



Achieving Automation

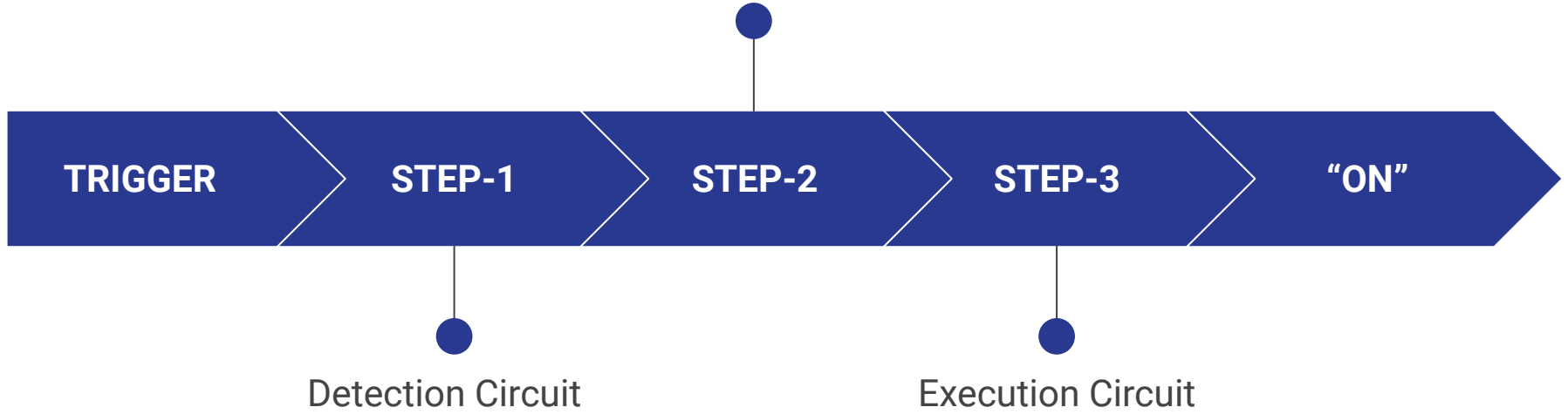
using
LM741 and IC 555

Introduction



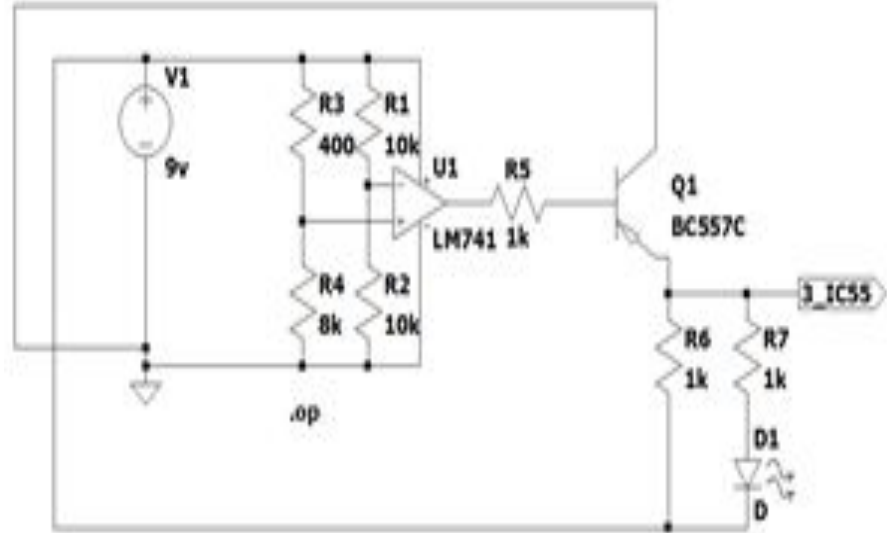
Design

Decision Circuit



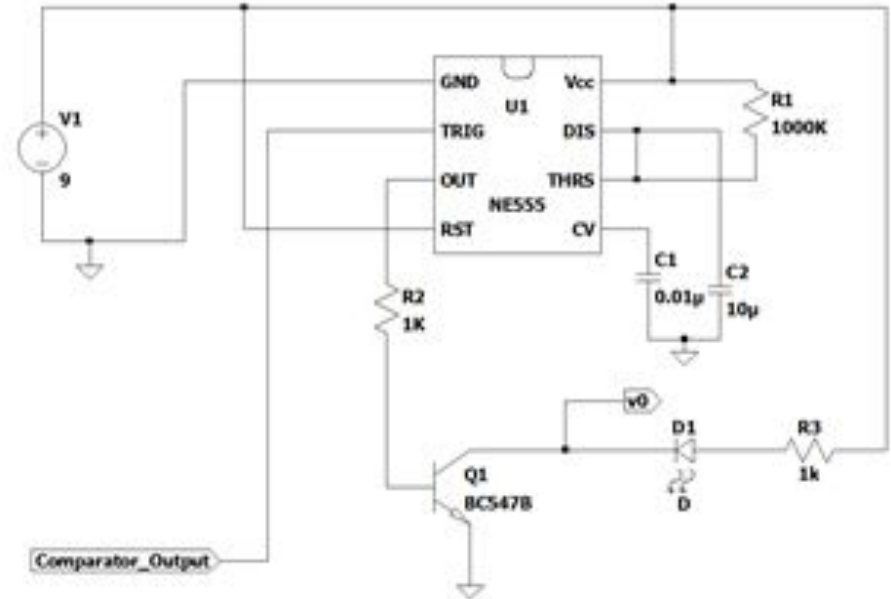
DETECTION & DECISION CIRCUIT

- Detection is done using an LDR (Light Dependent Resistor) circuit.
- Decision Circuit, is implemented using an comparator which takes input received from Detection Circuit.

