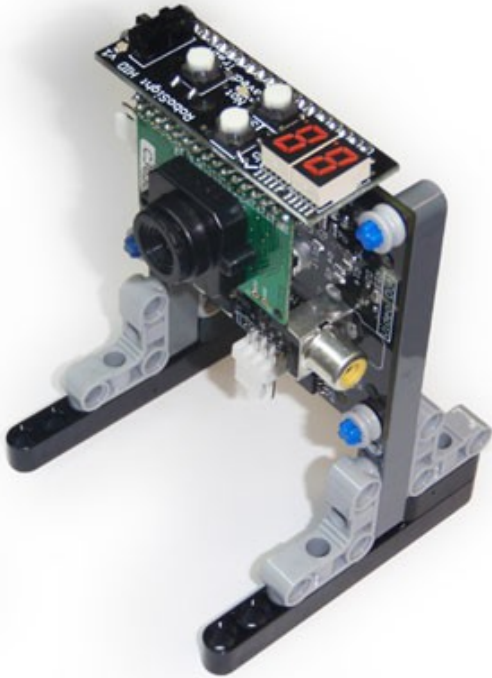# RoboSight

RoadNarrows Intelligent Systems

RNiS

An Affordable Pattern Recognition Vision System for Robotics

RoboSight by RNIS offers an affordable, but powerful vision recognition system, ideal for robotic platforms and small embedded applications. Powered by the CogniMem CM-1K neural network chip by Recognetics, complex visual objects are readily detected and categorized from patterns previously trained by the user or the embedding system. The recognized visual categories can then be fed to the higher-level functions of the controlling system to guide goal decisions, object localization, platform movement and navigation, and environment manipulation.

No Programming Required
Rather than require custom programming for each specific visual application, a simple train, then run cycle is all that is needed. Training can be accomplished either by the user using the attached RoboSight Human Interface Device, or through the serial interface connected to either a PC or the embedding system.

Key Features

- Powerful embedded CogniMem CM-1K neural network chip.
- OmniVision OV6630 camera, 352x288 resolution at 60 frames per second.
- Attached Human Interface Device with push buttons and display LEDs for stand-alone use.
- On-board non-volatile memory to store trained pattern categories and configuration.
- Read-only I^{2}C interface.
- RS-232 command-line interface for expanded features of RoboSight.

CogniMem CM-1K

- High performance pattern recognition
- 1024 neurons (992 for RoboSight)
- Expandable to 8192 neurons (N/A for RoboSight)
- Fully parallel architecture
- Time constant
- Non-linear classifiers
- 256 byte patterns
- L_1 and L_{sup} Norms
- 32K Categories
- Built-in video frame recognition engine
- Region of Interest focus

Specification

Camera Sensor Board	
Sensor	OmniVision OV6630 CMOS sensor
Effective Resolution (H x V)	352 x 288
Maximum Frame Rate	60 fps
Pixel Size (H x V)	9.0 x 8.2 µm
Scan Mode	Progressive
S/N Ratio	> 48 dB
Dynamic Range	> 72 dB
Pattern Recognition Board	
Pattern Engine	CogniMem CM-1K 1024 Neuron Chip
Classifier	Radial Basis Function
Region of Interest (left, top, right, bottom)	8, 8, 344, 280 pixel default position
NVRAM	500KB to hold trained data for > 900 neurons
µProcessors	PIC18F4620 – main controller processor PIC16F677 – HID processor
Human Interface Device Board	
Push Buttons	3 push buttons to train, assign, view, and erase
LED Display	2 seven-segment LEDs to display training session state and run-time category recognition.
Slider Button	Toggles between Train and Run mode.
Indicator LEDs	Power, Data-Not-Saved, Run-Train Mode
Serial Interfaces	
4-Wire I^2C	Read-only interface to retrieve the current category. I^2C in standard slave mode at 100kbps and 5V plus Power, and Ground to supply power to RoboSight.
3-Wire RS-232	Full featured, read/write interface to RoboSight. Ground, Tx, Rx at 115200-8-N-1
Video Out	RCA cinch connector for analog PAL monochrome out.
Mechanical and Electrical	
Dimension (W x H x D)	71 x 56 x 32 mm
Power	In run mode: 370mA @ 5v; In train mode: 350mA @ 5v
Attachments	Hole placements for a few popular robots.