

This book will Explain...

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- Deep Learning
- Reinforcement Learning
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- Formulas in each topic
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- Real time AI Models: Explanation
- Popular ML Libraries & Frameworks
- Vocabulary words in ML explanation & definition

NOTES & DIAGRAMS

BOOK FOR AI & ML

Diagrams of anything

BY: Sakthi

From: Kavitha k.

REFERENCE

"There is n

- Brene Brown

Starting a gratitude
why. The benefits o

- Gratitude i
the door or
acknowledg
- Gratitude i
aches and p
- Gratitude i
depression
- Gratitude i
grateful se
- Gratitude i
people wh
- Gratitude i
esteem—g
- Gratitude i
accomplish
- Gratitude i
thankful fo

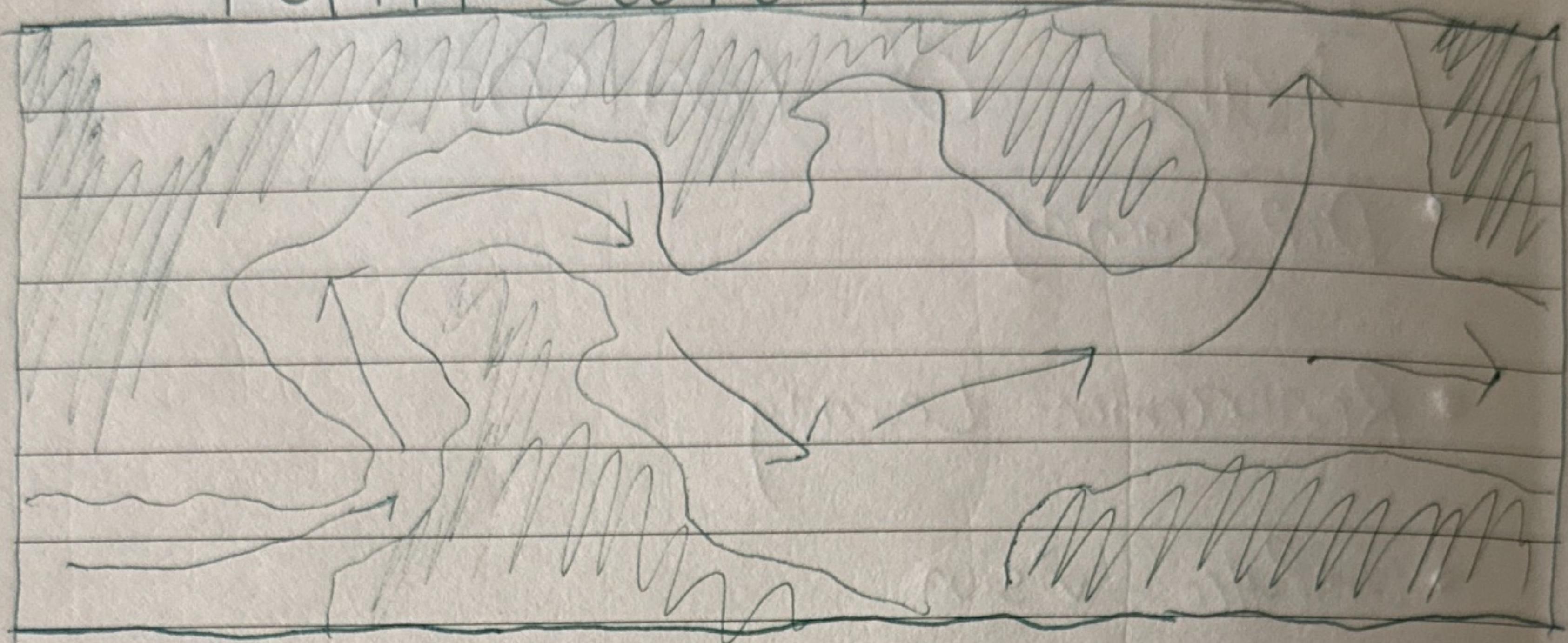
Now, all you need
you're grateful fo
water to drink... it

Try and build this
the morning, whil
right before bed.

And of course, if yo
reflect on your day
in your day.

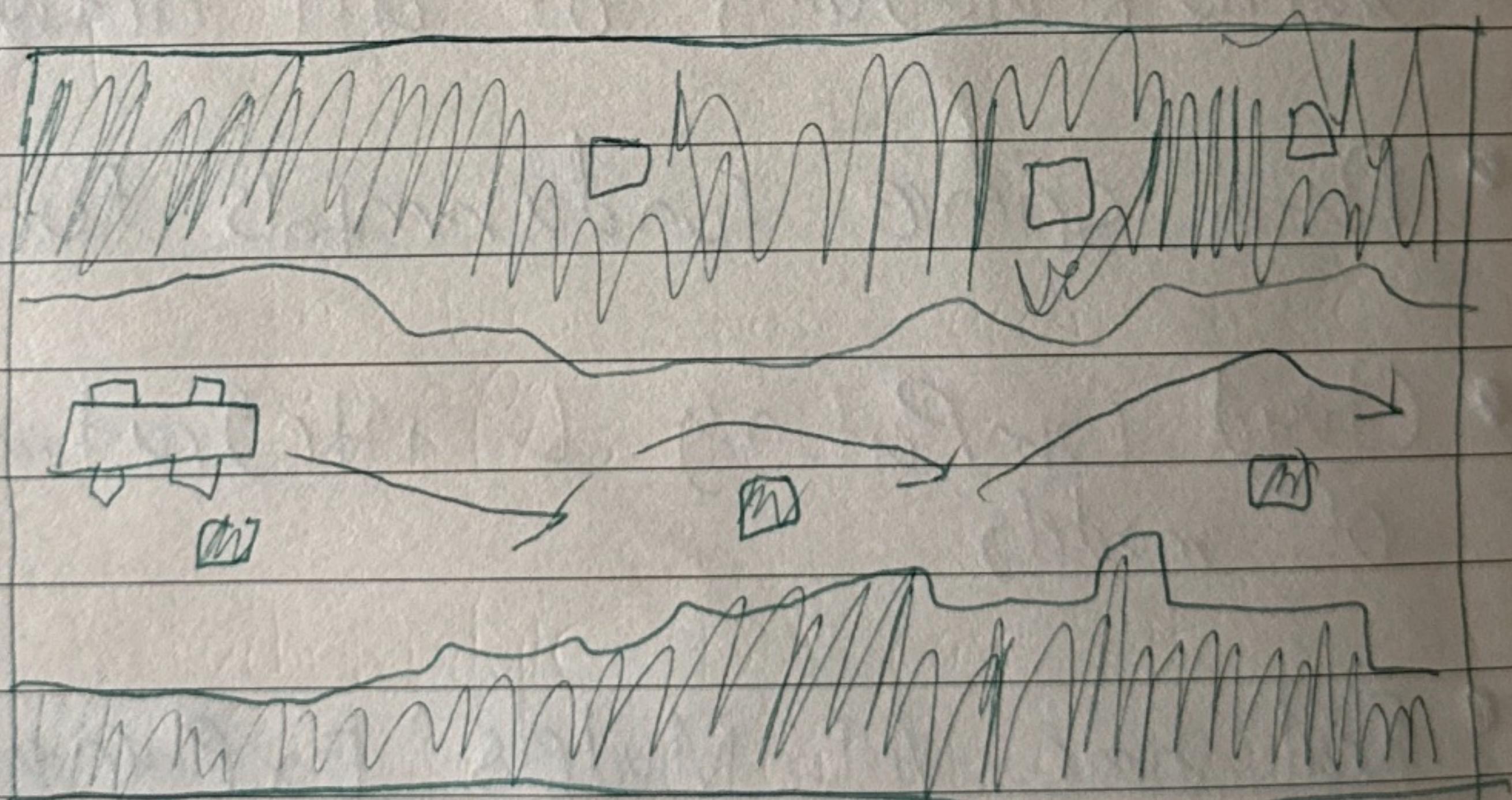
For more informa
Square.

