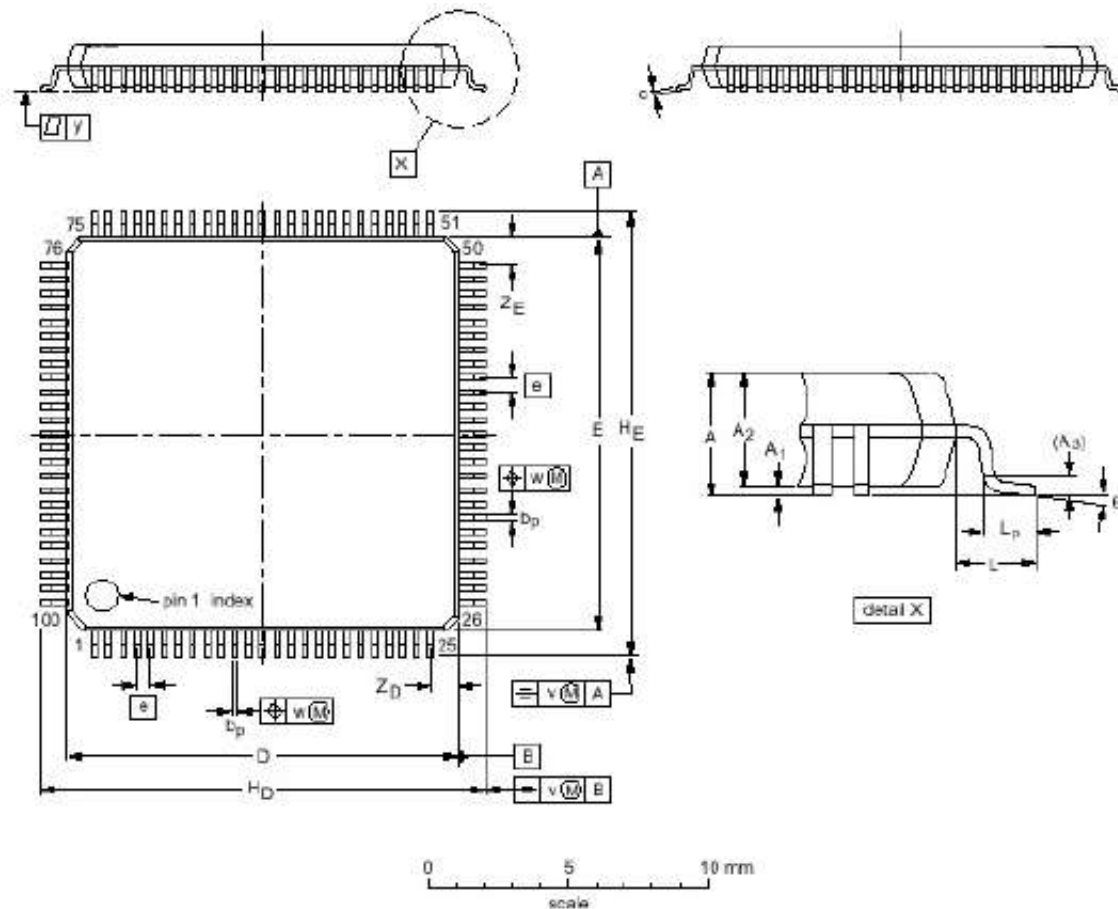
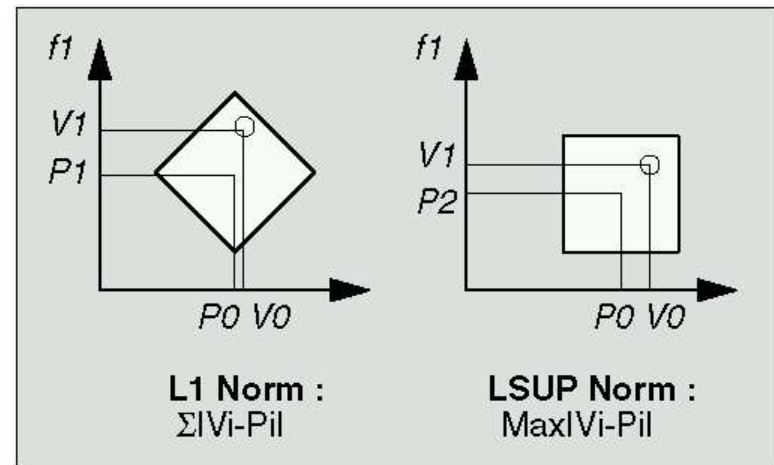
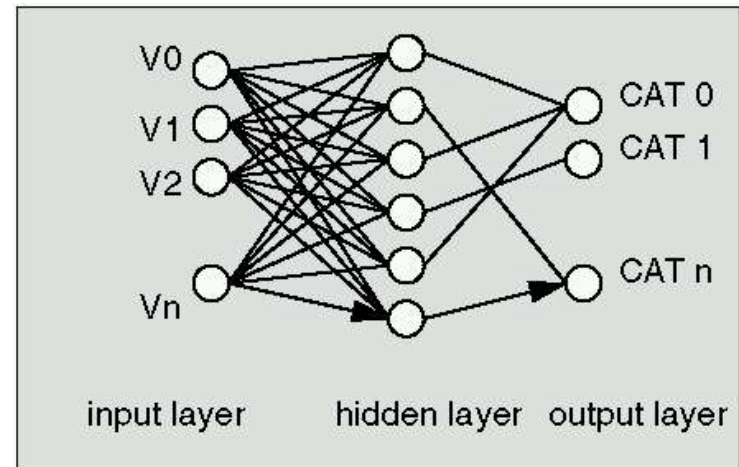
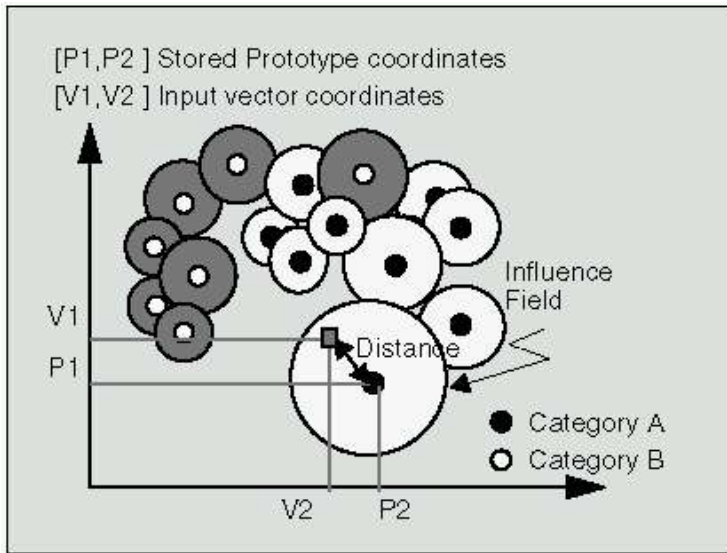