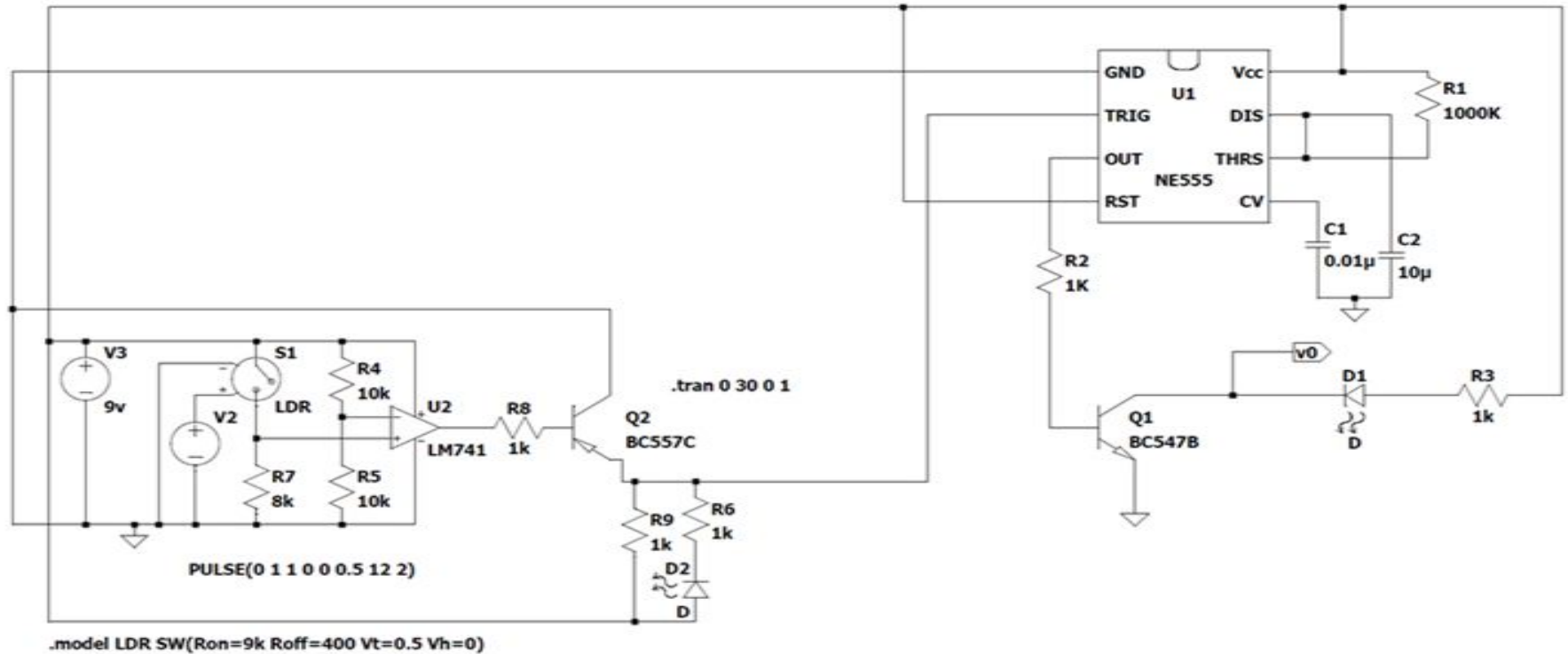


EXECUTION CIRCUIT

- Execution circuit is basically a Monostable multivibrator circuit, which is implemented using an IC-555 timer.
- The IC-555 timer gets the trigger input from the Decision circuit.



CIRCUIT USED IN OUR PROJECT



Applications

Case-1: When the duration of the trigger pulse is less than pulse width

SMART IRRIGATION SYSTEM

- Hygrometer sends the trigger to the comparator.
- This trigger pulse makes the IC-555 go into a unstable State with a fixed duration.
- Irrigation continues throughout the duration of unstable State.
- This process continues until the water in the soil is above the threshold.

Note: Triggers in between the irrigation(unstable period) doesn't effect the process.



