

Digital Image Processing (DIP)

By

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Research Methodology

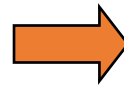
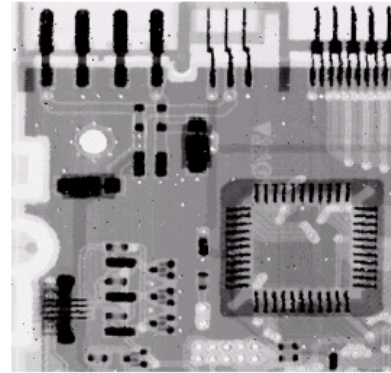
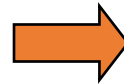
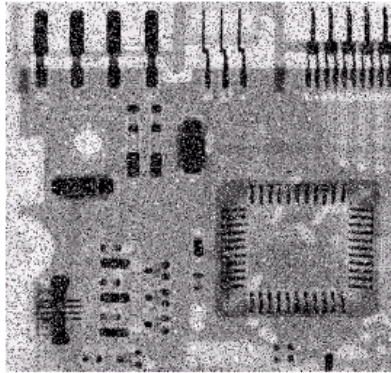
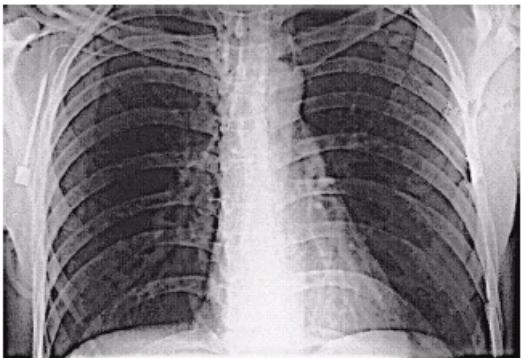
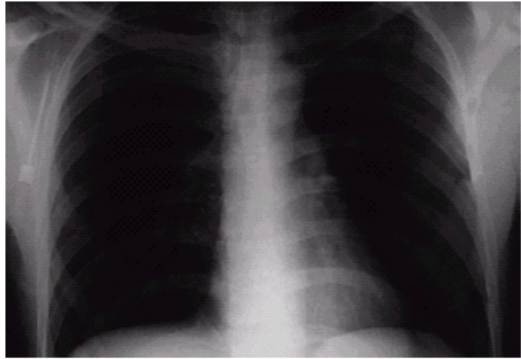
- Confusing terms
 - Samples العينات
 - Research Questions سؤال البحث
 - Hypothesis فرضيات البحث
 - Questionnaires الاستبيان
 - Analysis التحليل
 - Recommendation التوصيات

تطبيقات معالجة الصور (DIP applications)

- Biometrics Verification (انظمه التحقق من البصمه)
- Medical Images (تحليل الصور الطبيه)
- Computer Vision (الرؤيه الحاسبيه للروبورتات)
- OCR (انظمه قراءه)
- Remote Sensing (انظمه الاستشعار عن بعد)
- Video Processing (معالجة الفيديوهاات)
- Image enhancement and restoration (تحسين واستعاداه الصوره)
- Document Handling (تحليل الاوراق)
- Signature Verification (انظمه التحقق من التوقيعه)
- Others

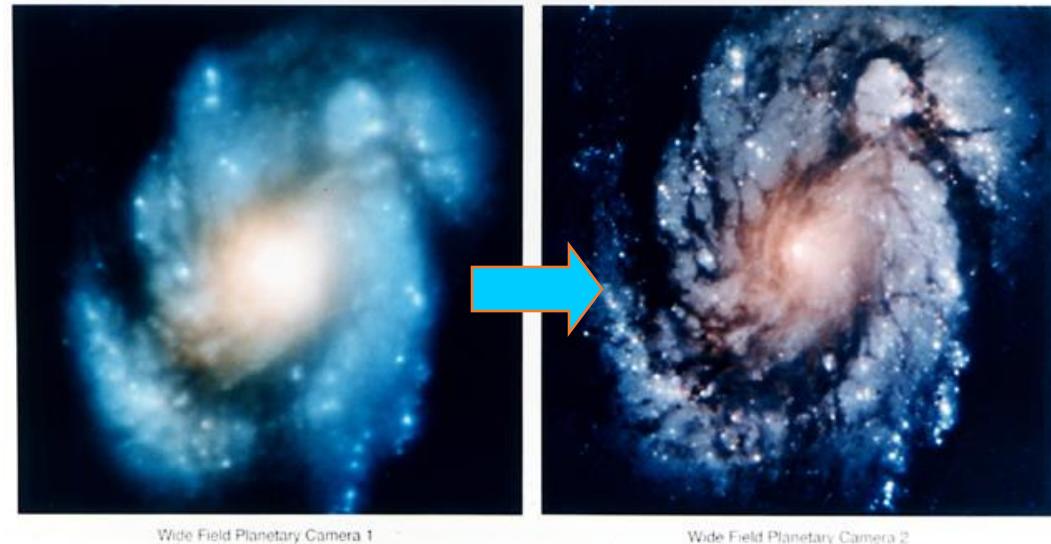
Examples: Image Enhancement

- One of the most common uses of DIP techniques: **improve quality, remove noise** etc