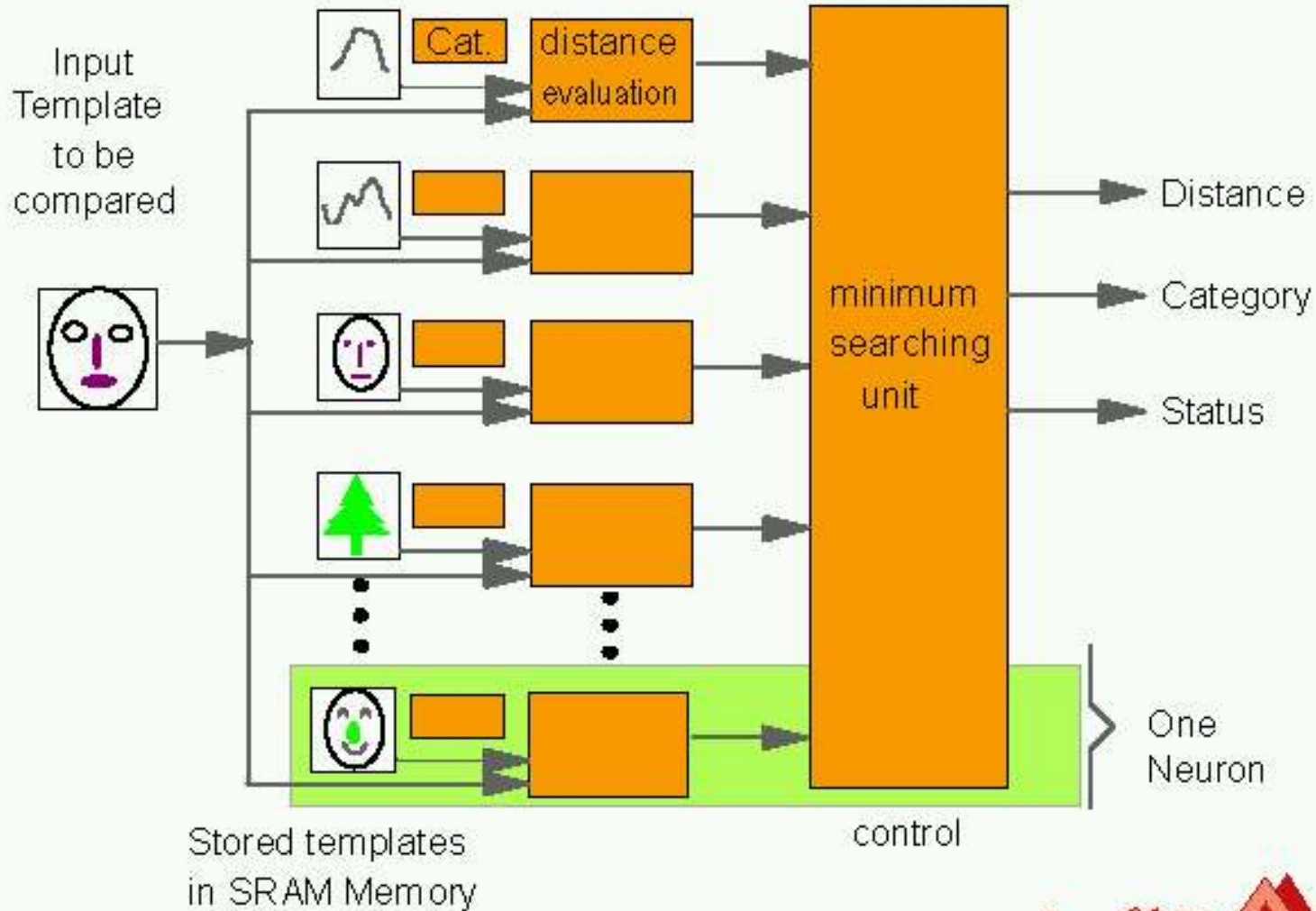
ZISC: Zero Instruction Set Computer chip