Case-2: When the duration of the trigger pulse is greater than pulse width

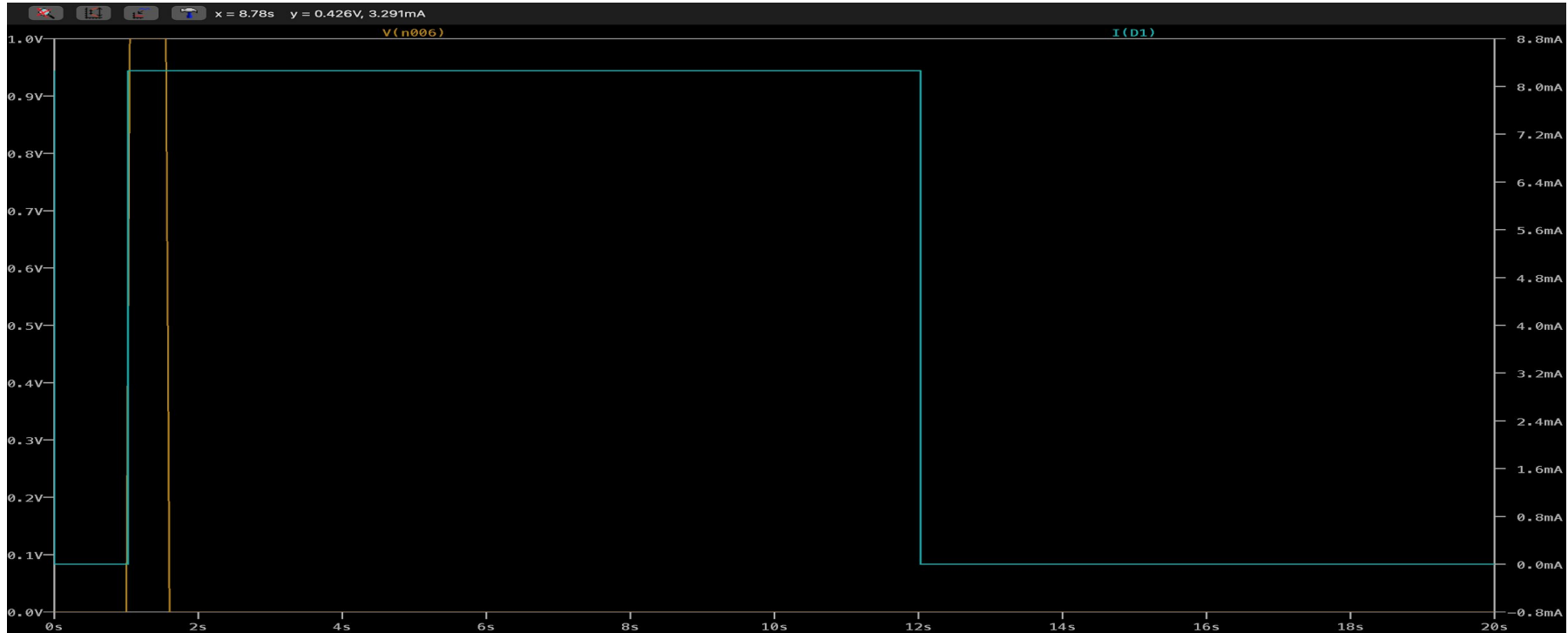
SMART LIGHTING SYSTEM IN ELEVATORS

- LDR is used here to detect the presence of people in an elevator.
- The output pulse width depends on the trigger pulse duration.
- Lights or Fans will only turn on when there are people in the lift.