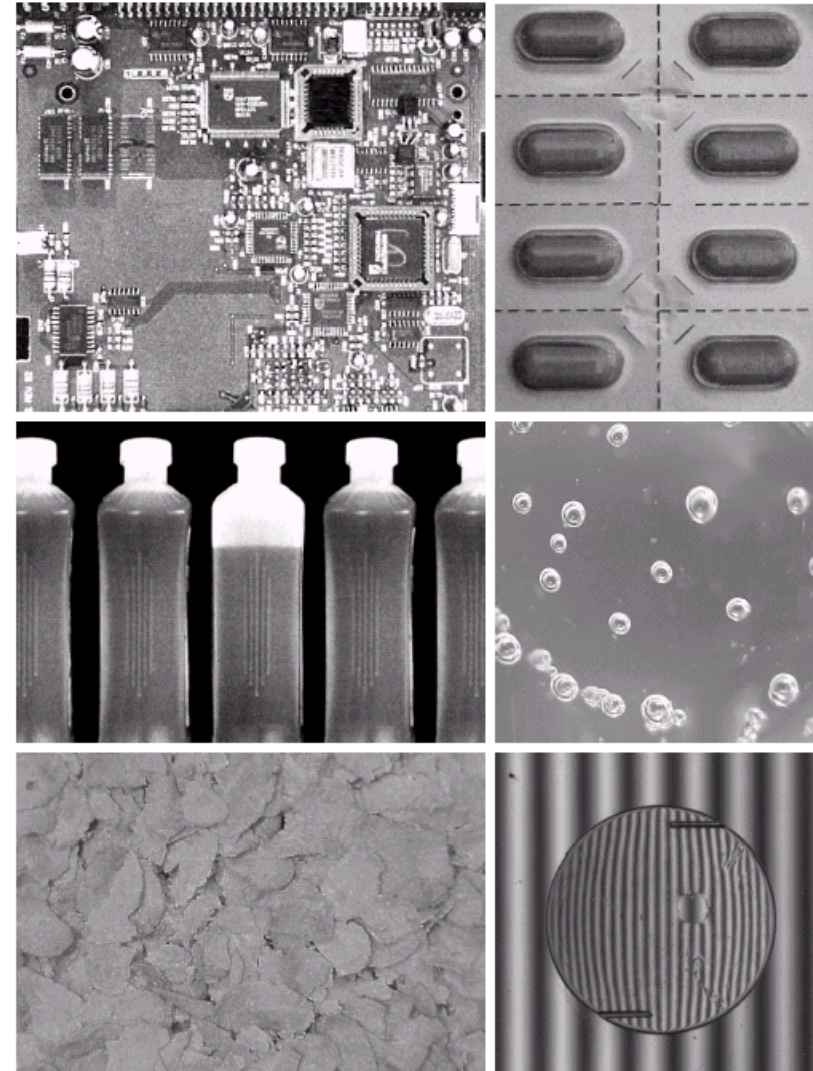
Examples: The Hubble Telescope

- Launched in 1990 the Hubble telescope can take **images of very distant objects**
- However, an **incorrect mirror made** many of Hubble's **images useless**
- **Image processing techniques** were **used to fix** this



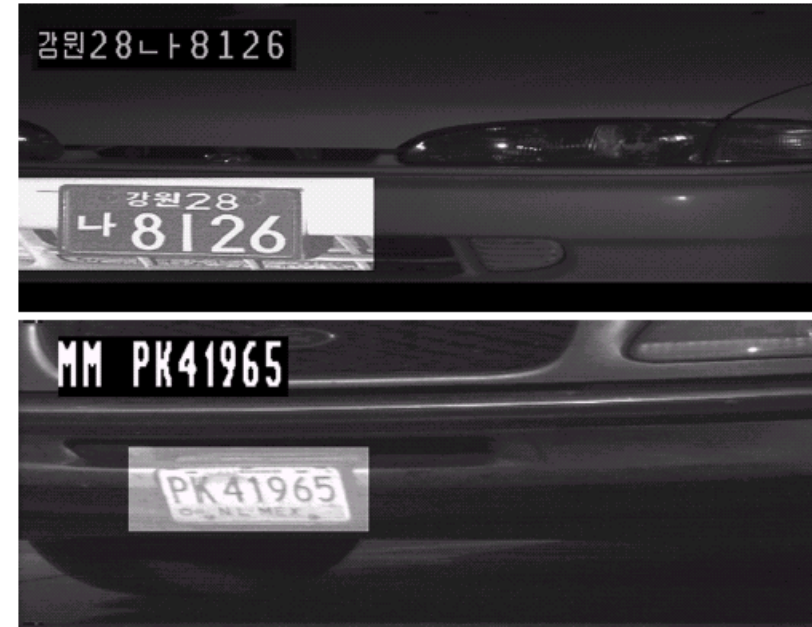
Examples: Industrial Inspection

- Human operators are expensive, slow and unreliable
- Make machines do the job instead
- Industrial vision systems are used in all kinds of industries
- Can we trust them?



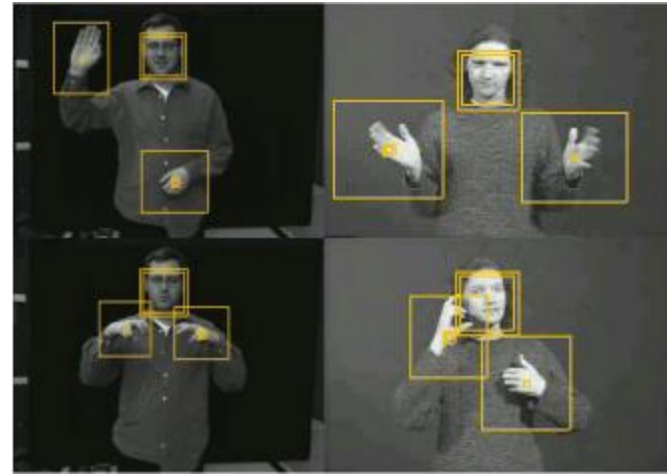
Examples: Law Enforcement

- Image processing techniques are used extensively by **law enforcers**
 - **Number plate recognition** for speed cameras/**automated toll systems**
 - **Fingerprint** recognition
 - **Enhancement of CCTV** images



Examples: HCI

- Try to make **human computer interfaces** more natural
 - **Face** recognition
 - **Gesture** recognition

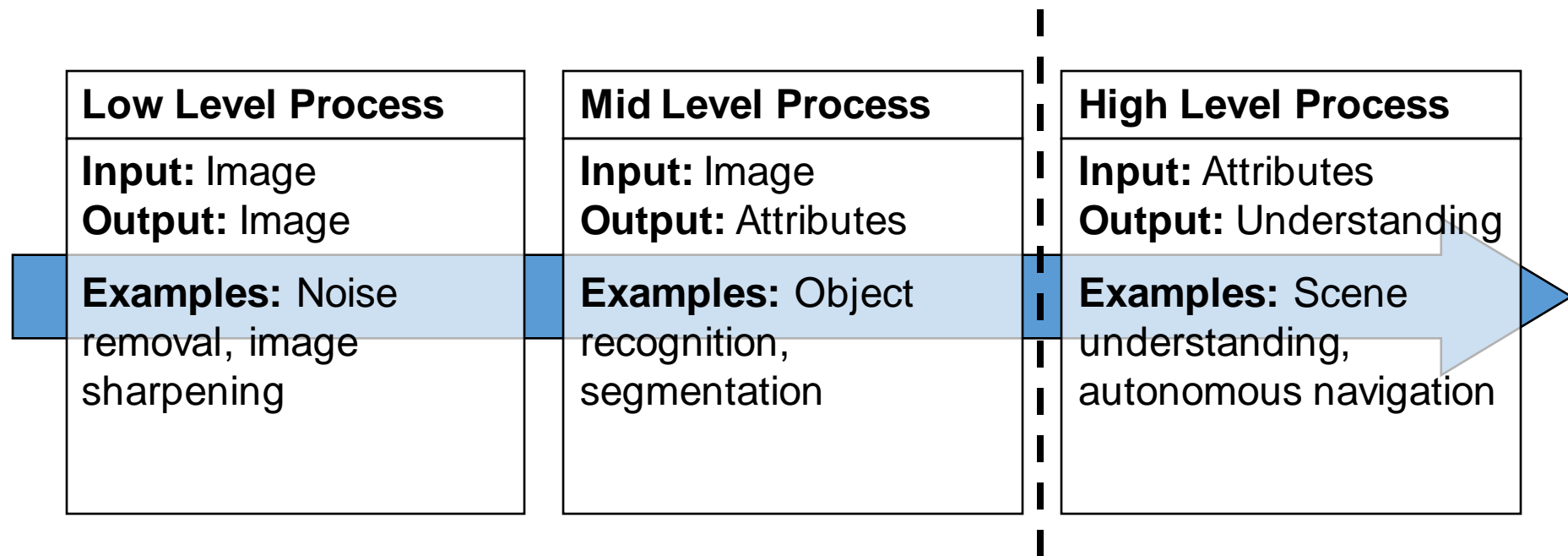


What is Digital Image Processing?