Implementación RBF-Like en ZISC



ZISC : Principle of operation



ZISC Hardware & Software

● Hardware

- ZISC 036 modules
- ISA Card : 12.5 K Recognition/Sec.
 - 8 ZISC = 288 Neurons
 - 16 ZISC = 576 Neurons
- PCI Card : 110 K Recognition/Sec.
 - 1 ZISC = 36 Neurons
 - 19 ZISC = 684 Neurons
- SIZMS
 - 6 ZISC = 216 Neurons



● Software

- DOS/Windows/ NT
- ZISC API in C_Code
- ZISC Editor 1.0
- Development tool kit ZISC Assitant

EZB 624 PCI of EOS

- **Hardware:**
 - PCI Card: 200K recognition/sec
 - 8 ZISC 78 = 624 neurons; upgradable up to 2964
 - Xilinx Virtex FPGA with 50,000 gates
- **Software:**
 - EZB SDK in Win32 DLL
C/C++ & VB



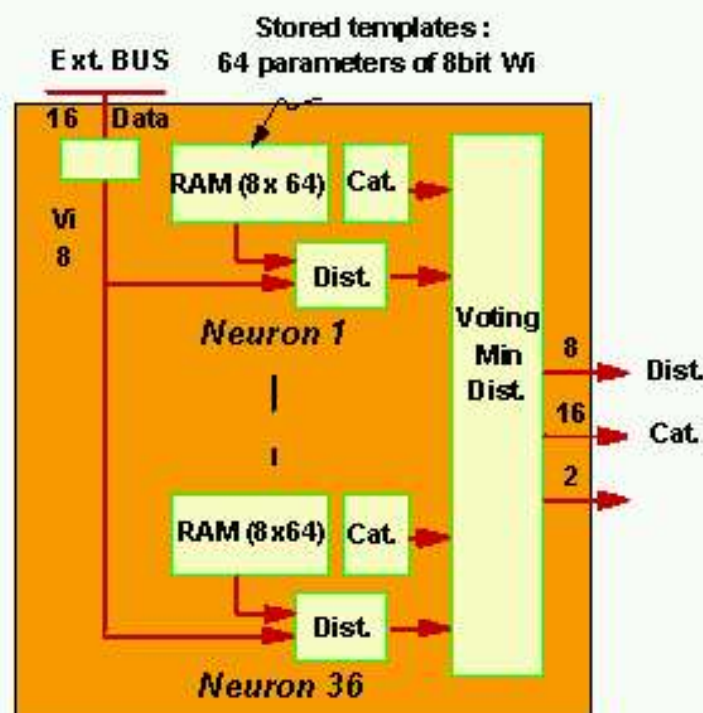
ZISC (Zero Instruction Set Computer)

