SUMMER VISION PROJECT

INTERNAL MEMO [redacted]

TO: Summer Vision Group

FROM: Gerald Jay Sussman and Adolfo Guzman

DATE: July 20, 1966

A Quick Look at Some of Our Programs

REGIONS1 — Sussman

Input:

1. An array filled with numbers, which are intensities read from the vidisector.
2. A point (inside the array).
3. A predicate, which defines a region.

Output: A list of two things:

1. Number of points on the boundary.
2. Unsorted list of boundary points. (A point is a list of two numbers, namely their bi-dimensional coordinates.)
3. Also, marks in the array the points belonging to the region found (with a - sign).

Purpose: Given a starting point, finds a region around it satisfying a given predicate. Marks this region, and returns its boundary.

Status: 1. Running.

2. Tested on made-up data.

Availability: In VISION LIBRARY tape in REG1 SUSMAN (LISP s-expressions).

In VISION LIBRARY tape in REG1 SUBRS (lap).

ARESET Sussman

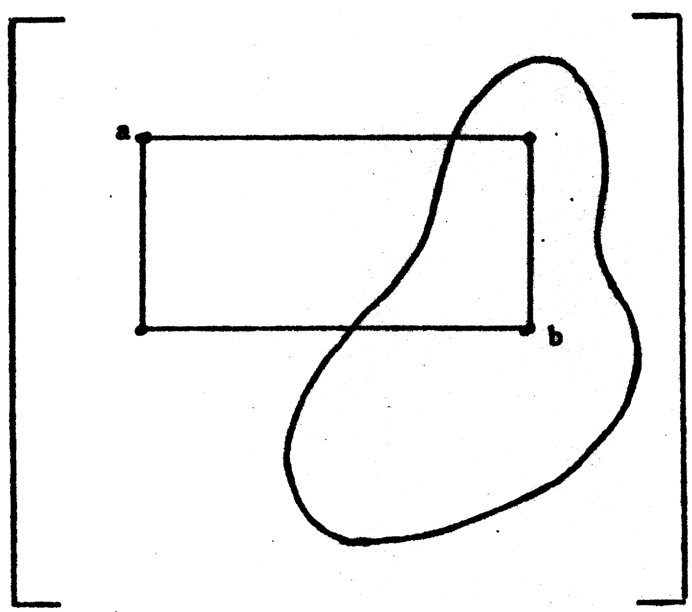
Given a, b, and a given region, inside an array, ARESET resets the negative points inside the box generated by REGIONS1 and returns the number of points reset (to + again).

Status: Running.

Tested on dummy data.

Availability: On VISION LIBRARY tape in REG1 SUSMAN.

On VISION LIBRARY tape in REG1 SUBRS.



RANDOM UTILITY PROGRAMS FOR ARRAYS. Sussman

FILL Fills an array with the elements of a list.

PRINARRAY: Outputs an array, from LISP, on teletype.

The format is:

(R1)

(R2)

(R3)

.

.

.

Availability: On VISION LIBRARY tape in REG1 SUSMAN.

On VISION LIBRARY tape in REG1 SUBRS.

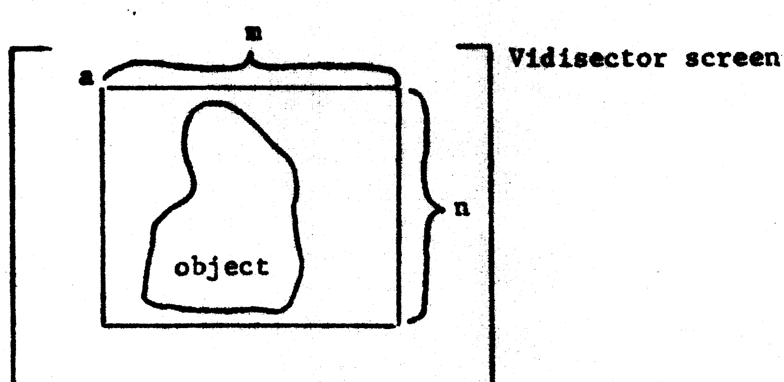
VDTAPE Sussman

Reads and writes vidisector input on tape.

DUMPVD Sussman

Input:

1. Starting point on vidisector
2. Number of points on vidisector to be dumped in x and y directions (size of sample, i.e. m x n).
3. Density of sampling.



Output: 1. Dumps area of vidisector specified on μ -tape.

Purpose: To make reference pictures of objects which can be used reproducably.

READPICT Sussman

Input: 1. Name of array to be defined.

2. Tape number to be read.

3. Name of file to be read.

Output: 1. List of specifications of picture when dumped by DUMPVD (i.e. starting point; number of points in x, y; density).

Effect: Defines an array with name given in input and fills it with picture dumped by DUMPVD.

Status: Running.

Tested on real data.

Availability: VISION SYSTEM as VDTAPE SUSMAN

VIDI DUMPS Sussman

A collection of pictures is beginning to be formed on microtape; this tape contains several objects which were seen by the vidisector and written with VDTAPE. They consist of a big collection of integers which represent the light intensity at a given point.