- Digital image processing focuses on **two major tasks**
 - **Improvement** of pictorial information **for human interpretation**
 - **Processing** of image data **for storage, transmission and representation** for **autonomous** machine perception
- Some argument about **where image processing ends** and fields such as **image analysis** and **computer vision** start

What is DIP? (cont...)

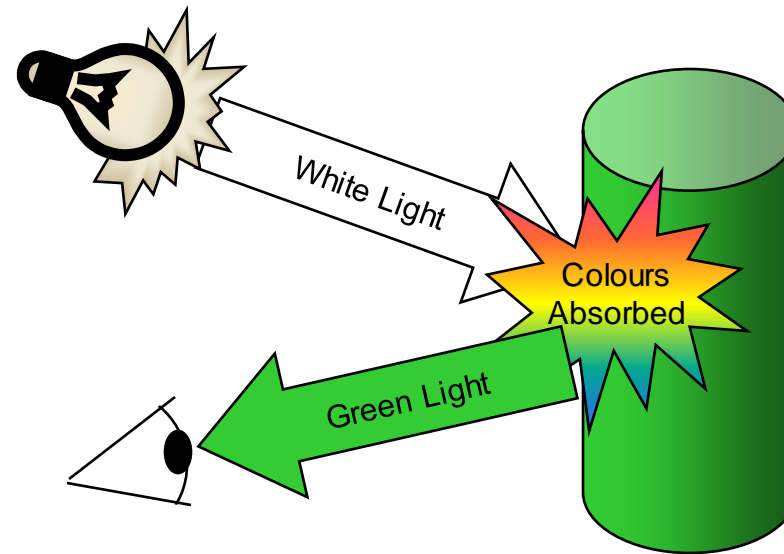
- The continuum from image processing to computer vision can be broken up into **low-, mid- and high-level processes**



