



浙江大学计算机学院
数字媒体与网络技术

Digital Asset Management

数字媒体资源管理

4. Digital Rights Management

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Digital Rights Management revisit

- DRM and film: DVD CSS
- DRM and music
 - audio CD: from sony BMG
 - internet music: iTunes store
- E-books: Adobe Acrobat and M\$ Reader

Protecting Digital Intellectual Property

- Preventing Copying With Encryption
 - 加密
- Preventing Copying With Watermarking
 - 水印

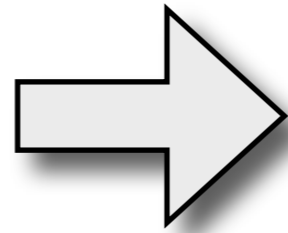
Encryption

- RSA
- DES
- MD5

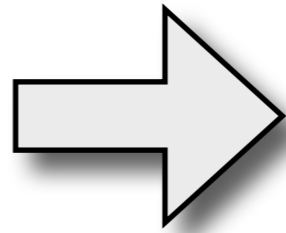
Stenography



Stenography

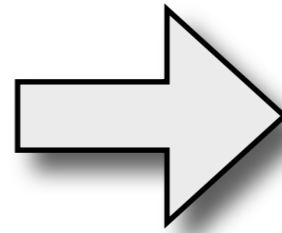


Stenography



1. removing all but the last 2 bits of each color component
2. X 85

Stenography



1. removing all but the last 2 bits of each color component
2. X 85

Digital Watermark

- Invisible ink on multimedia data
 - image
 - video
 - music
 - graphics

Digital Watermark

- Image

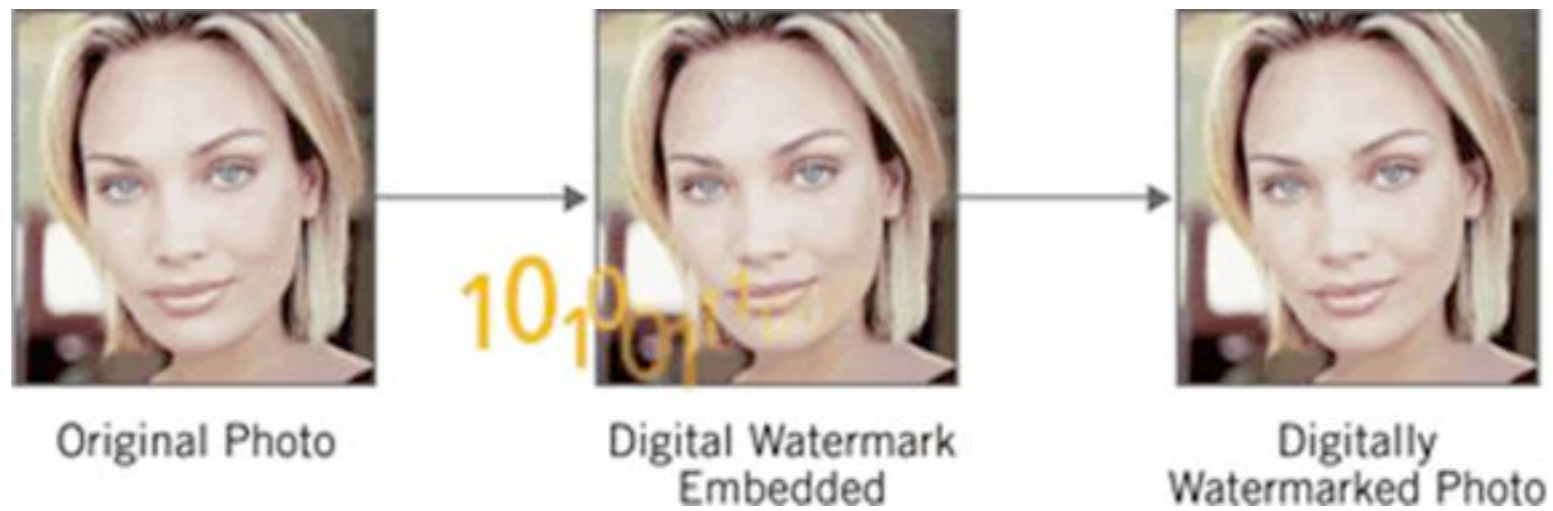
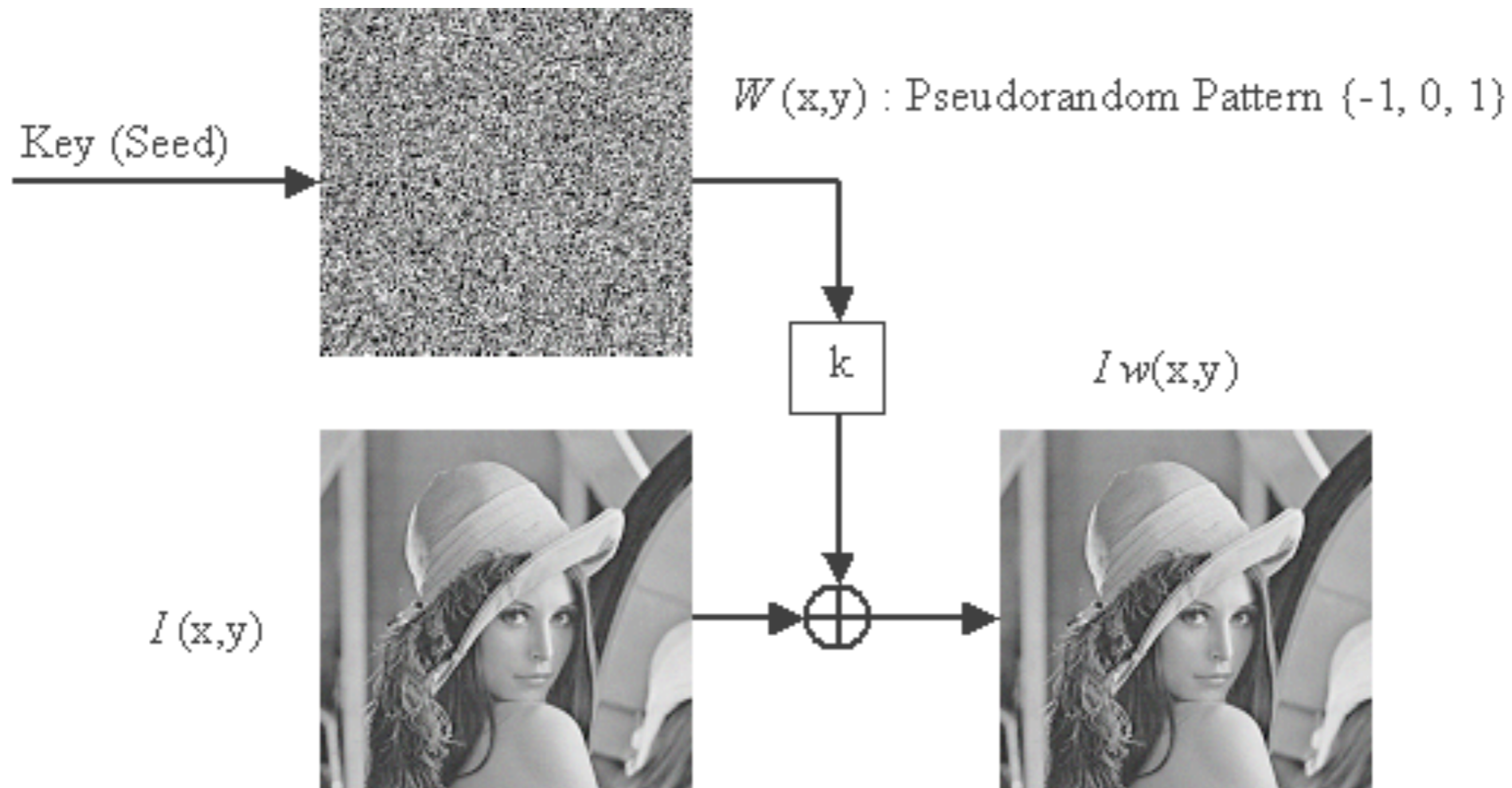