Path search



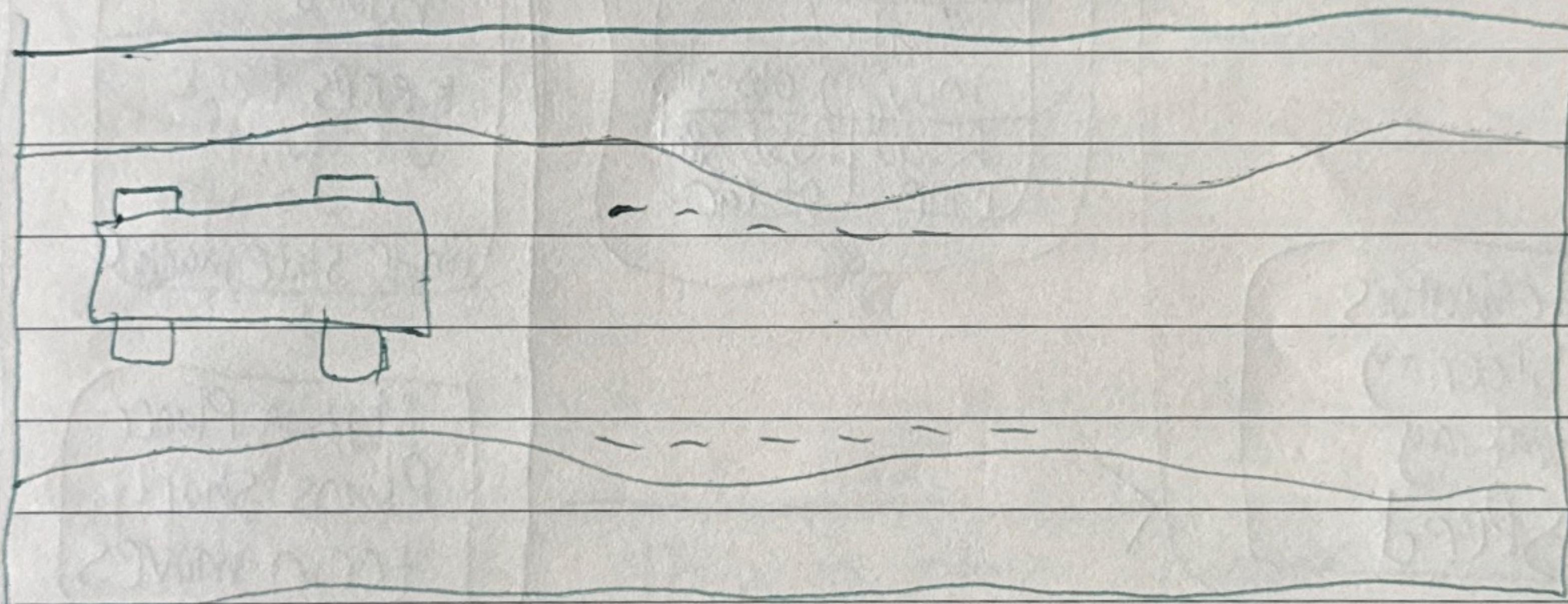
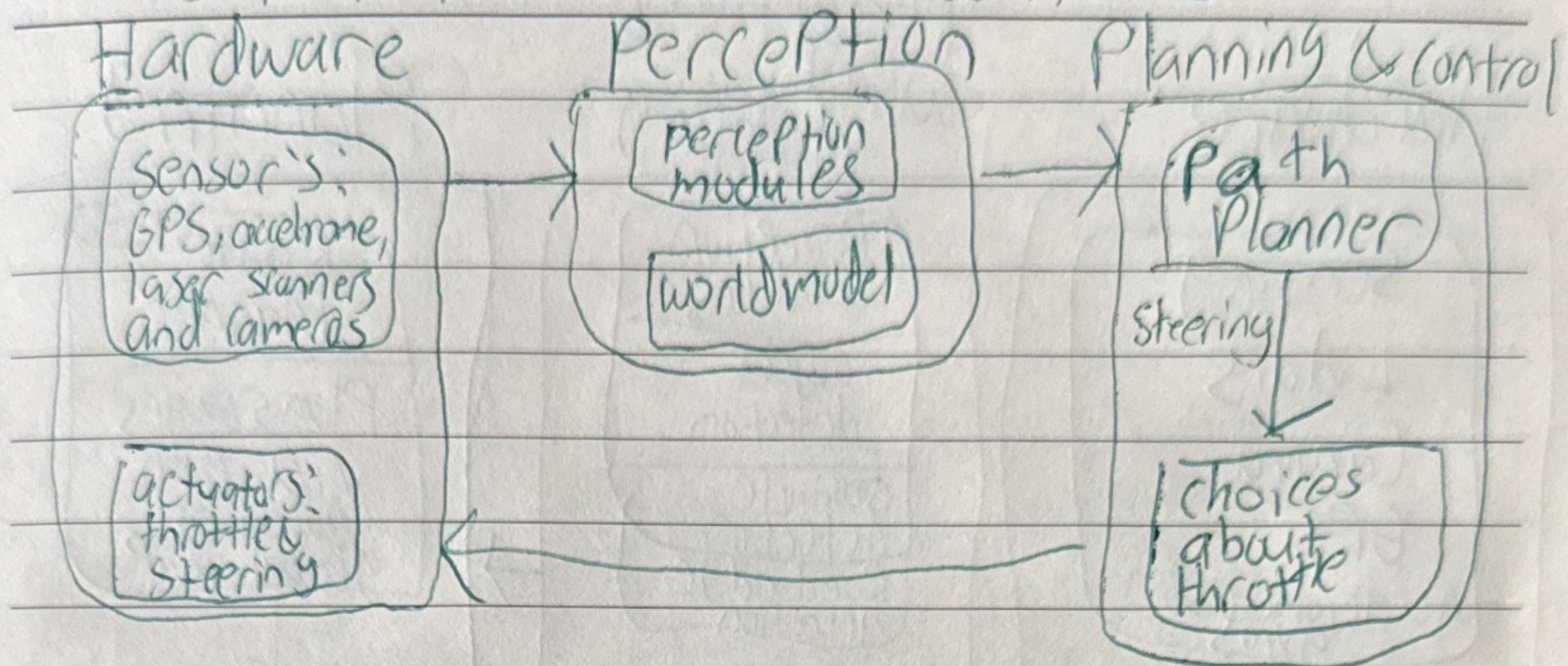
The Places in the middle
are the best Path and it
Provides a good Path for the car.
The shaded are avoided.