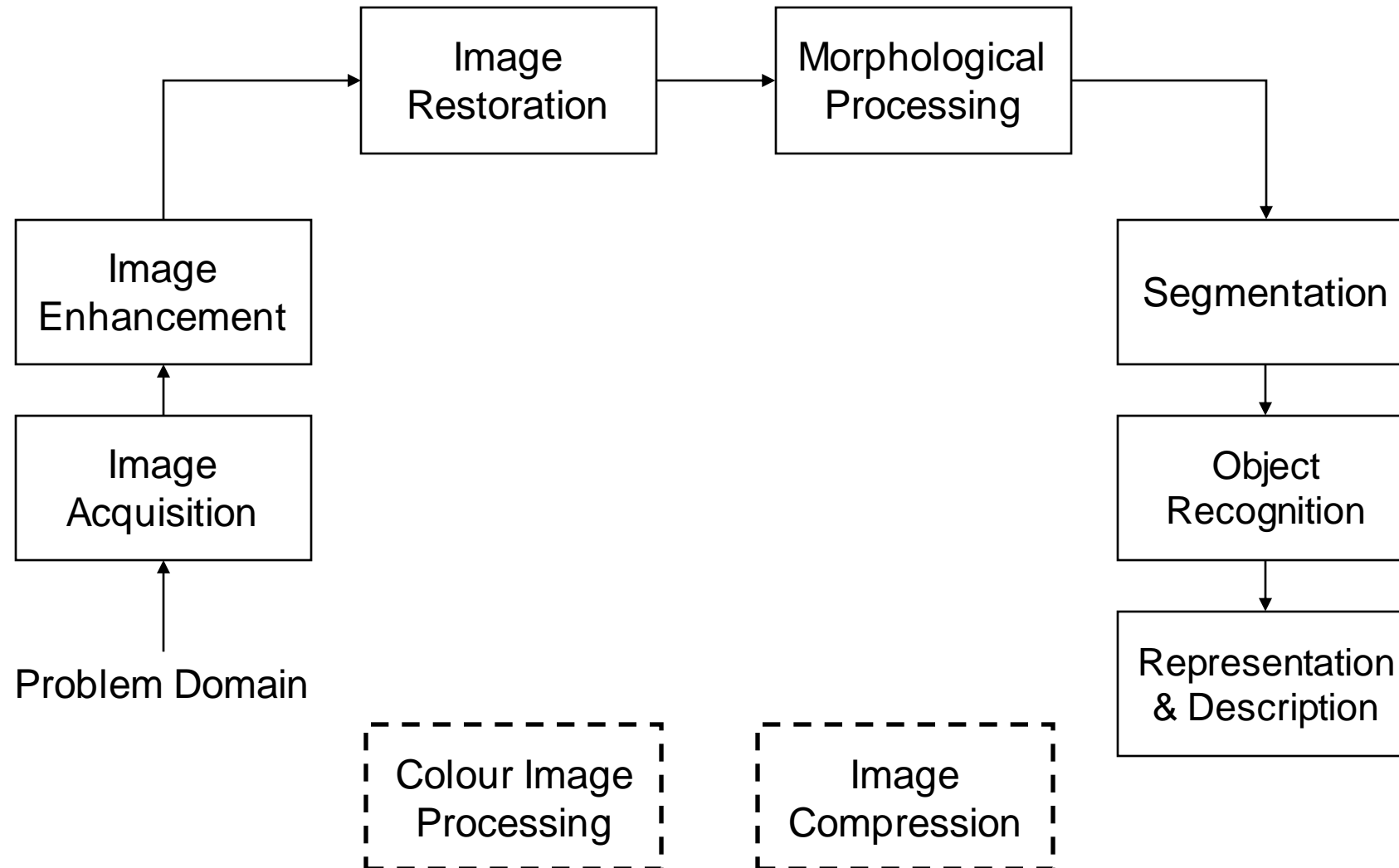
In this course we will
stop here

Reflected Light

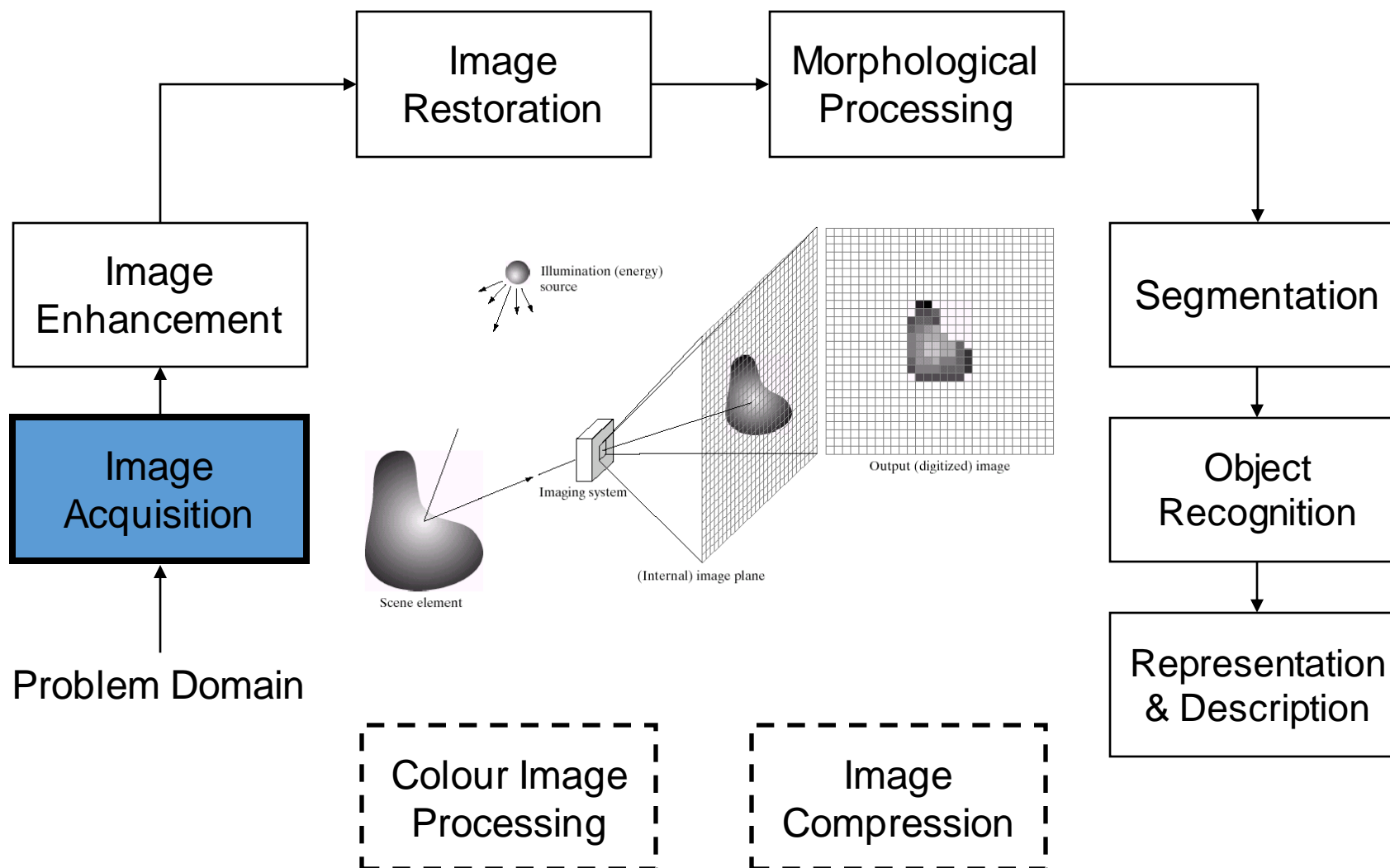
- The **colours** that we perceive are **determined by** the nature of the **light reflected from an object**
- For example, if **white light** is shone **onto a green object** most wavelengths are absorbed, while **green light is reflected** from the object