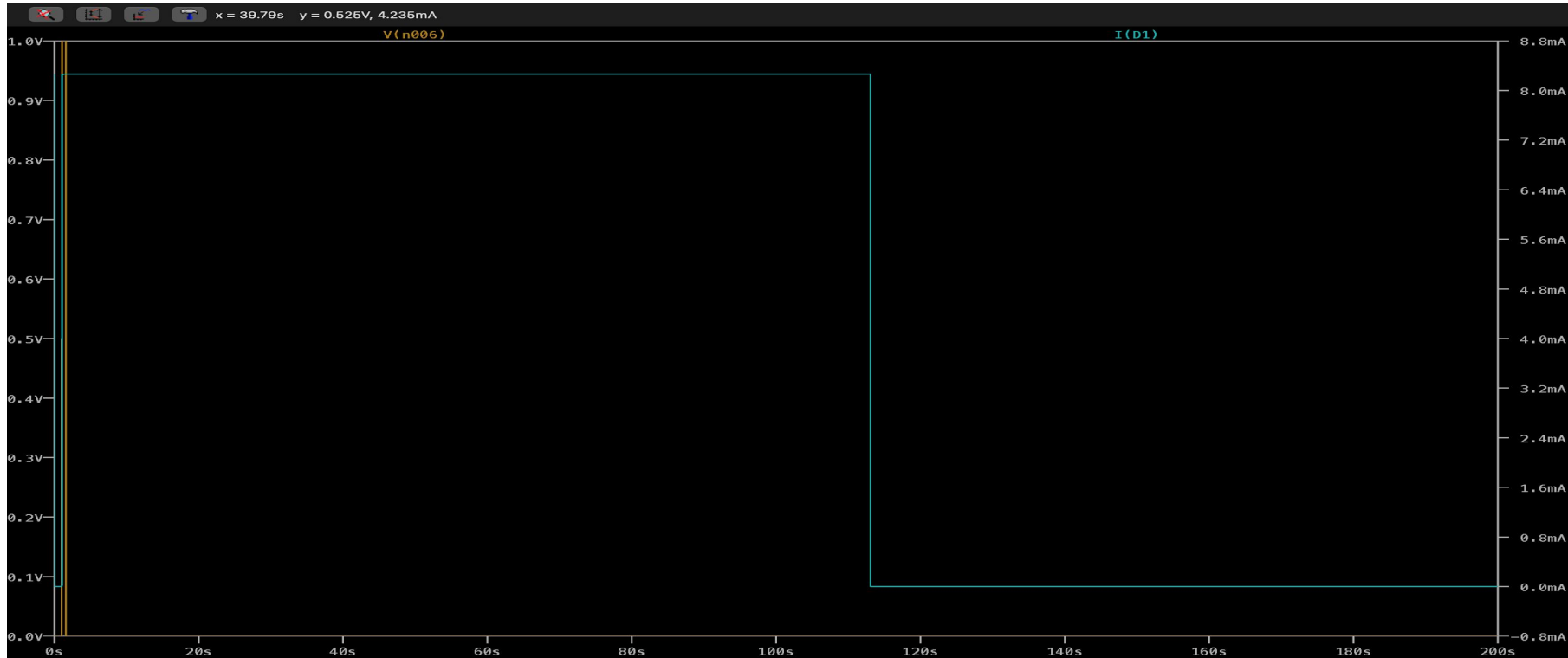
Simulation Results

Case -1a



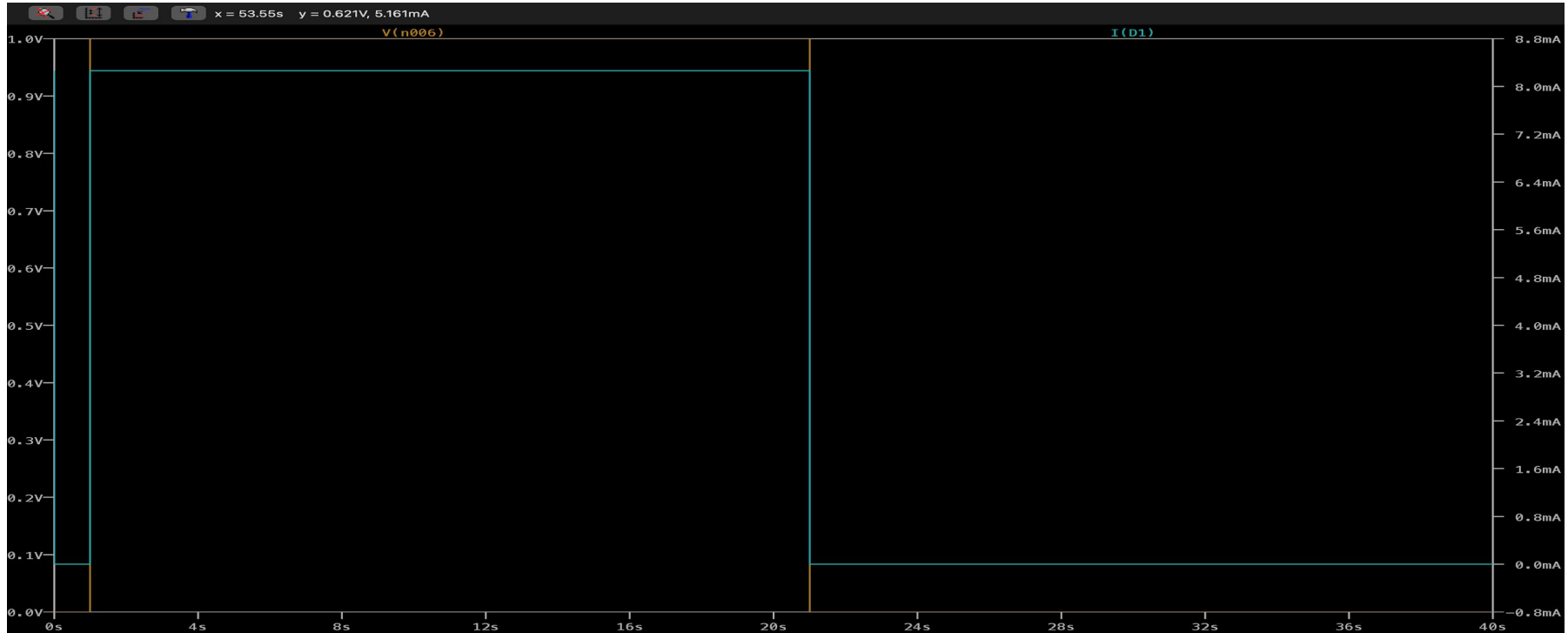
Output pulse width = 11 seconds ($R1 = 1\text{M}\Omega$, $C2 = 10\text{ }\mu\text{F}$) and trigger time = 0.5 seconds

Case -1b



Output pulse width = 110 seconds ($R1 = 10\text{M}\Omega$, $C2 = 10\text{ }\mu\text{F}$) and trigger time = 0.5 seconds i.e output pulse width is increased ten-fold with ten-fold increase in time constant

Case -2



Output pulse width = 20 seconds ($R1 = 1M\Omega$, $C2 = 10 \mu F$) and trigger time = 20 seconds

Conclusion

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Thank you!