Avoiding obstacles

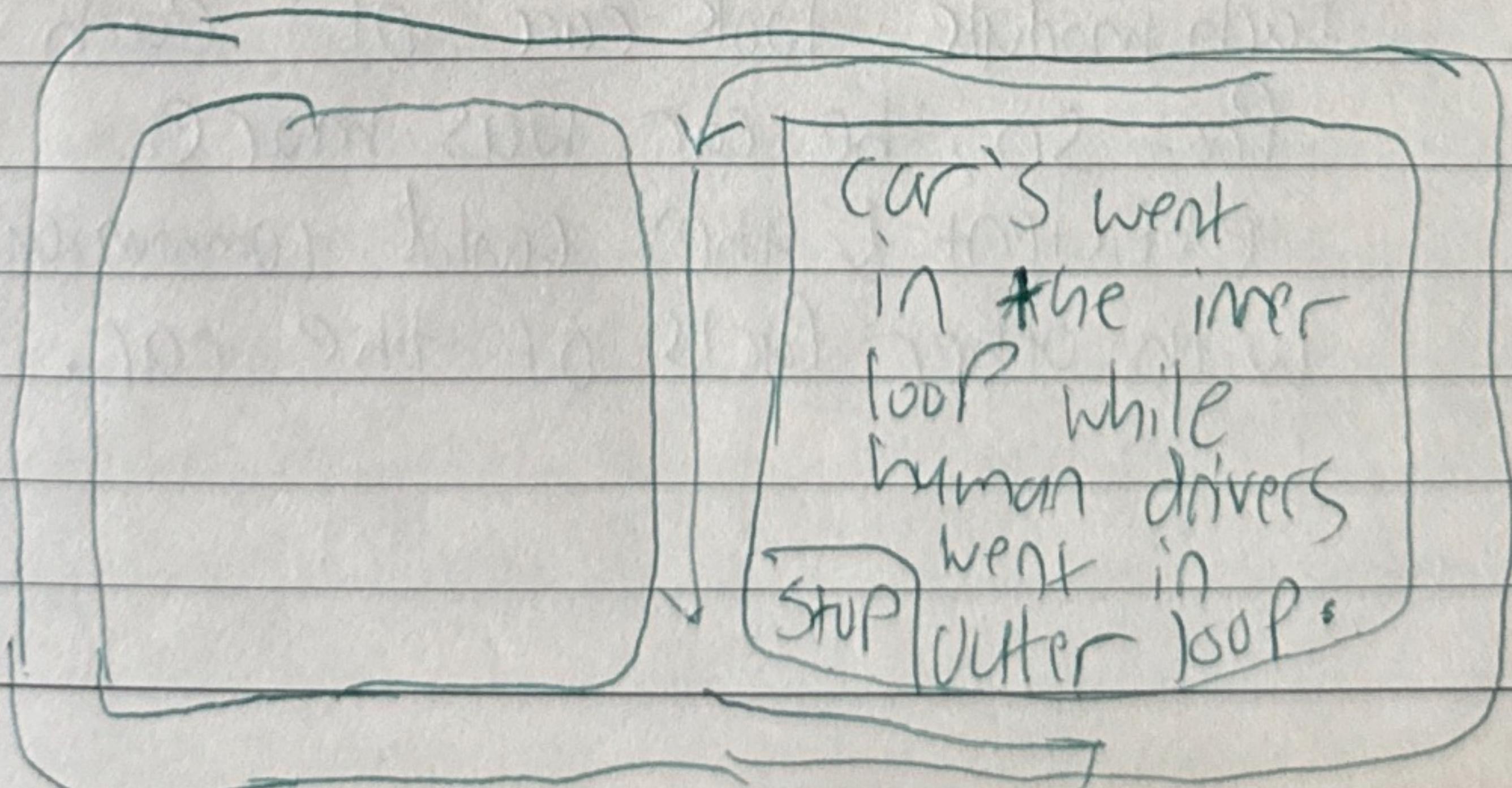


Instead of making Plans for
long distance, the car can make
Plans for short distance.

Stanley's Architecture



The car detects the edge of the road & maintains an equal distance from both sides.



Hardware

sensing
Lidars
Camera
GPS
Accelerometers &
gyros

Perception & world modeling

Perception modules
object detection
obstacle detection
Road edge detection

Planning

Route Planner
Plans routes via Path search on global map

World model
Static & moving obstacles
Road Post & Seal map
of car

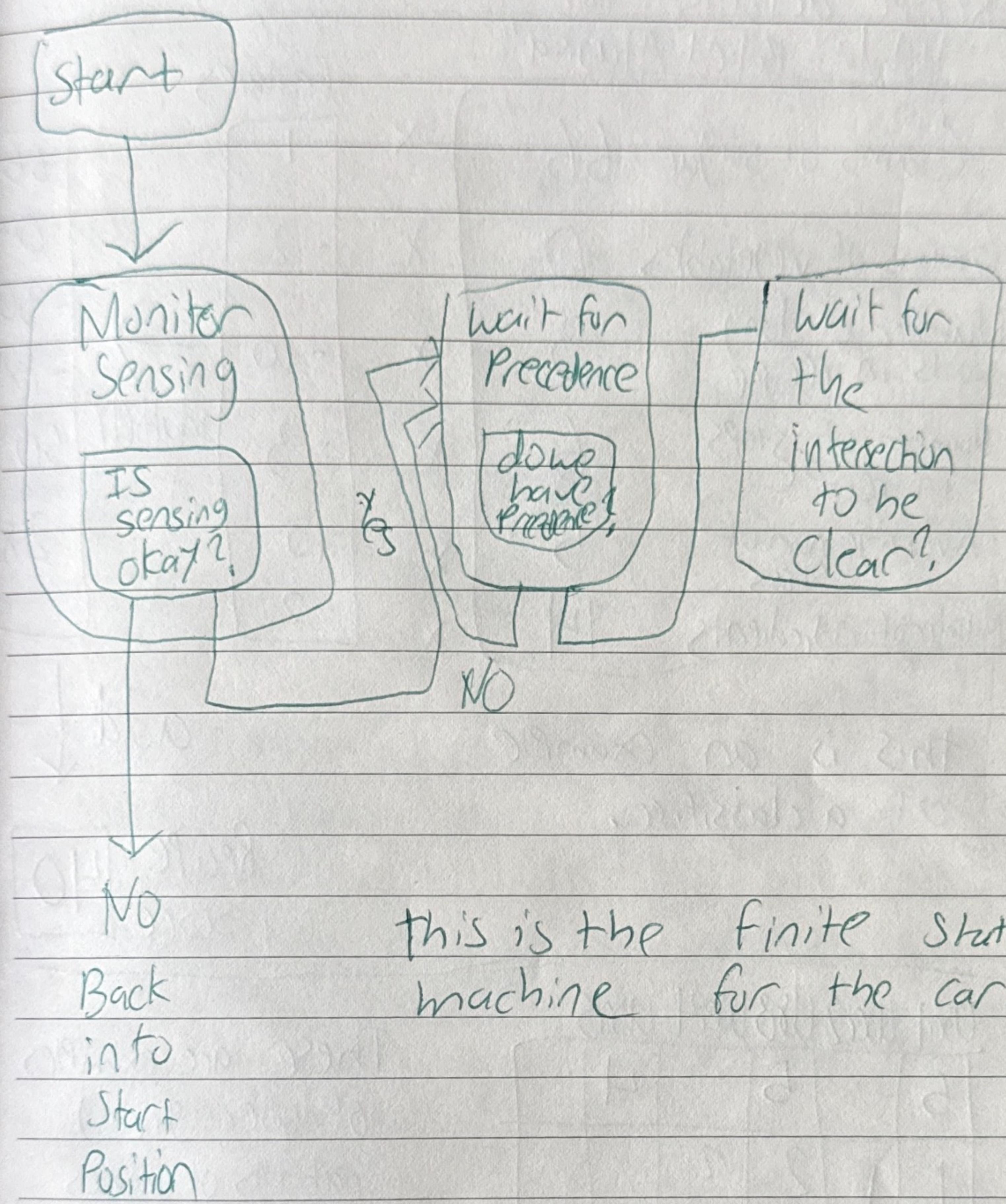
Monopoly board
Keeps track of what to do with finite state machine

Actuators
Steering
Braking
Speed

Motion Planner
Plans short term moves

This was boss's architecture in DARPA.