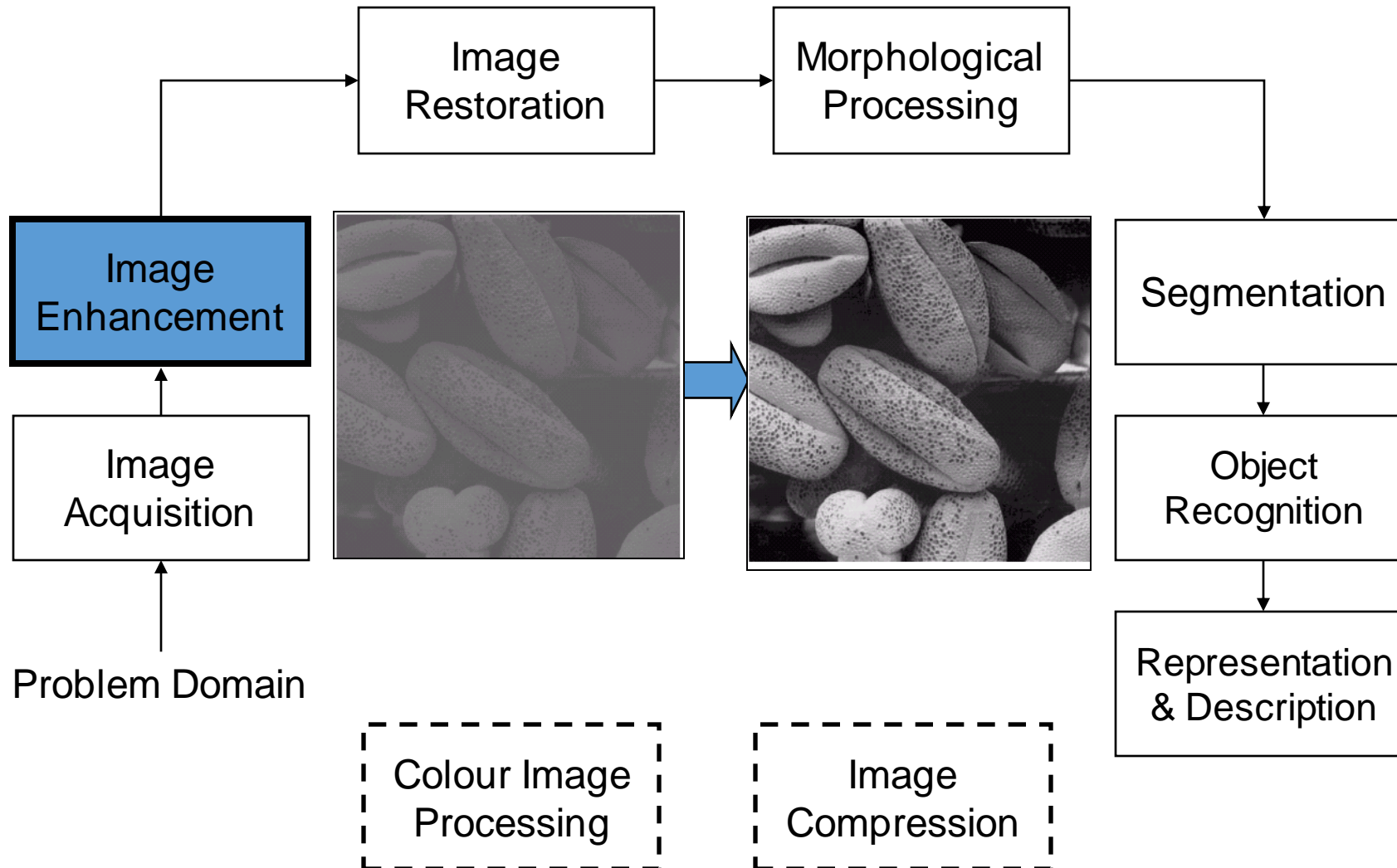
Key Stages in Digital Image Processing



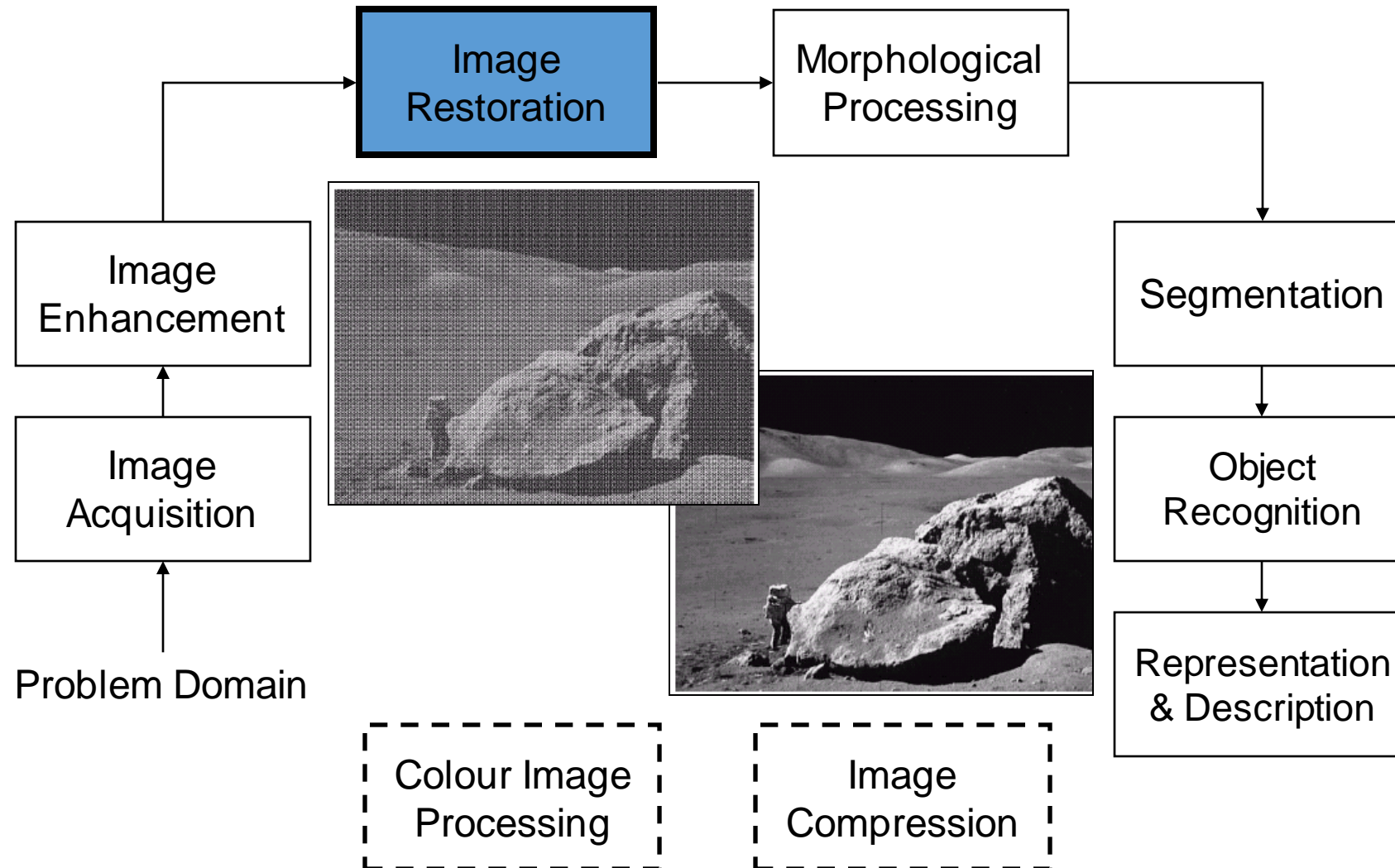
Key Stages in Digital Image Processing: Image Acquisition



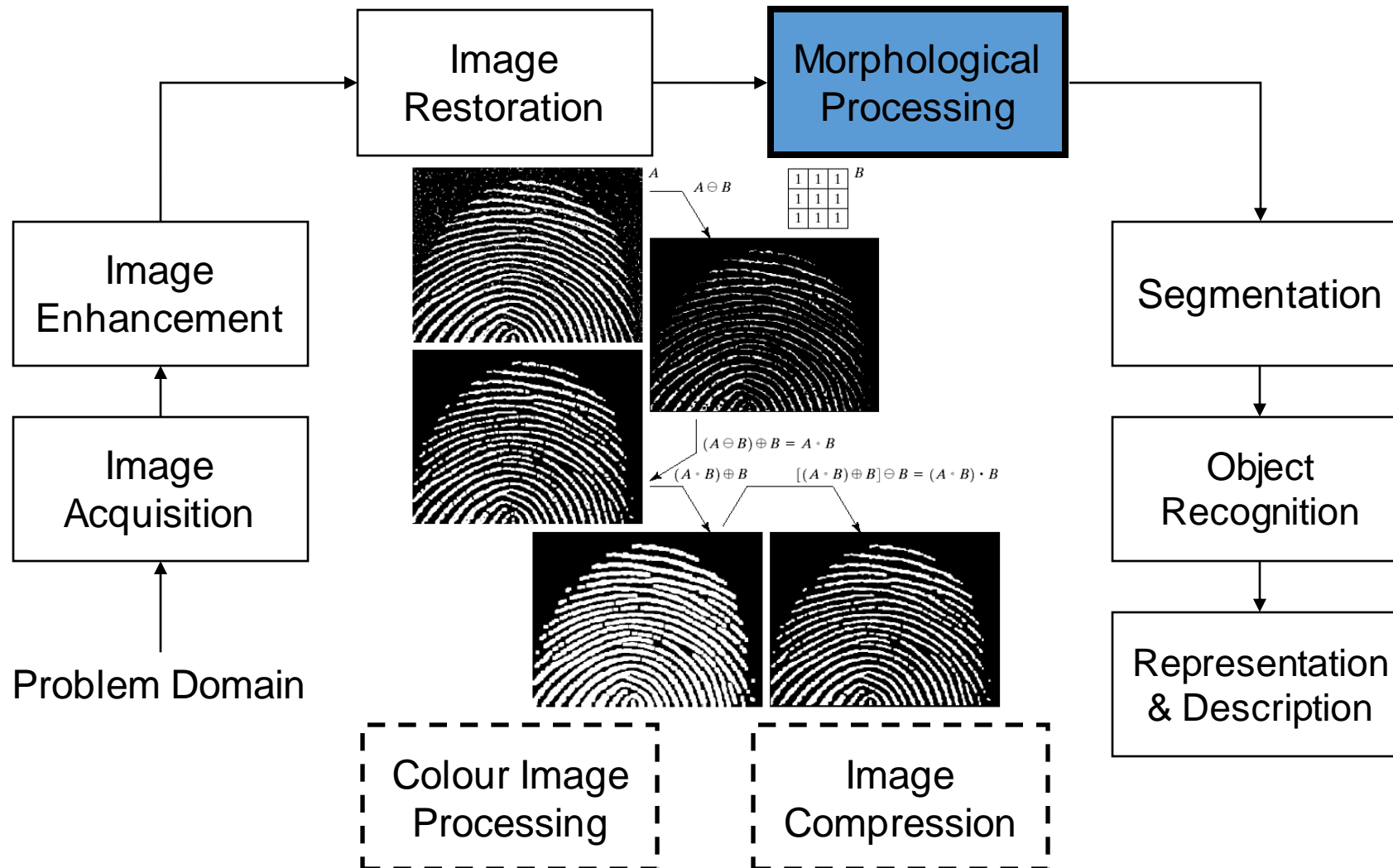
Key Stages in Digital Image Processing: Image Enhancement



