

Galaxy Zoo Challenge

CLASSIFYING THE MORPHOLOGIES OF DISTANT GALAXIES IN OUR
UNIVERSE



Is the galaxy simply smooth and rounded, with no sign of a disk?

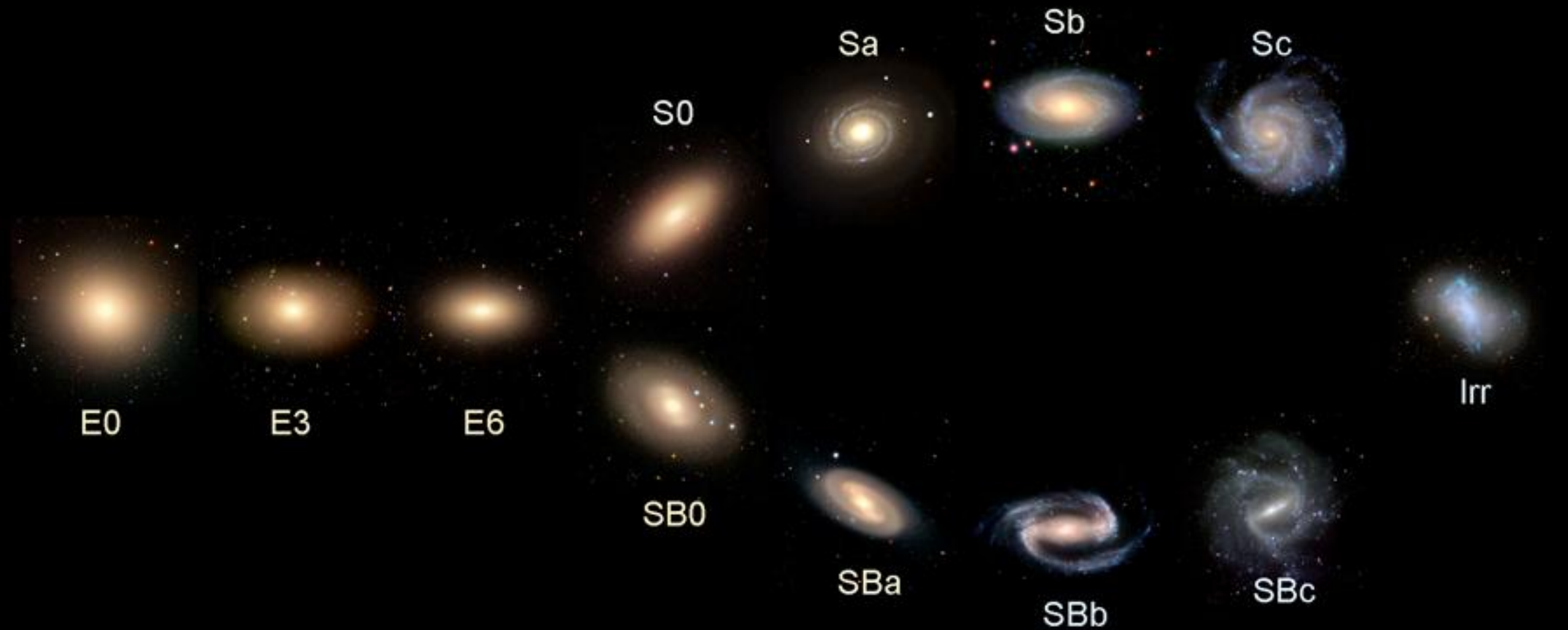


A Star Feature Galaxy



A Spiral Feature Galaxy (2 Spiral arms)

Hubble's Galaxy Classification Scheme



Data Set

- Hubble's CANDELS project (COSMIC ASSEMBLY NEAR-INFRARED DEEP EXTRAGALACTIC LEGACY SURVEY)

Problem Statement

- Classifying Galaxies according to their
 - Shape
 - Circular
 - Elliptical
 - Feature
 - Disk
 - Star
 - Spiral