Each module took care of each part so, the car was more efficient & they could communicate with other parts of the car.



this is the finite state
machine for the car.

No
Back
into
Start
Position

Classifier for Netflix recommendation challenge

Recipe details for
"Holiday Baked Alaska"

weights
for
features

Grams of sugar	66	x	1	66
Grams of vegetables	0	x	-2	0
Number of long words in recipe	3	x	-10	→ -30
Number of steps in recipe	6	x	-3	MULTPLY 50
Average num of stars	5	x	10	-28
Number of ingredients	14	x	-2	

this is an example
of a classifier.

add ↓

Recipe 40
Score 40

	User1	User2	User3	User4	User5
Movie1	5	5	4	...	
Movie2	1	1	2	2	...
Movie3	4		2	...	
Movie4	4	2		...	
Movie5	4			...	

These are examples
of user giving
ratings of movies
in a matrix.
Classifier has to
predict the missing
values in the
matrix with a
model.

Matrix factorization for movie recommendation

Jurassic Park movie genres	Steven Spielberg Mov. AFFINITY	SPielberg affinity to jurassic park genres
Science Fiction	1.0	1.2
Drama	0.0	0.0
Terror	0.0	0.0
Comedy	0.0	0.0
Adventure	1.0	0.6
Romance	0.0	0.0

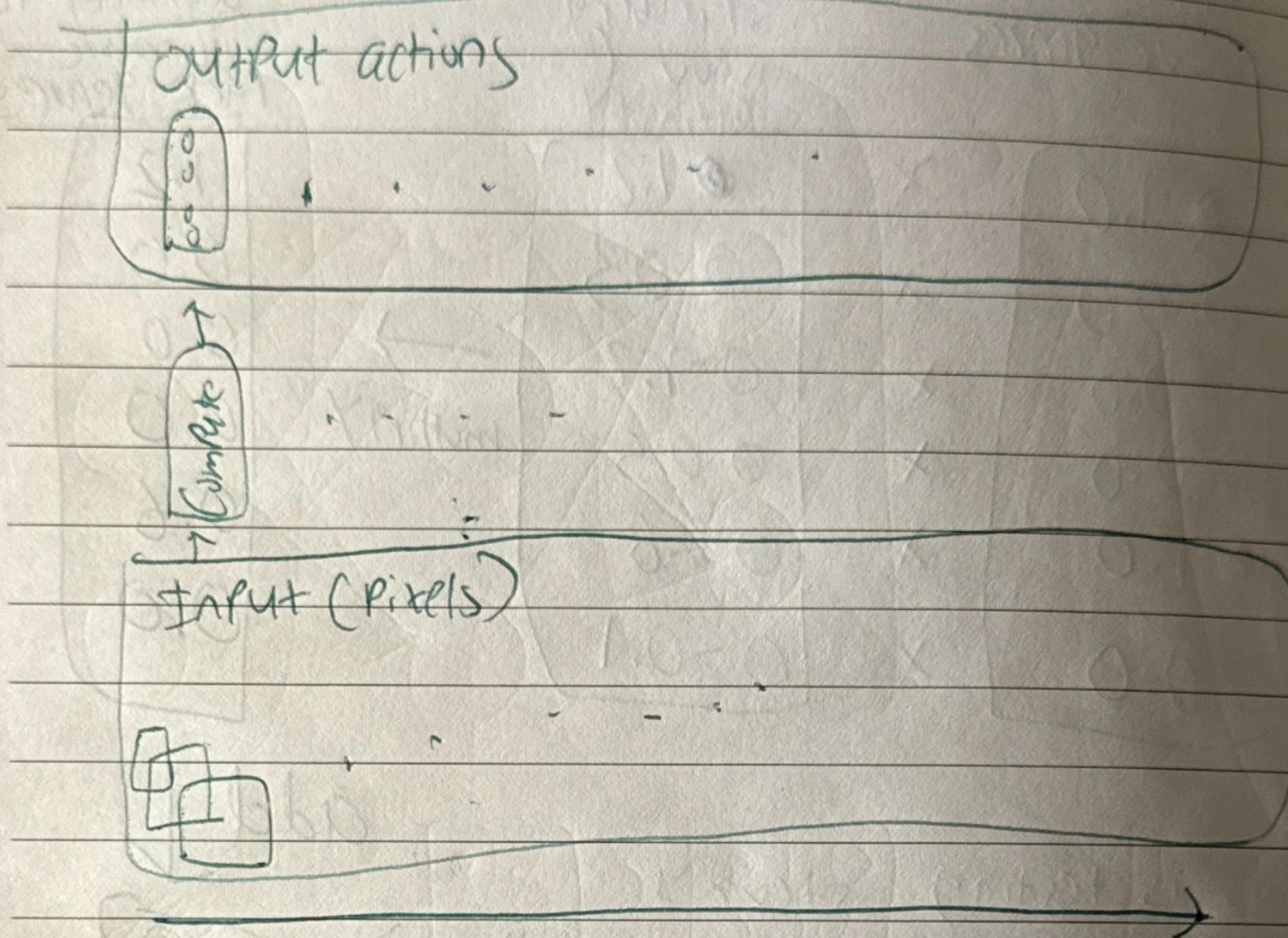
This is testing Steven's
 Spielberg affinity to
 Jurassic Park it
 is classified as
 adventure & science
 fiction that is
 multiplied of his
 liking to those
 genres & all
 added together.