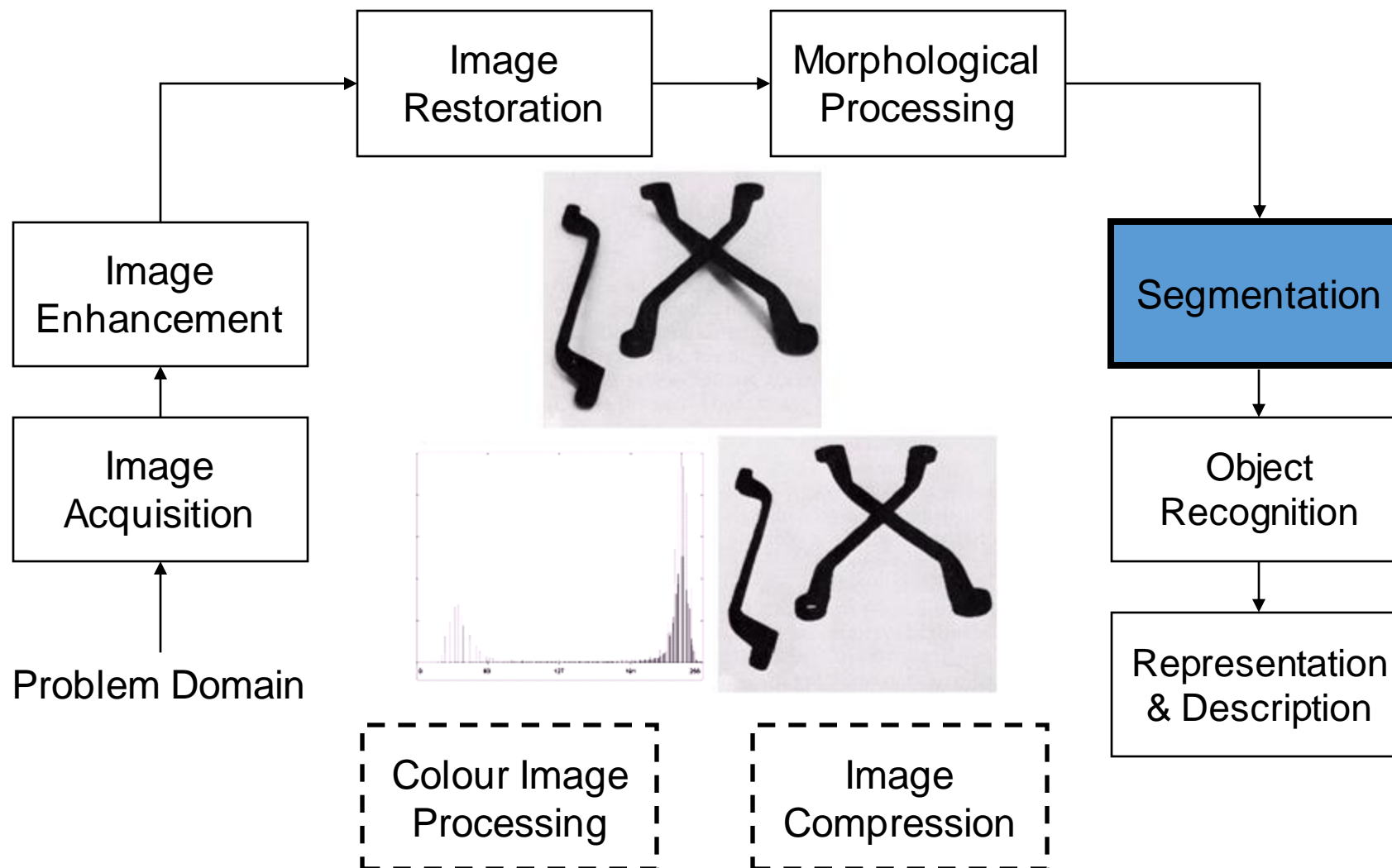
Key Stages in Digital Image Processing: Image Restoration



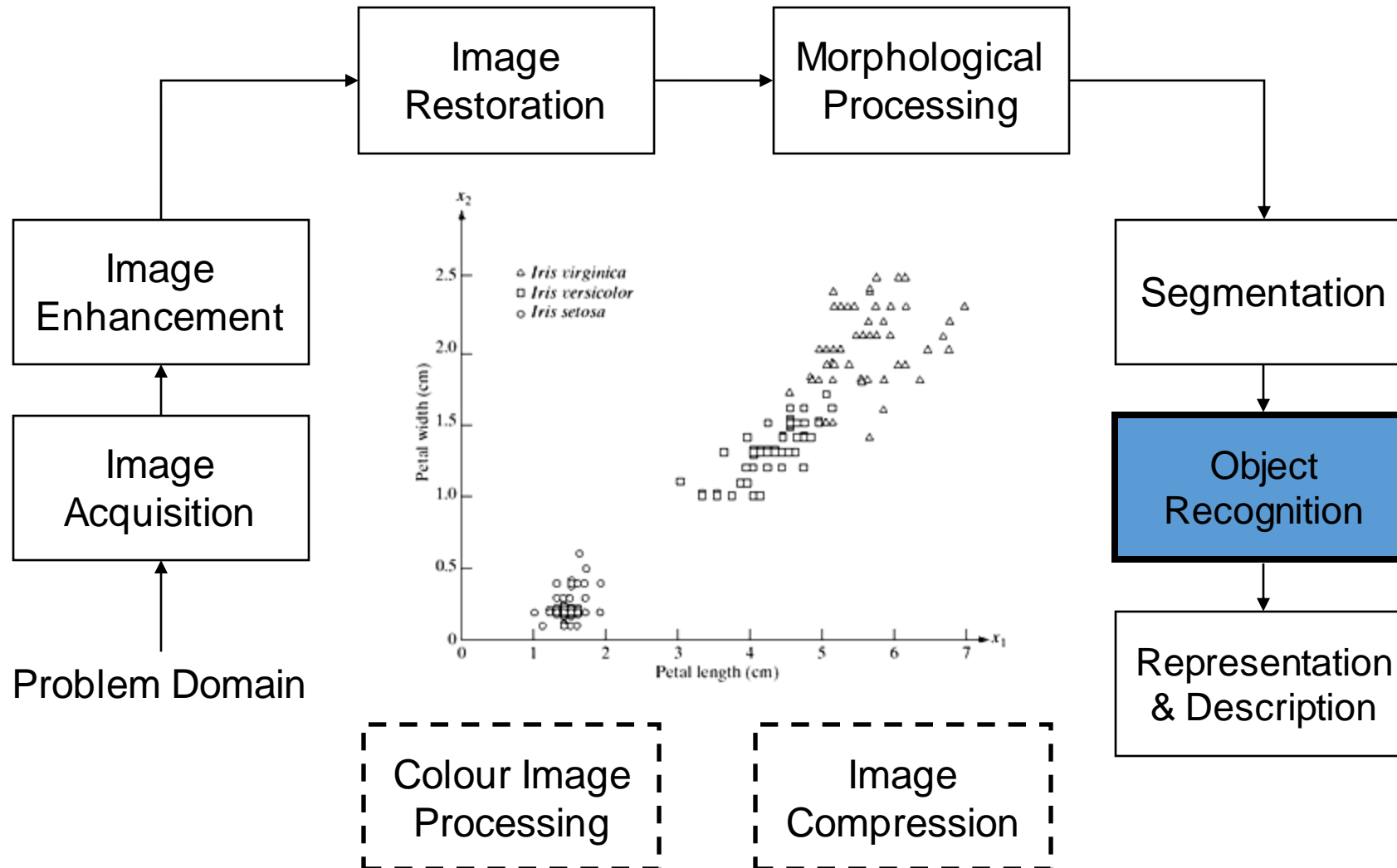
Key Stages in Digital Image Processing: Morphological Processing