Decision Tree

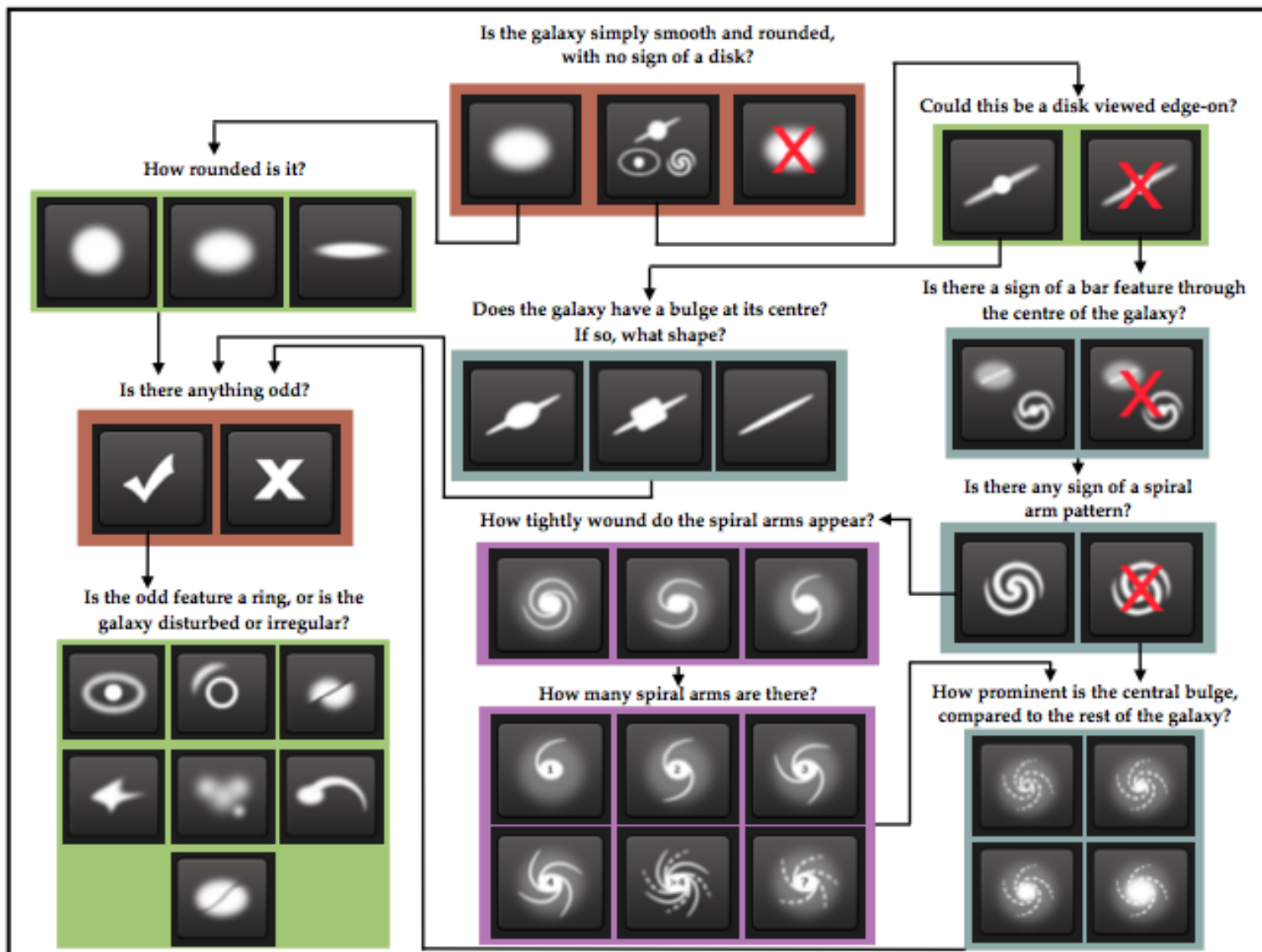


Figure 1. Flowchart of the classification tasks for GZ2, beginning at the top centre. Tasks are colour-coded by their relative depths in the decision tree. Tasks outlined in brown are asked of every galaxy. Tasks outlined in green, blue, and purple are (respectively) one, two or three steps below branching points in the decision tree. Table 2 describes the responses that correspond to the icons in this diagram.

Previous Work

Galaxy Zoo: Reproducing Galaxy Morphologies Via Machine Learning

- Classified into three classes
 - Early Types
 - Spiral
 - Point/ Source artifacts
- An artificial neural network is trained on a subset of objects classified by the human eye and it is tested whether the machine learning algorithm can reproduce the human classifications for the rest of the sample.