add ↓

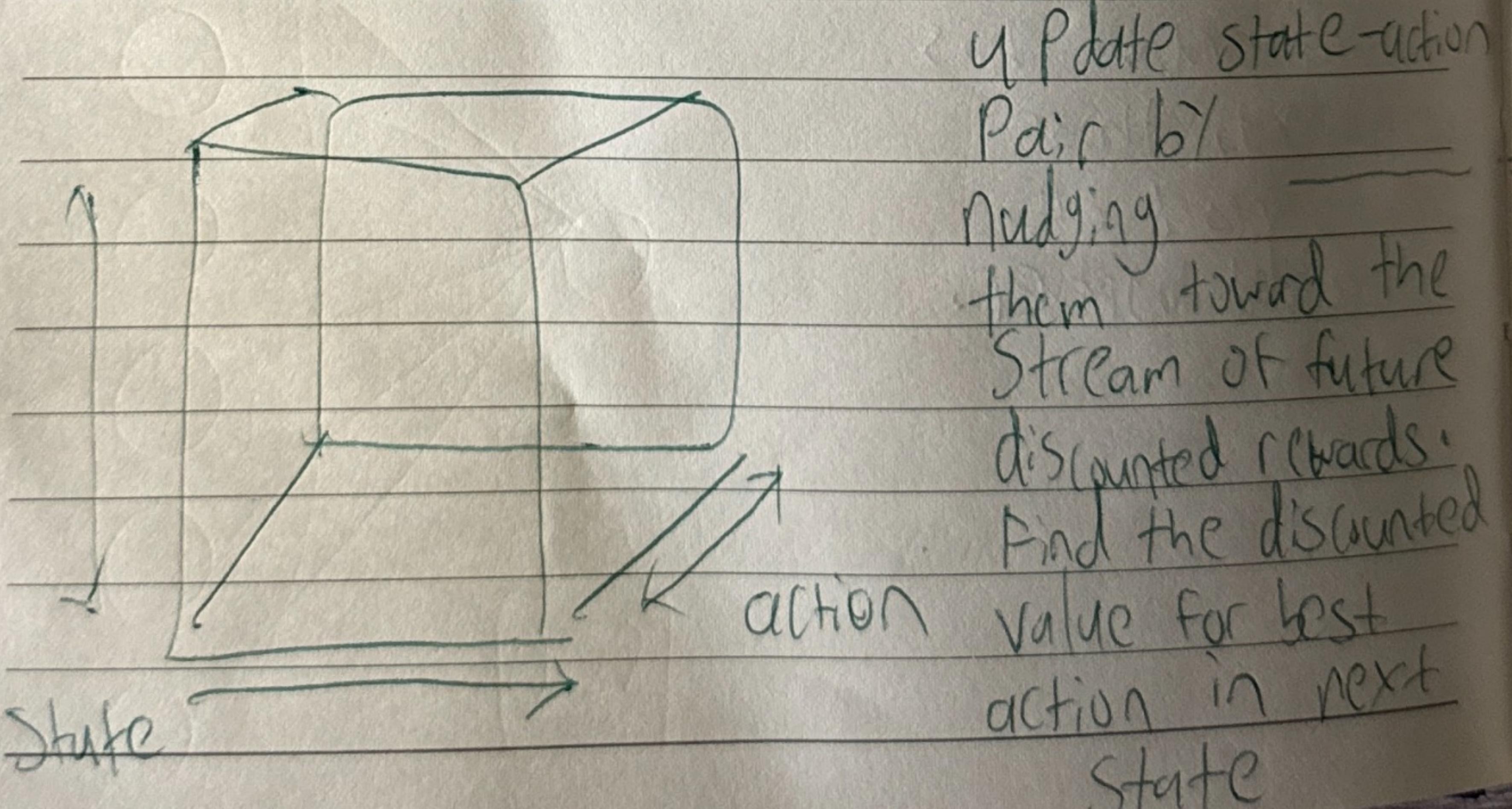
Spielberg's
 affinity to
 Jurassic
 Park

1.8

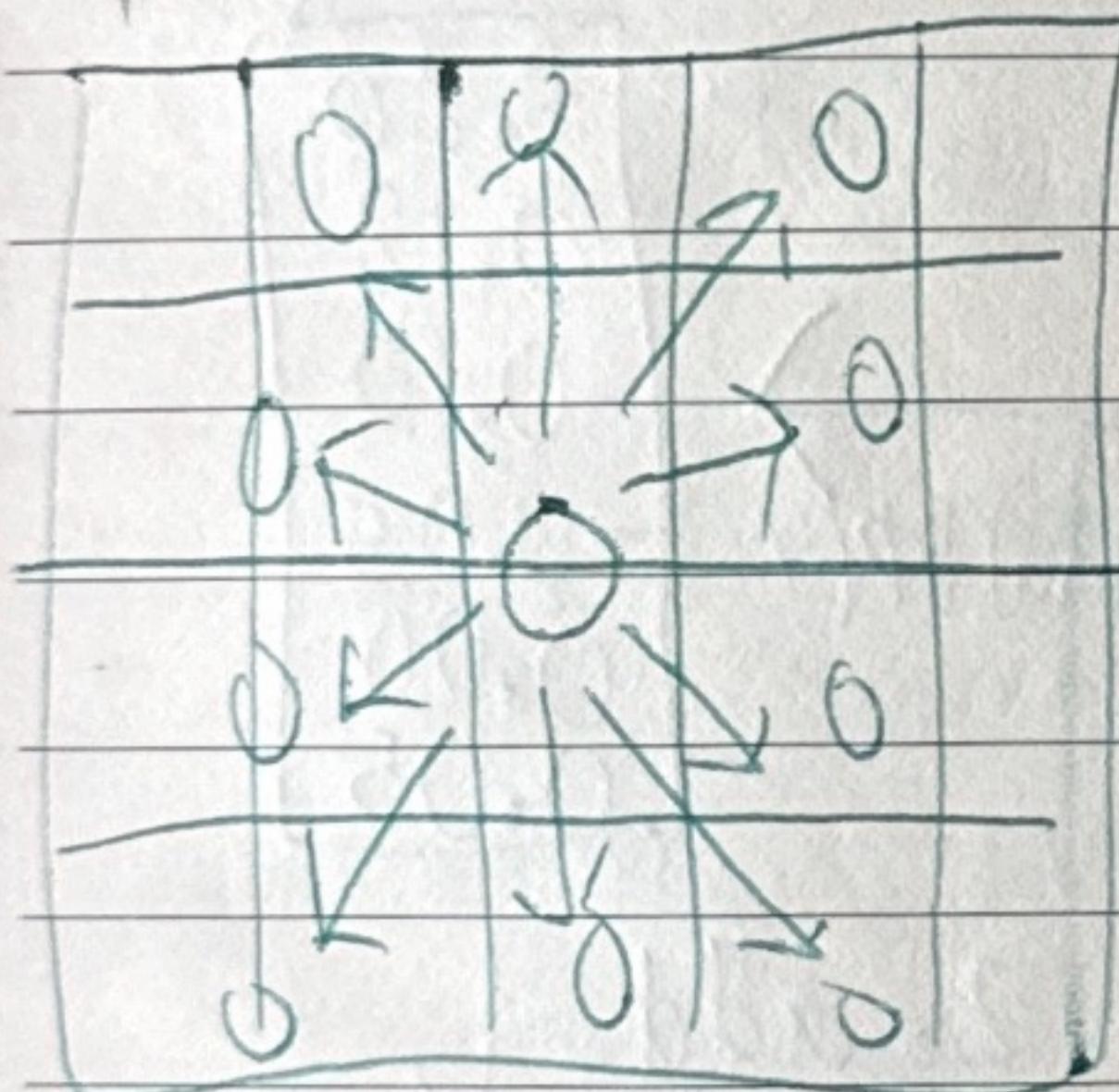
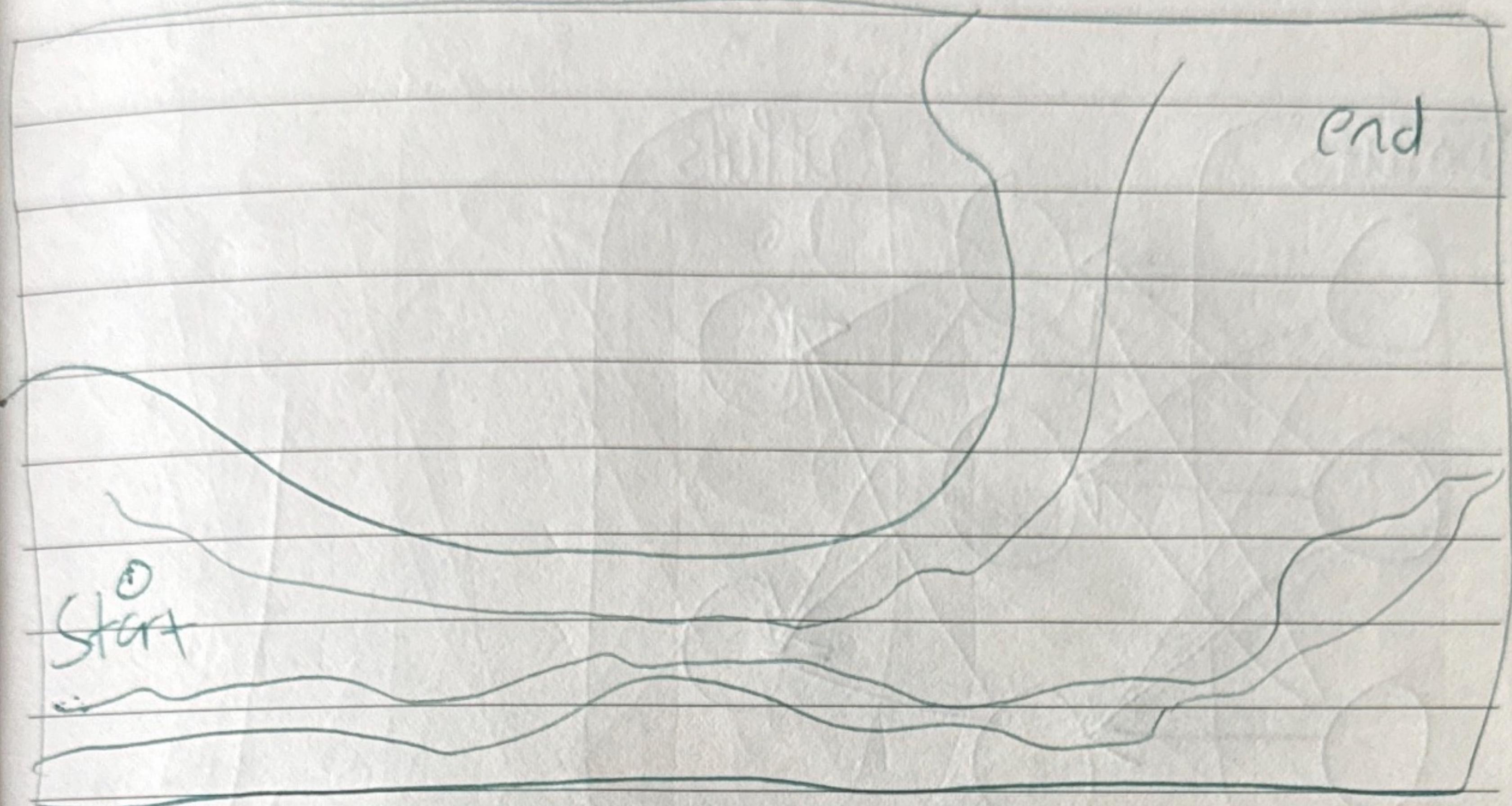
Reinforcement Learning in Alan Playing agent