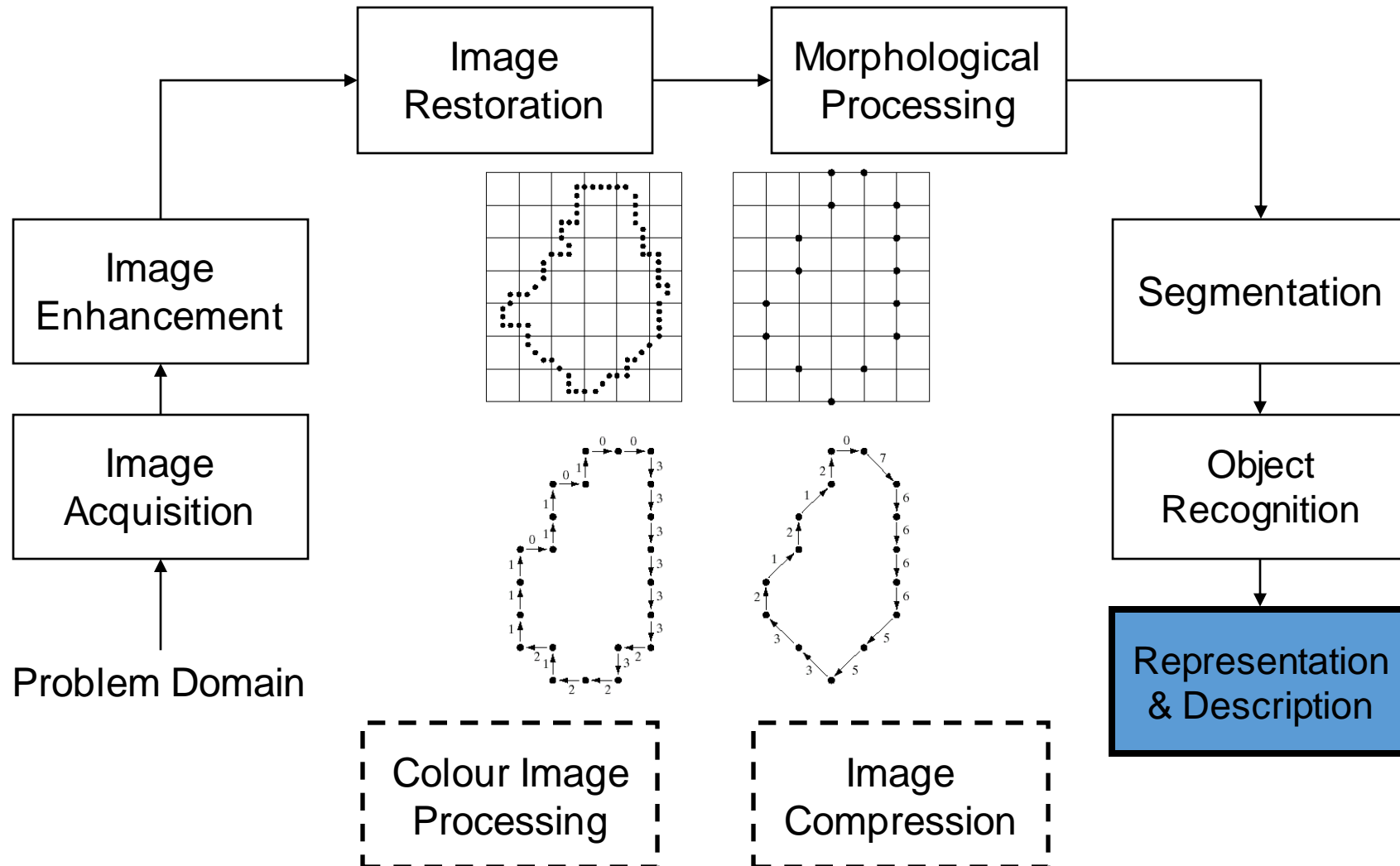
Key Stages in Digital Image Processing: Segmentation