A fast parallel pattern matching
Engine with Built-in learning
2,000 MIPS @ 25 MHz

ZISC036 main features

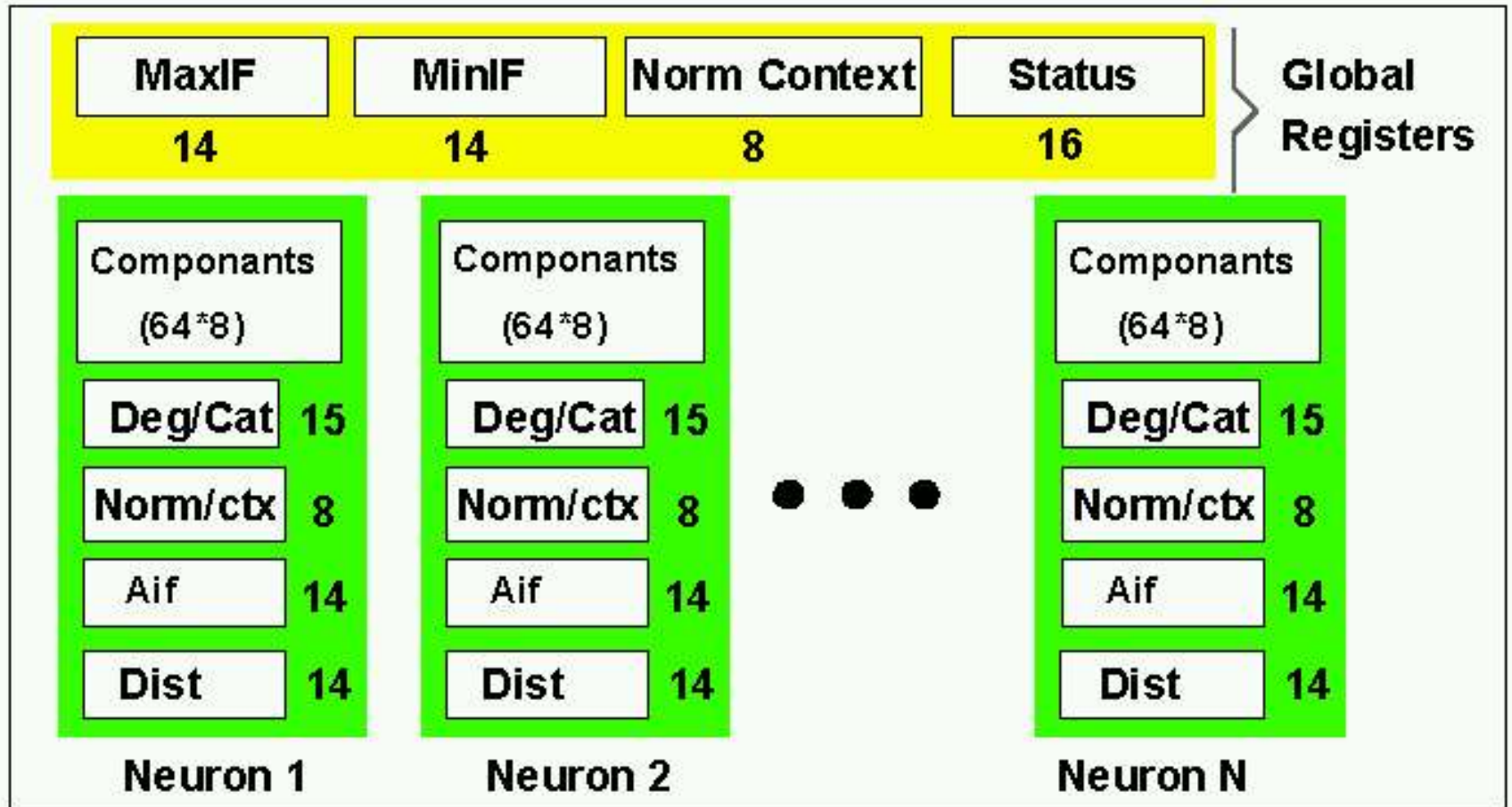
- 36 Neurons
- 250 000 Recog./s
- 1 to 64 Vector components (8 bits) templates
- Categories/distances (14 bits)
 - Norm L1 or LSup
 - mode ROI or KNN
- subnetwork & Network extendability

