# PATTERN RECOGNITION (EVOLUTION OF DETECTORS) USING GP

# GENETICALLY EVOLVED RECOGNIZER WITH DYNAMICALLY DEFINED DETECTORS (AUTOMATICALLY DEFINED FUNCTIONS)

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(PROGN  (DEFUN ADF0 ()
            (VALUES (OR (OR (AND W SE) (OR (AND (NOT (OR SW SW)) (NOT (AND X
            SW))) (NOT (OR (NOT S) (AND X NW))))) (AND (OR (NOT S) (AND W SE))
            (OR (OR S X) (NOT N))))))
        (DEFUN ADF1 ()
            (VALUES (AND (AND (NOT (NOT X)) (NOT (OR S X))) (NOT (OR S X)))))
        (DEFUN ADF2 ()
            (VALUES (OR (AND (NOT (AND W E)) (OR (AND NW W) (NOT NW))) (OR (OR
            (AND N E) (AND S SE)) (OR (AND W (NOT NW)) (OR SE NE))))))
        (DEFUN ADF3 ()
            (VALUES (AND (NOT (AND (NOT SE) (OR W SW))) (OR (NOT (OR NW (NOT
            NW))) (AND (NOT S) (AND (NOT (AND (NOT SE) (OR W SW))) (OR (NOT (OR
            NW (NOT (AND (NOT SE) (OR W SW))))) (AND (NOT S) (OR (NOT (NOT NW))
            (NOT SE)))))))))
        (DEFUN ADF4 ()
            (VALUES (AND (NOT (OR (OR W SW) (OR NW NW))) (AND (AND (AND X N)
            (NOT NE)) (AND (NOT (OR (OR E SW) (OR NW NW))) (AND (AND (AND (AND
            X N) (NOT NE)) (NOT NE)) (OR (OR N SE) (OR X E)))))))
        (VALUES
            (IF (OR (NOT (ADF4)) (AND (OR (NOT (AND (GO-S) (GO-S))) (AND (OR
            (NOT (AND (GO-S) (GO-S))) (AND (NOT (AND (ADF3) (ADF3))) (HOMING
            (GO-S)))) (OR (NOT (AND (GO-S) (GO-S))) (AND (HOMING (GO-N))
            (HOMING (GO-N)))))) (OR (NOT (ADF4)) (AND (OR (NOT (AND (GO-S) (GO-
            S))) (AND (OR (NOT (AND (GO-S) (GO-S))) (AND (NOT (AND (ADF3)
            (ADF3))) (HOMING (GO-N)))) (OR (NOT (AND (GO-S) (GO-S))) (AND
            (HOMING (GO-N)) (HOMING (GO-N)))))) (OR (NOT (AND (GO-S) (GO-S)))
            (AND (NOT (AND (GO-S) (ADF3))) (HOMING (GO-N))))))))) ; antecedent of
            outermost IF
                (IF (HOMING (AND (GO-S) (ADF0))) (IF (GO-S) NIL L) (IF (HOMING
            (GO-S)) (IF (ADF1) L I) (IF (ADF1) L NIL))); then-part of outermost
            IF
                (IF (OR (OR (GO-E) (ADF3)) (AND (OR (NOT (ADF4)) (AND (NOT
            (ADF3)) (OR (NOT (AND (GO-S) (GO-S))) (AND (NOT (GO-S)) (AND (ADF3)
            (ADF3)))))) (HOMING (GO-N)))) (IF (ADF2) (IF (GO-S) L NIL) (IF (GO-
            S) (IF (ADF3) L NIL) (IF (GO-S) NIL L))) (IF (NOT (ADF1)) (IF (GO-
            E) NIL I) (IF (ADF1) L L))); else-part of outwemost IF
            ))).
```

# ARRANGEMENT OF PIXELS REQUIRED
# TO CAUSE ADF4 TO RETURN T

| | | |
|---|---|---|
| **Off** | On | **Off** |
| **Off** | On | **Off** |
| **Off** | | |

# ARRANGEMENT OF PIXELS REQUIRED TO CAUSE ADF3 TO RETURN A VALUE OF T

| | | |
|---|---|---|
| **Off** | | |
| **Off** | | |
| **Off** | **Off** | **Off** |

# ARRANGEMENT OF PIXELS REQUIRED TO CAUSE `ADF2` TO RETURN A VALUE OF `NIL`

| On | **Off** | **Off** |
|----|---------|---------|
| On |         | **On**  |
|    |         | **Off** |