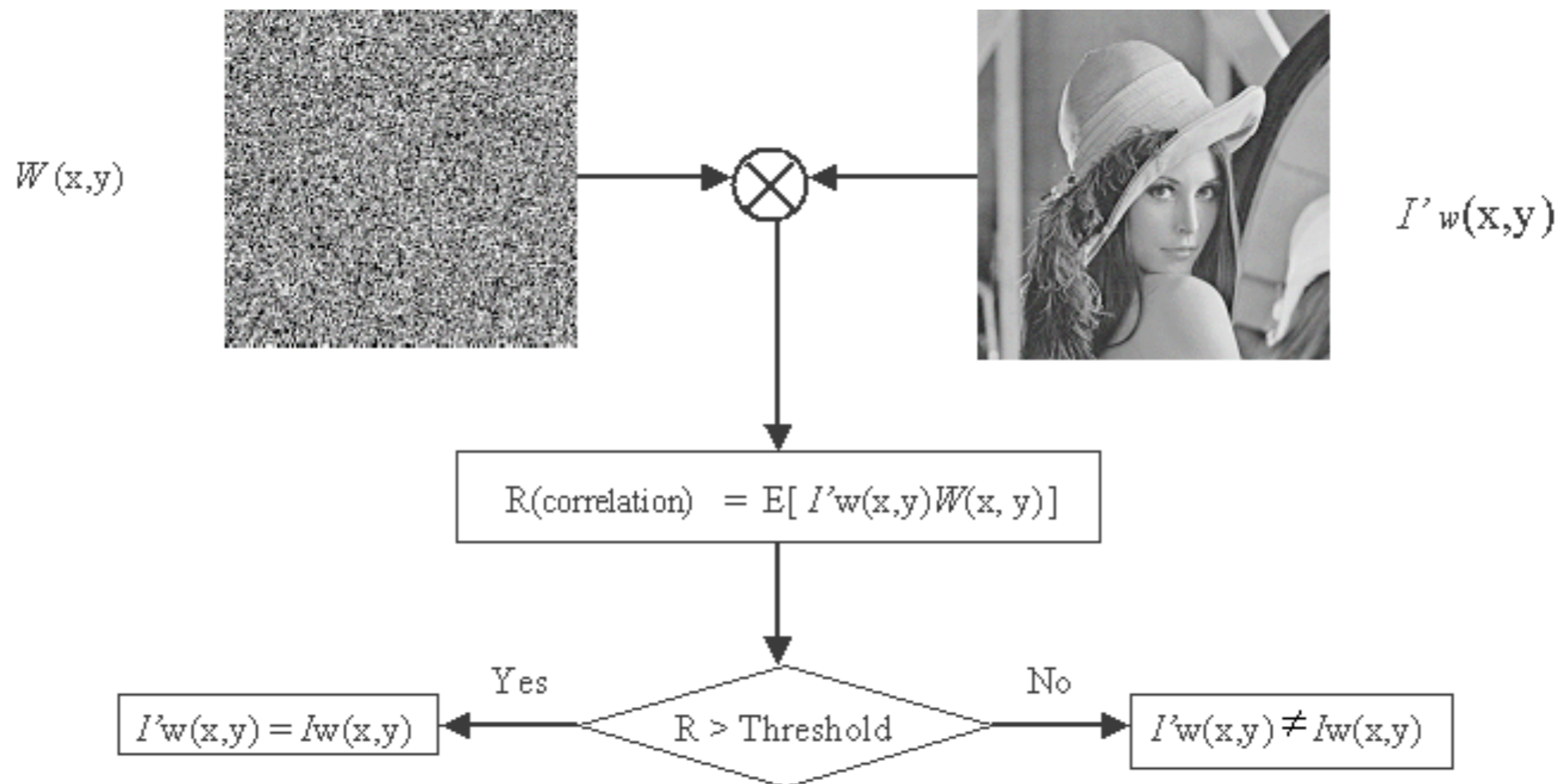
Image watermarking



$$I_w(x,y) = I(x,y) + k*W(x,y)$$

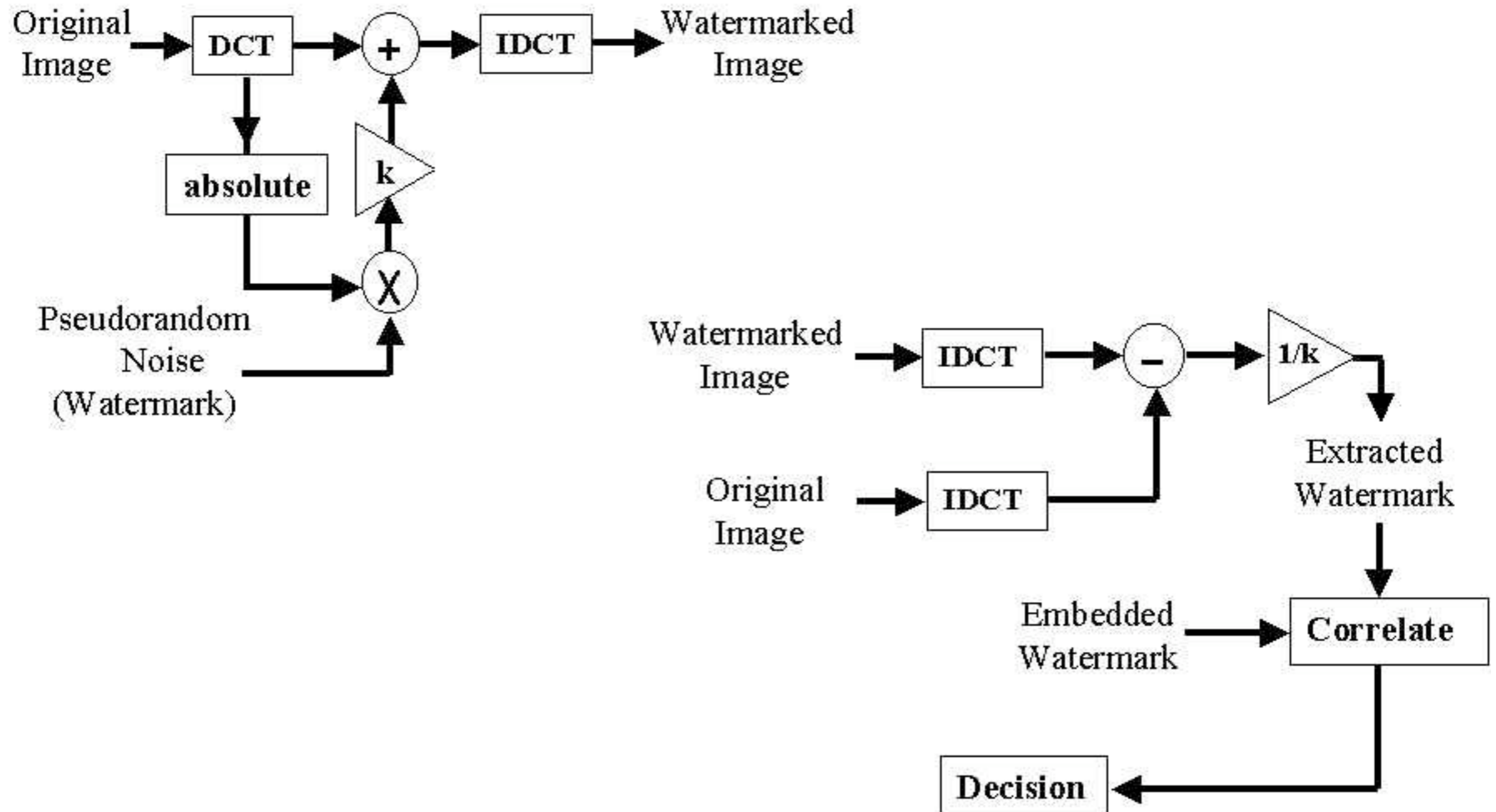
embedding

Image watermarking



detecting

DCT based algorithm



Digital Watermark

- Music: mp3stego

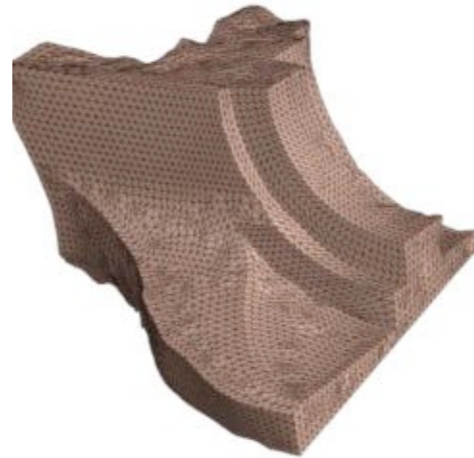
[http://www.petitcolas.net/fabien/
steganography/mp3stego/index.html](http://www.petitcolas.net/fabien/steganography/mp3stego/index.html)