CMOS 1 um
800 mW @5 V
11.3 mm²
PQFP 144 pins



Cat : Category
Dist: Distance Evaluation
(1) Compare distance
(2) $Dist = \sum |Vi - Wi|$

Architecture



List of API functions

**global

*Z_Init
Z_SelectNetwork
*Z_Clear
Z_GetMaxNeurons
Z_SetMode
Z_SetContext
Z_SetNorm
Z_SetContextRegister
Z_SetMaxif
Z_SetMinif
Z_GetMode
Z_GetContext
Z_GetNorm
Z_GetMaxif
Z_GetMinif

**learn and recognize

Z_PutComponent
Z_PutLastComponent
*Z_PutVector

*Z_PutCat
Z_Leam

Z_GetStatusRegister
*Z_GetDist
*Z_GetCat
Z_GetDeg
Z_Identify

**Saving and restoring

*Z_SaveZiscInFile
*Z_LoadZiscFromFile
Z_GetNAif
Z_GetNNorm
Z_GetNContext
Z_GetNContextRegister
Z_GetNPrototype
Z_PutNComponent
Z_PutNLastComponent
Z_GetNCatRegister
Z_PutNAif
Z_PutNCatRegister
Z_PutNPrototype
Z_GetNComponent
Z_GetNLastComponent

ZISC Applications examples

Visual recognition

OCR (licence plates)

Faces

Counting

Sound recognition

Word recognition

Locutor identification

Data mining

Image processing

compression

edge detection

noise suppression

Signal processing

Doppler

sound analysis (material)

Industrial control

alignement

defect detection (cracking, fails,)