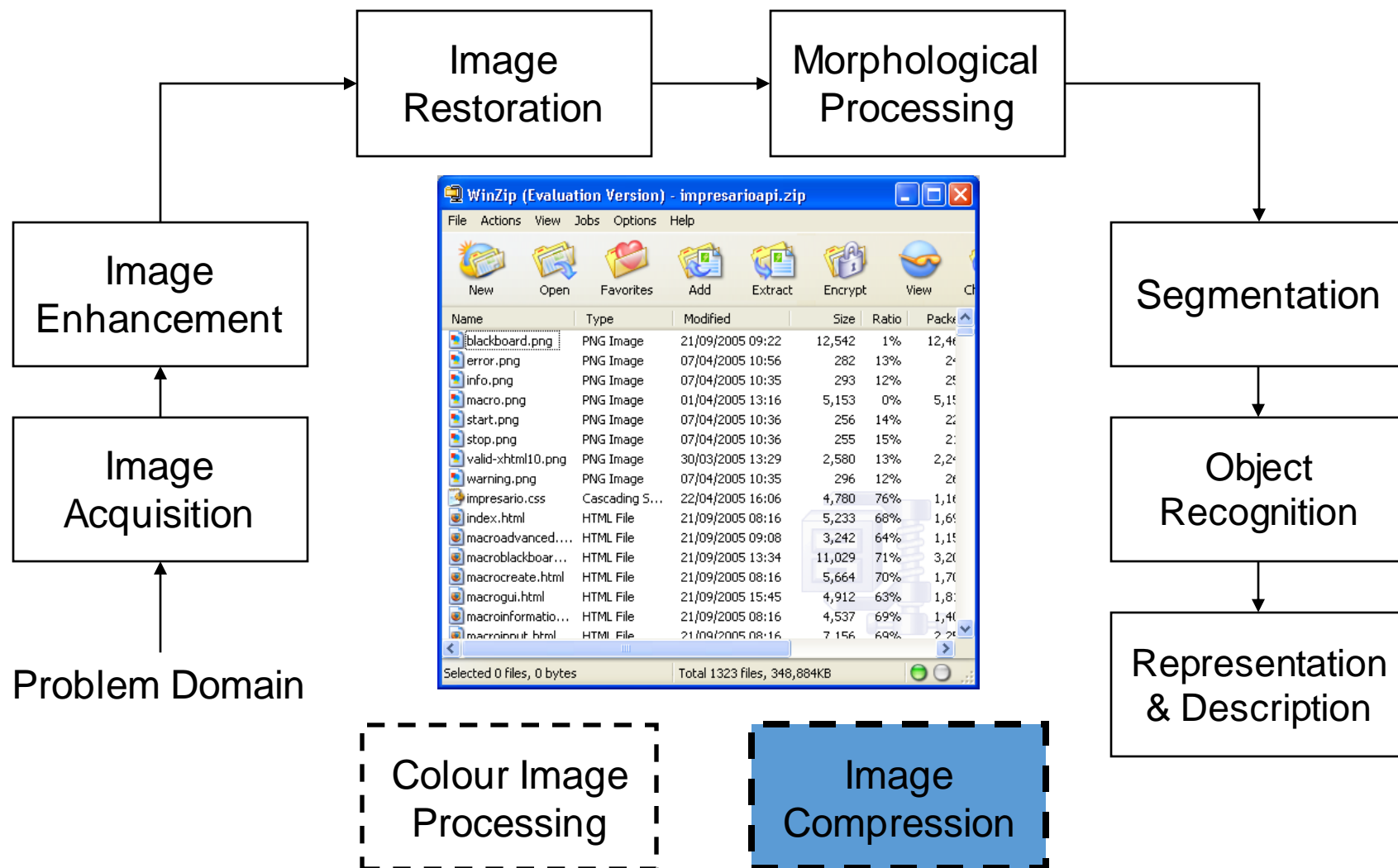
Key Stages in Digital Image Processing: Object Recognition



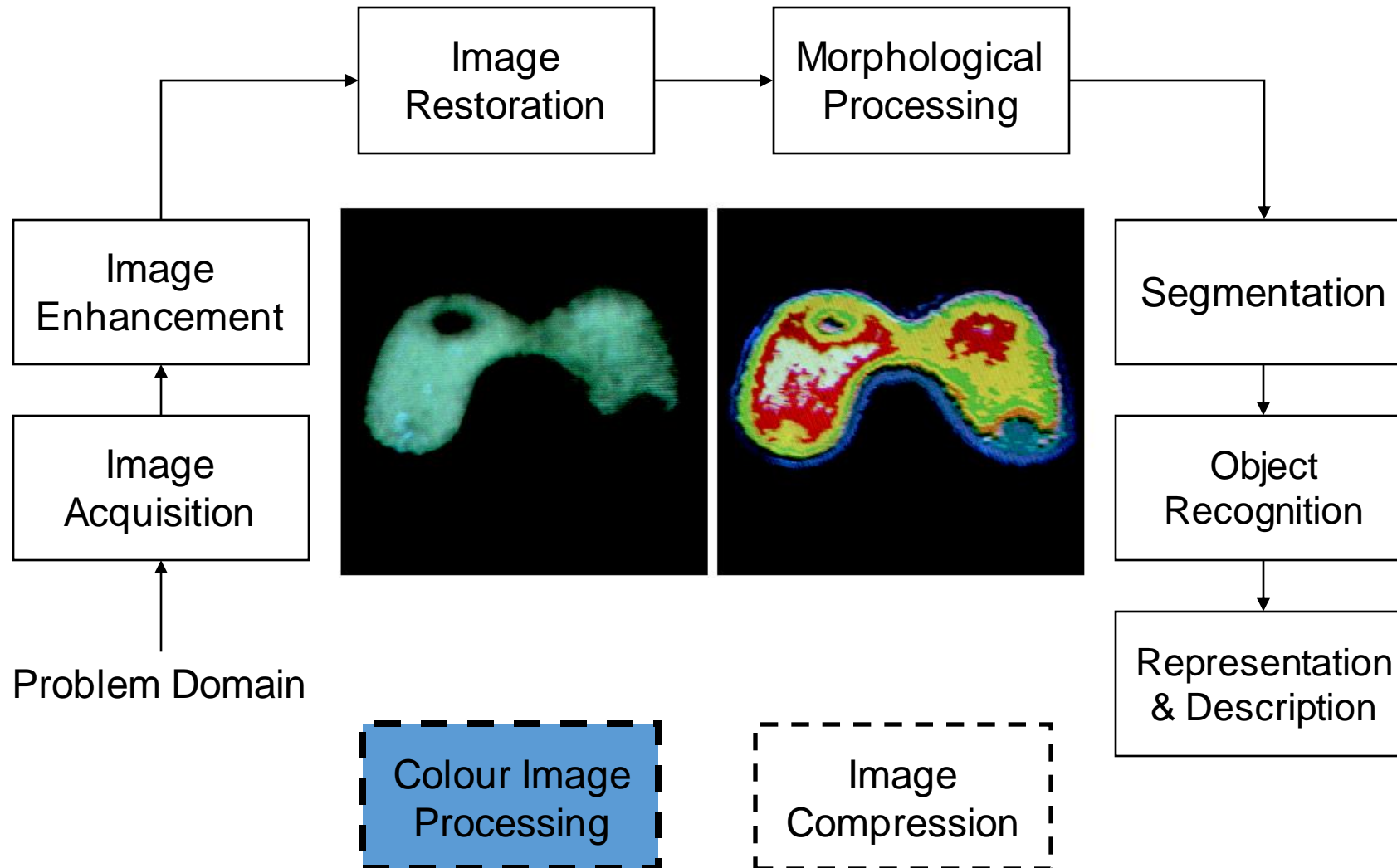
Key Stages in Digital Image Processing: Representation & Description



Key Stages in Digital Image Processing: Image Compression



Key Stages in Digital Image Processing: Colour Image Processing



MATLAB

Imread	قراءه الصوره
imshow	عرض الصوره في نافذه
figure	لفتح نافذه اخره
subplot	imshow لعمل نافذه وتعرض اكثر من صوره مع
imwrite	لحفظ الصوره في الكمبيوتر
:	اكثرها شيوعا (الى) او (كل)
%	لكتابت التعليقات او الشروحات في البرنامج حيث ما كتب بعد % لا ينفذ
size	لايجاد ابعاد المصفوفه
.	في ضرب او قسمه المصفوفات بكسل في بكسل
Imcomplement	معكوس الصوره
bwareaopen	To remove a small objects from image