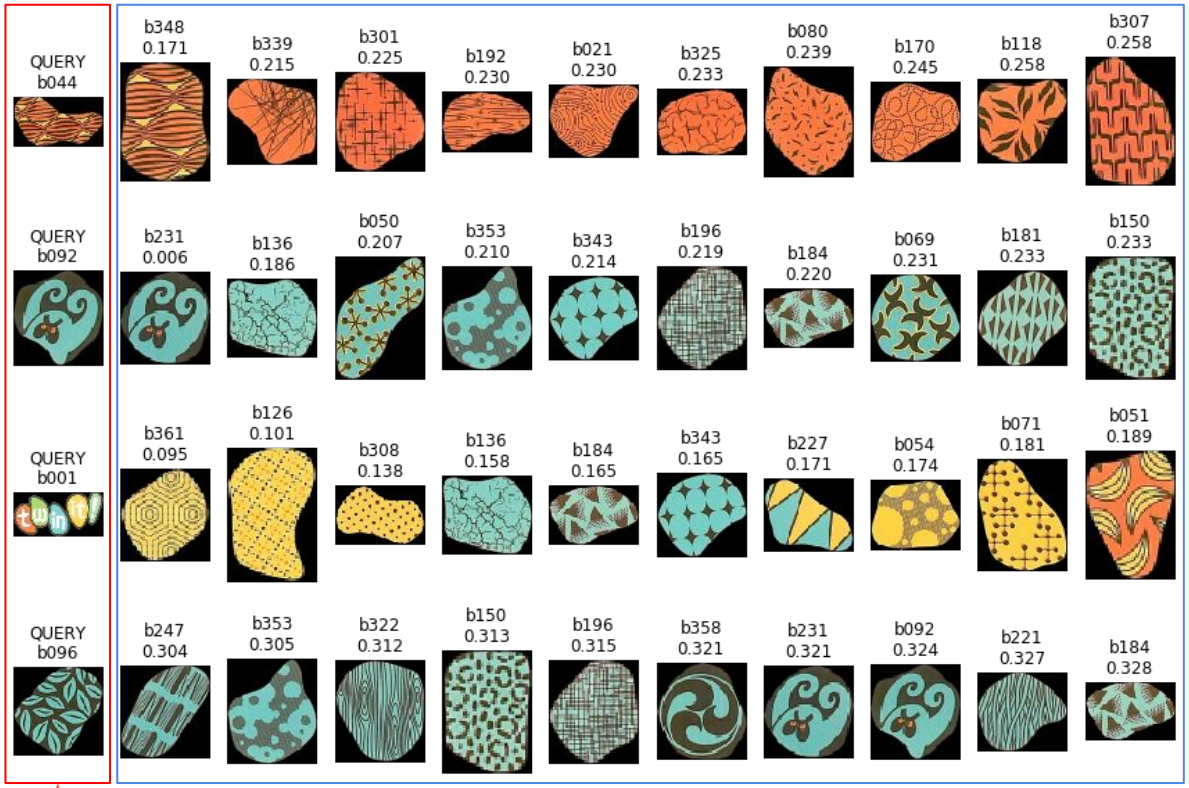


query images

result images (closest to query according to method)

Actual goal for practice session

For each bubble,
return **best matching**
bubbles



query images

result images (closest to query according to method)

Challenges

🎯 Goal: Describe the bubbles so that two bubbles with the **same texture** will have **“similar” descriptions**, i.e. are **close** in the **description space**.

Difficult because objects to “group together” exhibit annoying variations:

- Translation (obvious)
- Noise: small changes in color, saturation, exact pixel values
- **Outer shape**
- ~~Rotation~~
- ~~Size~~
- ~~Viewpoint~~
- …

Our real problem here

Variant / Invariant

Key concept to remember: **which variations our system must cope with?**

Here, we want to design a description system which is **invariant** to

- Translation
- Small noise
- Outer shape

We therefore need to focus on textural information.

TODAY we will implement a color descriptor.

Next session, we'll extract local descriptors.