focus control

tracking objects

Control and command

PID

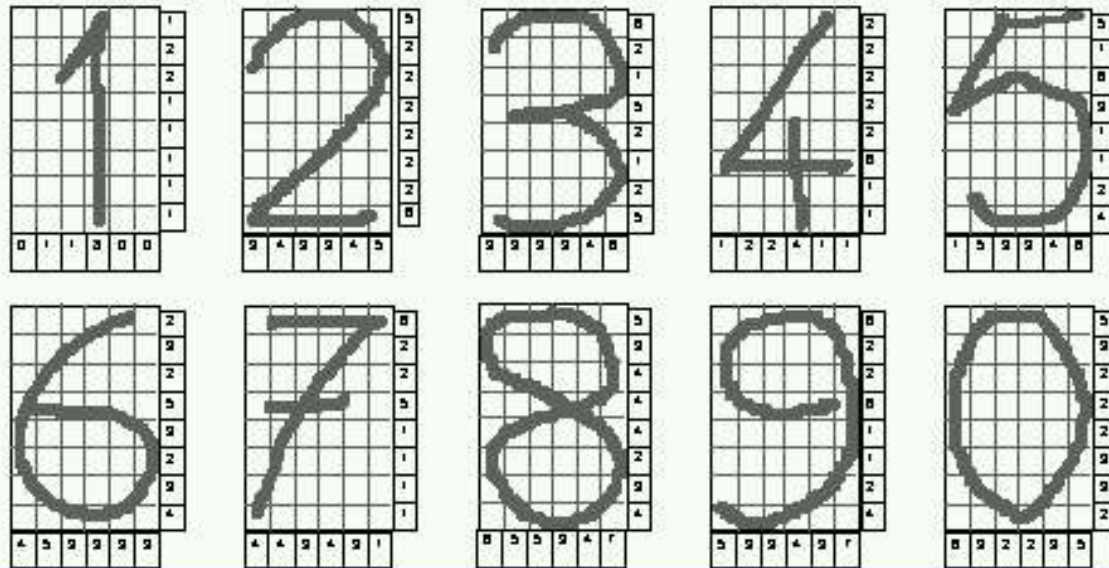
predictive maintenance

process monitoring

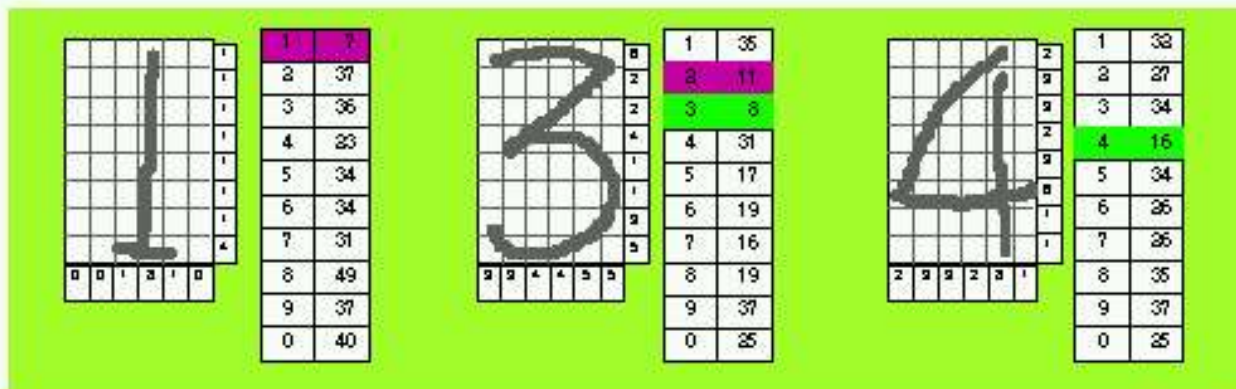
Modélisation

Yield monitoring & prediction

ZISC Application example (OCR)



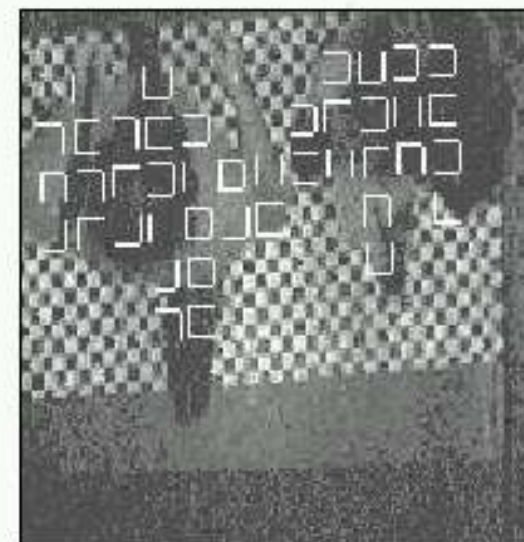
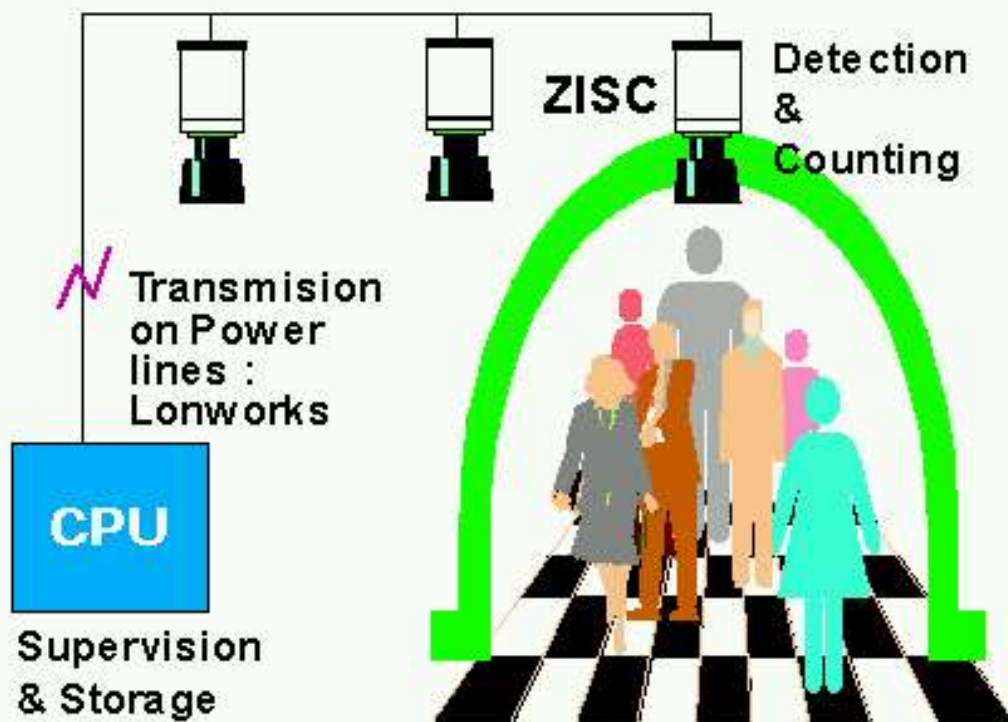
Elementary learning set