Sussman tape #5 currently contains

WHITE CUBE -- a cube

CYLIND WOOD -- a wooden cylinder

CLOTH COUCH -- a piece of Seymour's couch.

SORTBOUND Sussman

Experimental version of function for ordering boundary returned by REGIONS1.

Input: 1. Array before reset by ARESET.

2. List of boundary points.

Output: 1. A list of segments.

Availability: On VISION LIBRARY tape as BDSORT SUSMAN.

SAL Sussman

Experimental version of a scope assembly language, embedded in LISP.

Input: 1. List of macro-commands to scope, e.g.

(PARAM (SCALE·2))

(POINT (3 5) (4 6) (200 30))

(VECTOR (25 60) (700 1005) (720 30)

(CHAR (30 50) WHAT'S THIS HACK)

(INCRE (100 250) (+ 0) (0 -) (- 0) (- -) (- -))

2. Name of display.

Output: 1. Array having name given as input with contents as scope words to be displayed.

Status: All implemented features working.

Mian function is SAL.

Availability: On VISION LIBRARY tape as SAL SUSMAN.

CONVERT Guzman

This is a language for symbolic manipulation, imbedded in LISP.

Status: Running.

Tested (not exhaustively).

Availability: In VISION SYSTEM as CONVRT GUZMAN (dump of LISP + CONVERT).

DT Guzman

Input:
1. A scene, described by its regions, in symbolic form. Each region is an atom with special properties in its property list: shape, color, neighbors, etc.
2. A model of an object, also in symbolic form with properties, etc.

Output:
1. Prints all the objects in the scene which match the model.
2. Returns as value the remainder of the scene.

The analysis which DT does at the present time is relatively unsophisticated; it does not recognize (yet) partially occulted objects.

Status: Running.

Tested in a couple of simple (simulated) scenes.

Availability: In VISION LIBRARY tape as DT GUZMAN.

Lamport

EXEC1

Input: 1. A list of predicates.

2. A number of boxes.

3. An array.

4. Dimensions of array.

Output: 1. Divides the array (the world, the scene) into boxes.

2. Applies REGIONS1, with each of the predicates, to the central point of each box.

3. Finds all the regions.

4. Returns a list of three elements.
The first is a list of lists of regions for each box.
The second is the number of regions found.
The third is a list of regions found and the predicates that each satisfies.

5. This is the driver for REGIONS1.

Status: Running.

Tested on dummy data.

No prob lems in its interface with REGIONS1.

Availability: On VISION LIBRARY tape as EXEC1 LAMPRT.

DISP

Lamport

Displays the regions found by EXEC1.

Functions: INITDISPLAY sets up display arrays.

REGDISP displays region defined by region number.

PREDISP displays region defined by predicate.

Status: Running.

Availability: In VISION LIBRARY as DISP LAMPRT 9.

QFUNS1 Speciner

Quality functions.

Measures: 1. Grooviness (GROOVES).

2. Average intensity (AVGINT).

GROOVES

Input: 1. Name of array (SPACE).

2. Point about which grooviness is to be measured (x,y).

3. Portion of array to be examined (XMIN, YMIN, XMAX, YMAX).

Output: 1. A list of the density of the grooves about the given point in the examined portion of the array, and their orientation ($\sin\theta \cdot \cos\theta$).

(density = 1/period of gooves)

Status: Running.

Tested on real data.

AVGINT

Input: 1. Name of intensity array (SPACE).

2. Portion of array to be examined (XMIN, YMIN, XMAX, YMAX).

Output: 1. A number: the average intensity of the examined portion of the array.

Status: Running.

Tested on real data.

ANGSEG **John White**

Input: 1. An ordered list of points.

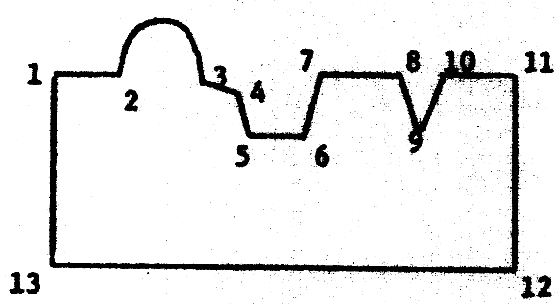
2. The angles between them.

This list is a boundary found by EXEC1.

Output: 1. An analysis of the region, specifying the concave and convex parts, the direction in which the given region was traversed, and its area. (Additional information may be easily added.)

Each one of the parts is simply specified by a list of its points; terminal points may or may not be repeated.

Example:



will be described as ([10 11 12 13 1 2 3] [3 4] [4 5 6 7] [7 8] [8 9 10]) where we see that convex and concave parts alternate.

Status: Coded.

CS-TR Scanning Project
Document Control Form

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IMAGE MAP! (1-9) UNH'ED TITLE PAGE, 2-9
(10-13) SCANCONTROL, TRGT'S (3)

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