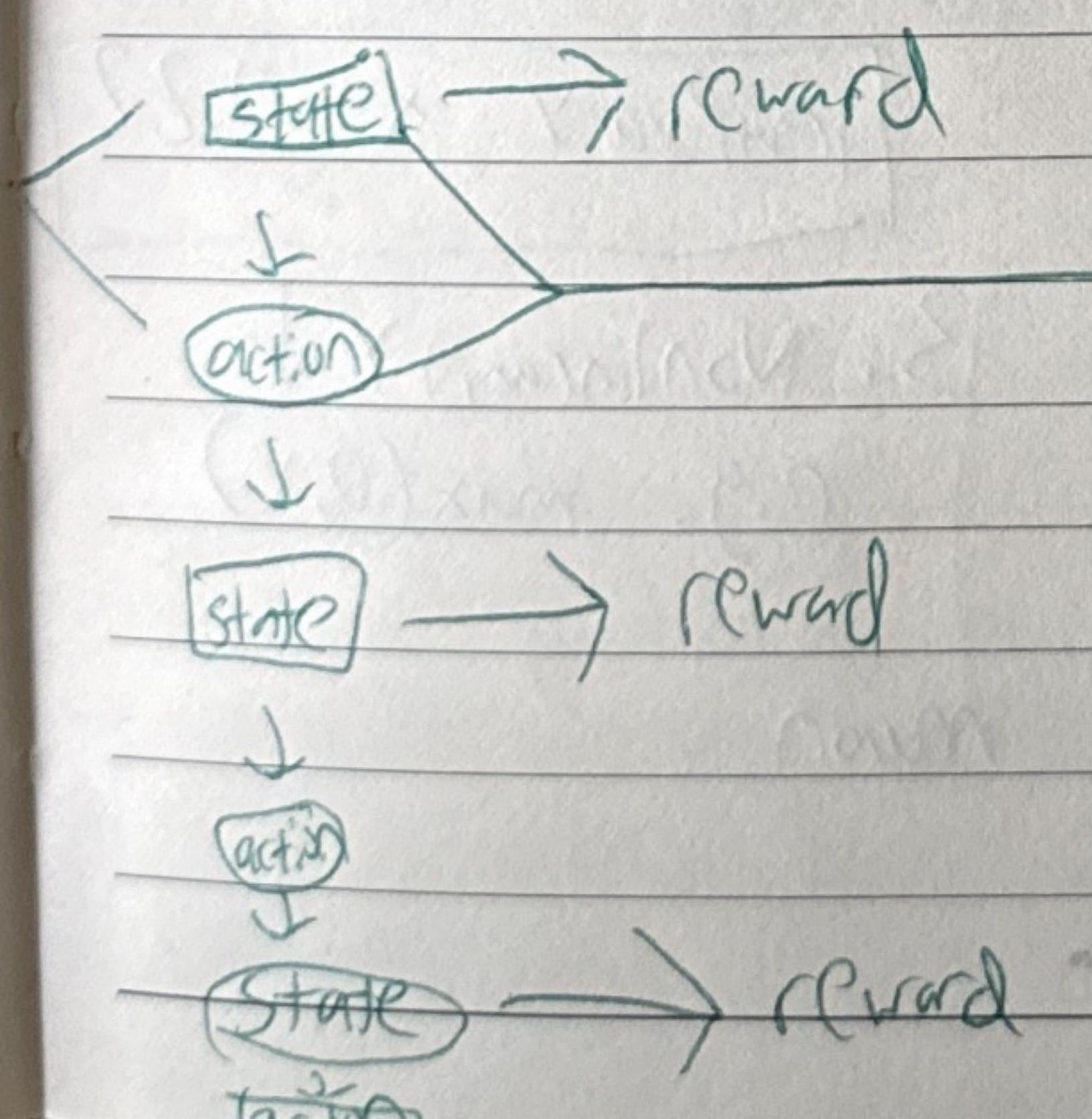
The agent would receive the last four screenshots of the game and then it would decide its next actions based on the Pixels.