Recognition examples

People Counting in mass transportation

- Error rate below 0.05%



Top View from camera

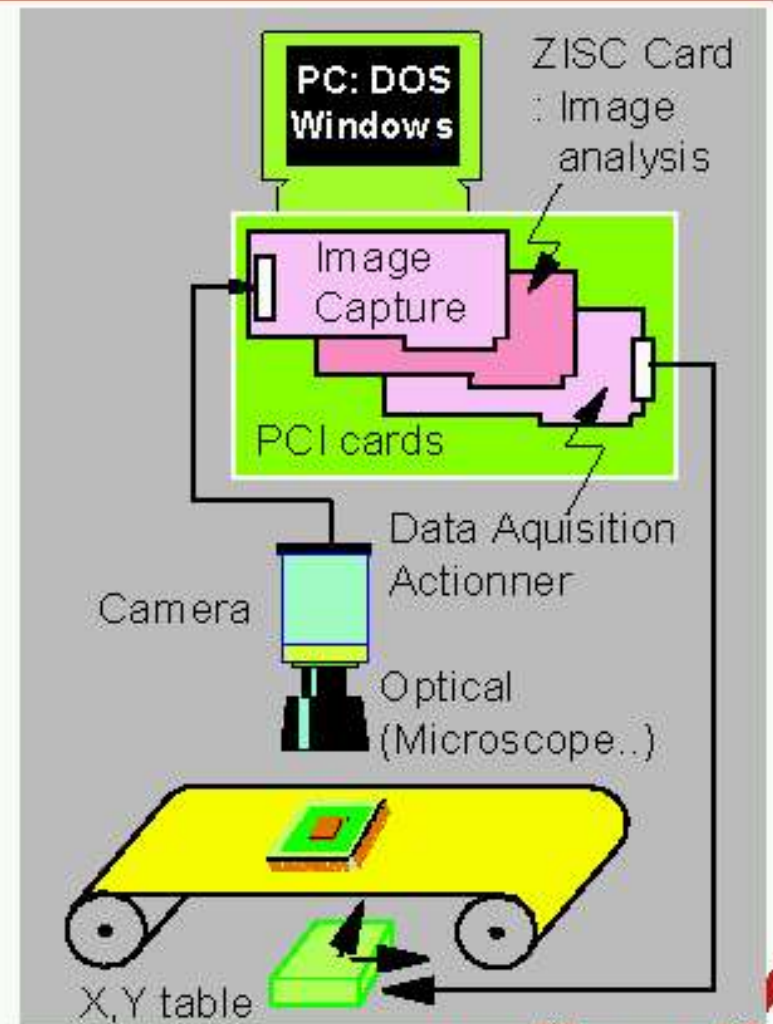
ZISC Real Time Vision Control Platform

- **Operations performed by the ZISC**

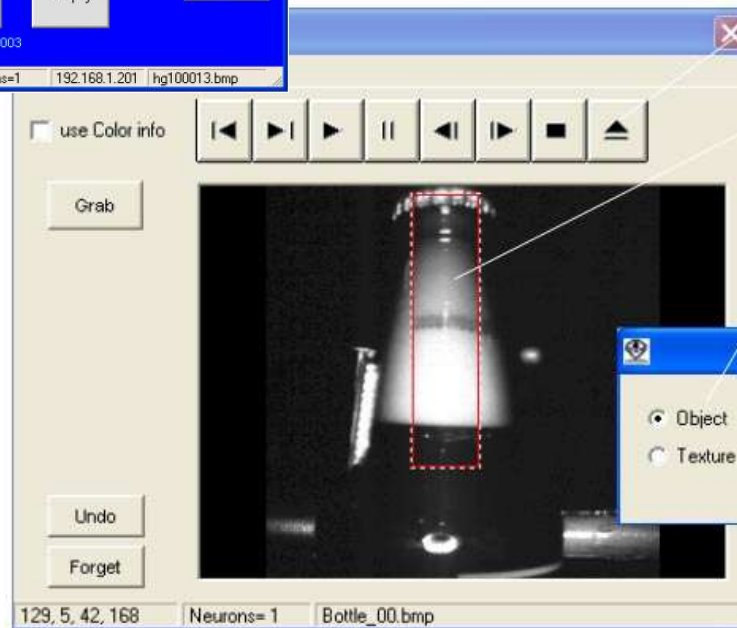
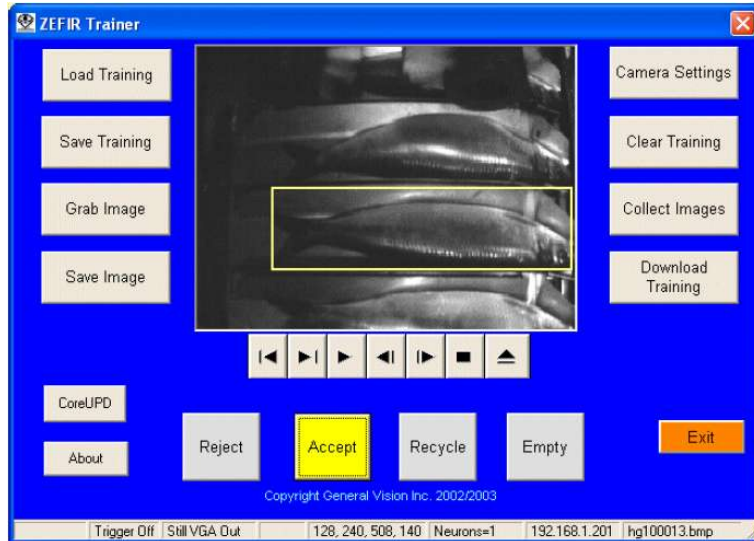
- Image centering
- Real Time recognition
- Classification

- **Applications**

- Industry :
 - *Quality inspection*
 - *defect detection*
- Medical :
 - *Cell analysis*
- Robot with intelligent vision