a simple demo

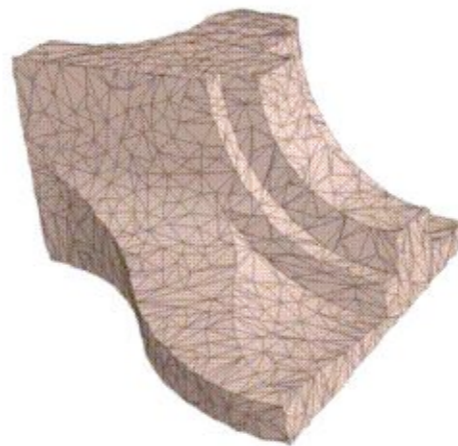
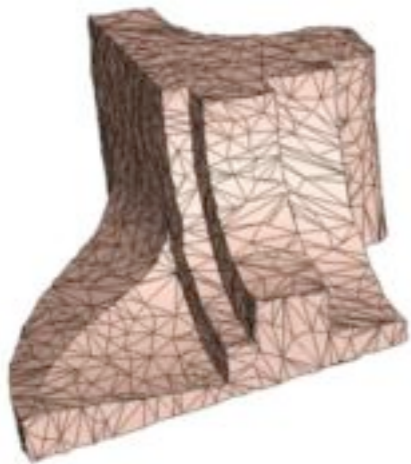
Digital Watermark

- Graphics:

Alice

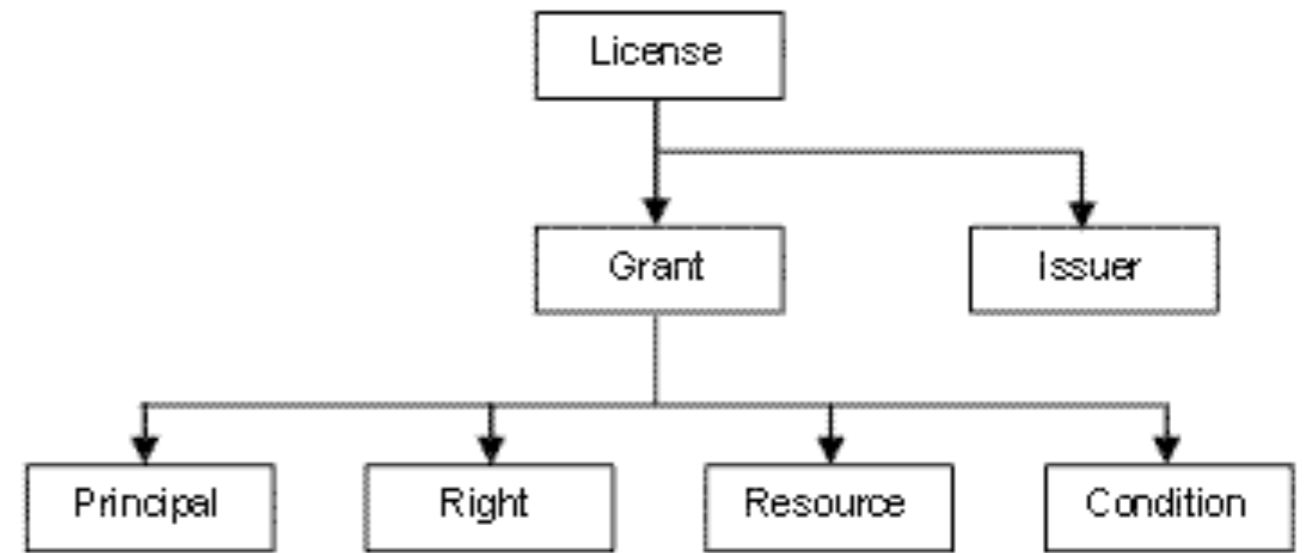


Bob



Metadata for DRM

- MPEG-21: REL
- A Digital Item
 - is a structured digital object with a standard representation, identification and metadata
- User
 - is any entity that interacts in the MPEG-21 environment or makes use of Digital Items



DRM technologies and associated devices

Name	Used in	Date to use	Description
Fairplay	iPod and iTune	2003+	The purchased music files are encoded as AAC, then encrypted with an additional format that renders the file exclusively compatible with iTunes and the iPod
3-play	Microsoft Zune	2006+	Music files that are received wirelessly from other Zune devices can be played only a maximum of three times on the device.
Janus WMA DRM	All PlaysForSure Devices	2004+	Janus is the codename for portable version of Windows Media DRM for portable devices.
OMA DRM	Implemented in over 550 phone models.	2004+	A DRM system invented by the Open Mobile Alliance to control copying of cell phone ring tones

DRM opposition



DRM opposition



digital rights management
= digital restrictions management ?

DRM opposition



**DRM IS
KILLING MUSIC**



AND IT'S A RIP OFF!

digital rights management
= digital restrictions management ?

DRM-free



- Apple began selling "DRM-Free" music through their iTunes store in April of 2007
- the DRM-Free iTunes files were still embedded with each user's account information