Golf course Playing agent

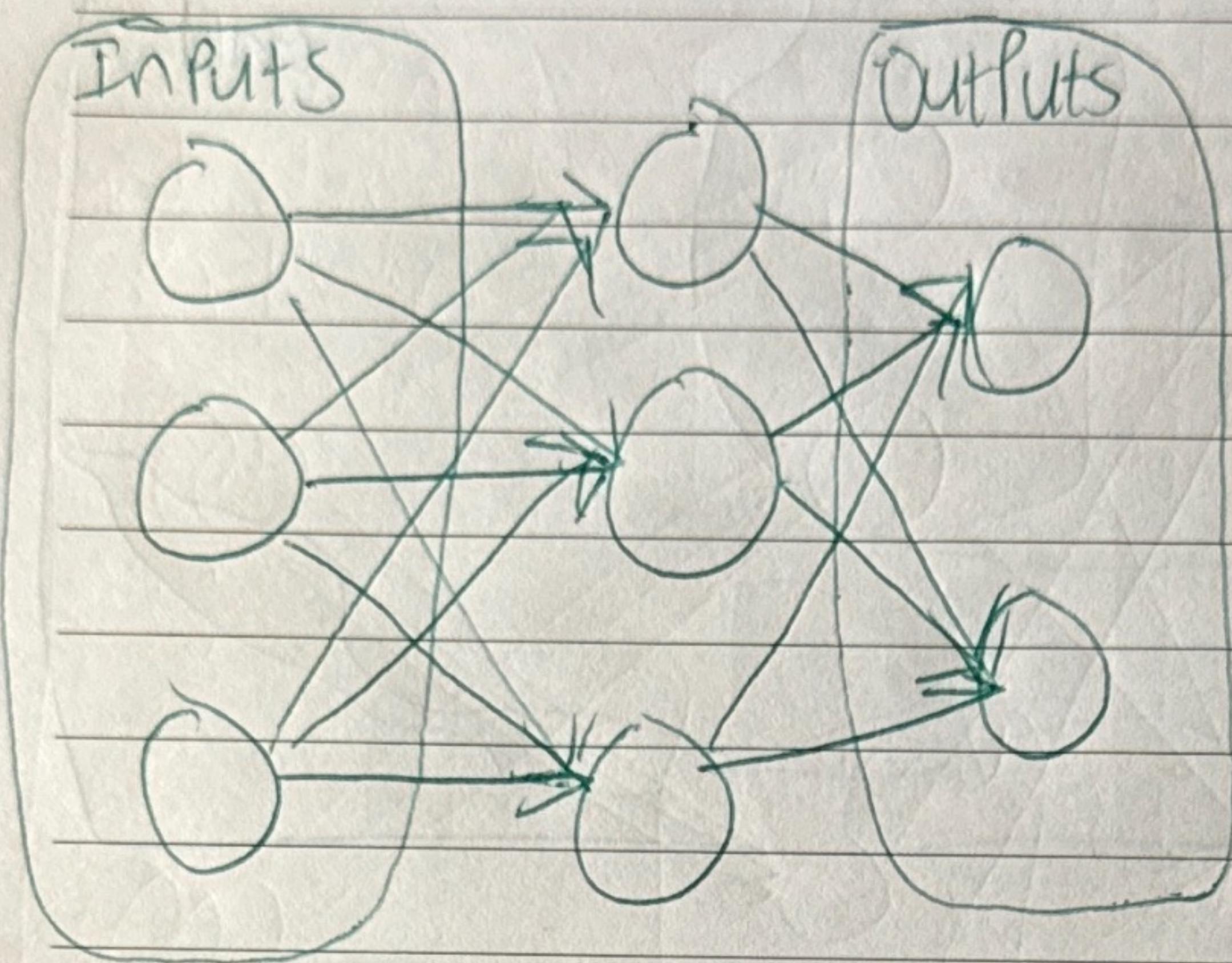


These are all the States that a golf ball can take, and a golf ball agent will avoid places that are darker.



For selected state action pairs update the agent's state action cube.