CogniSight ActiveX: SDK para el reconocimiento de imágenes



1) Navigate through folders of collected images

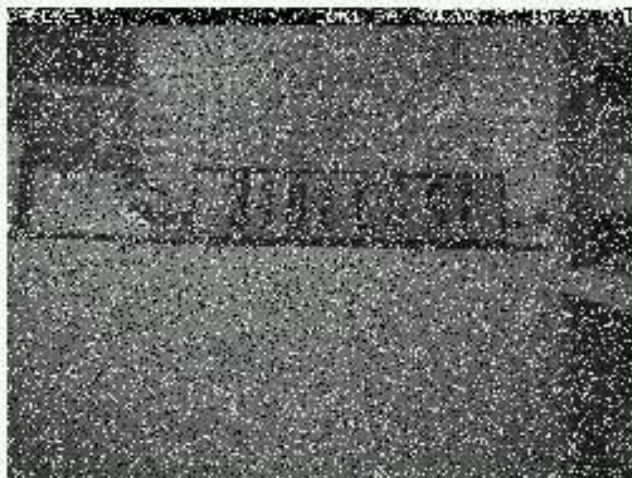
2) Move and resize the region of interest

3) Select Object or Texture



4) Teach the category of the region

Noise Filtering: Automobile's plates recognition



**Enhanced
image**

Data Mining

- ZISC parallel architecture enhances performance of data mining
 - Multiple simultaneous comparisons
 - Allows Incomplete word matching
- Combined with conventional method:
 - x10 better