Neural Networks

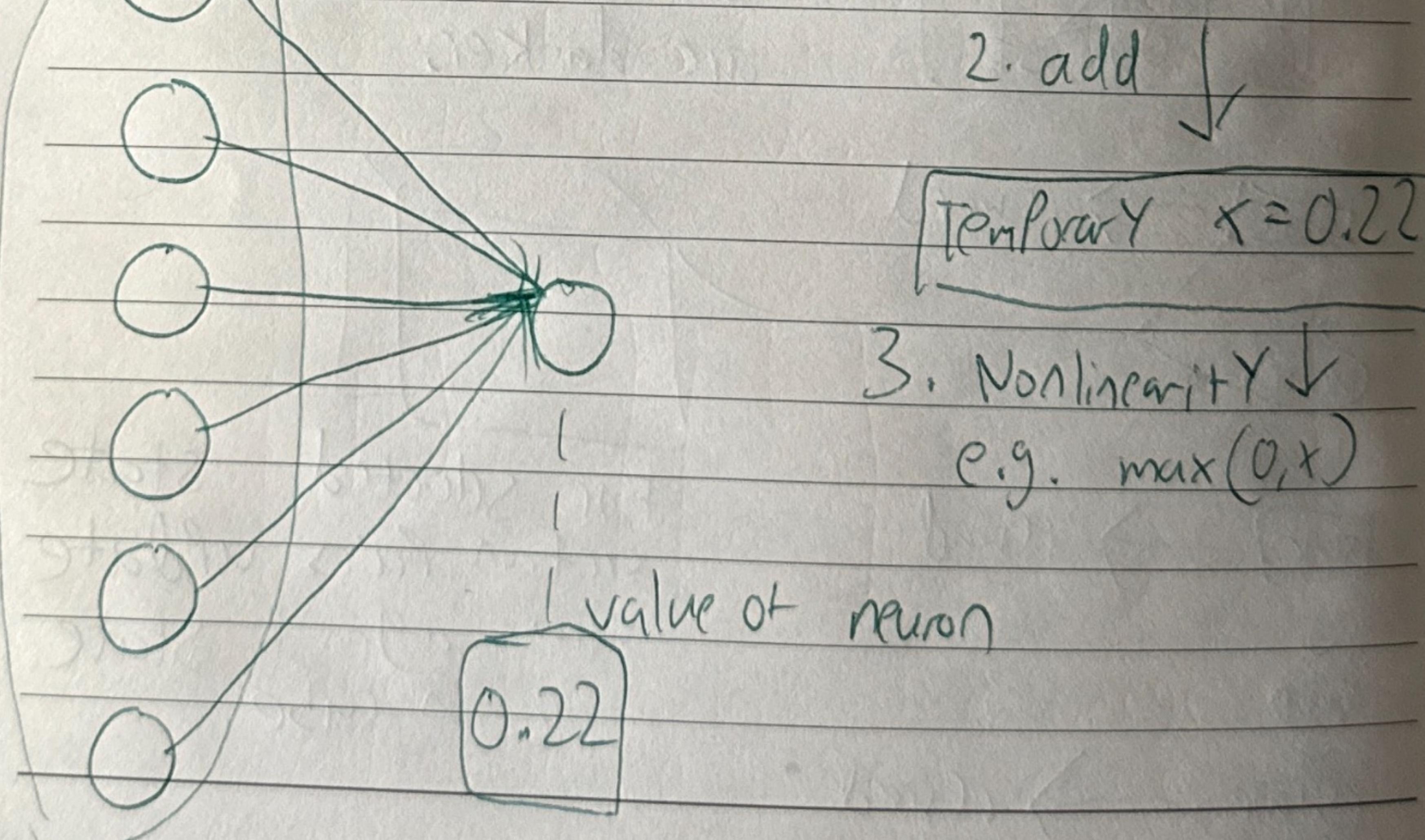


Inputs to neuron

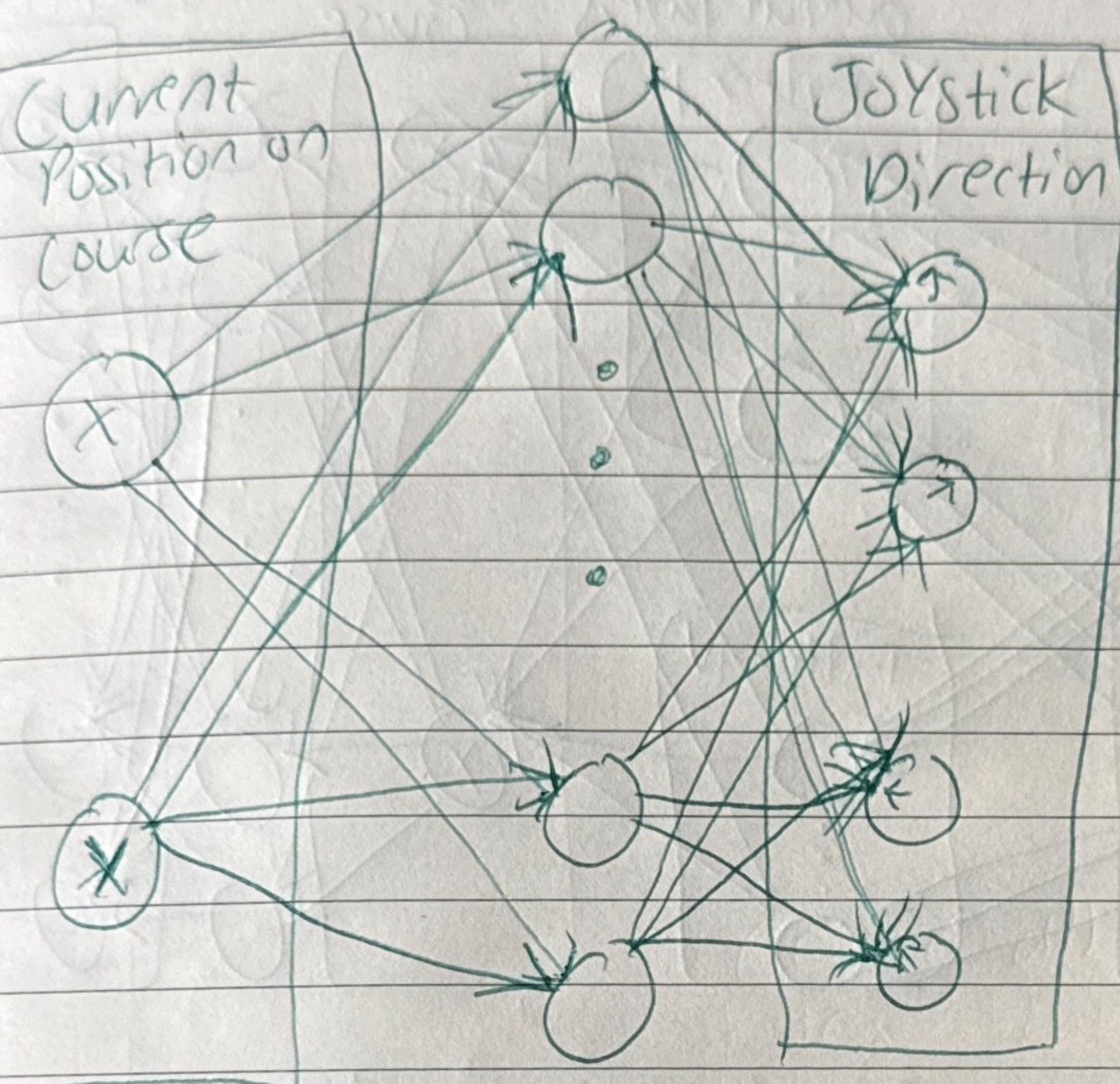
1.2	x	1.0
0.6	x	0.2
-0.2	x	0.5
0.1	x	-0.5
0.0	x	0.6
-0.5	x	-0.1

Multiply

1.20
0.12
-0.10
-0.05
0.00
0.05

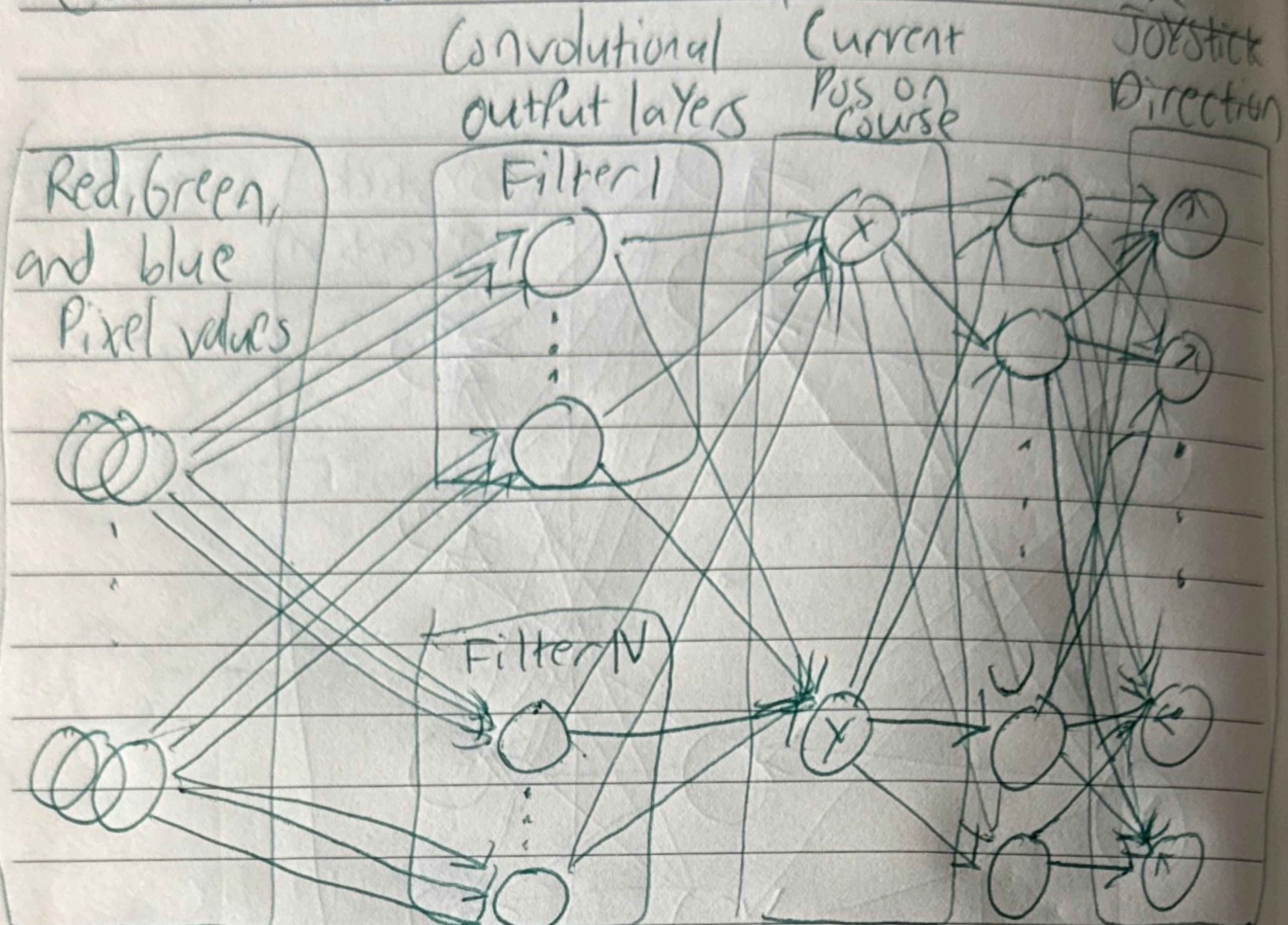


Atari Playing neural networks



The current position is placed at (x, y) and it decides where to move next to move and the values are passed to the value-state-action cube.

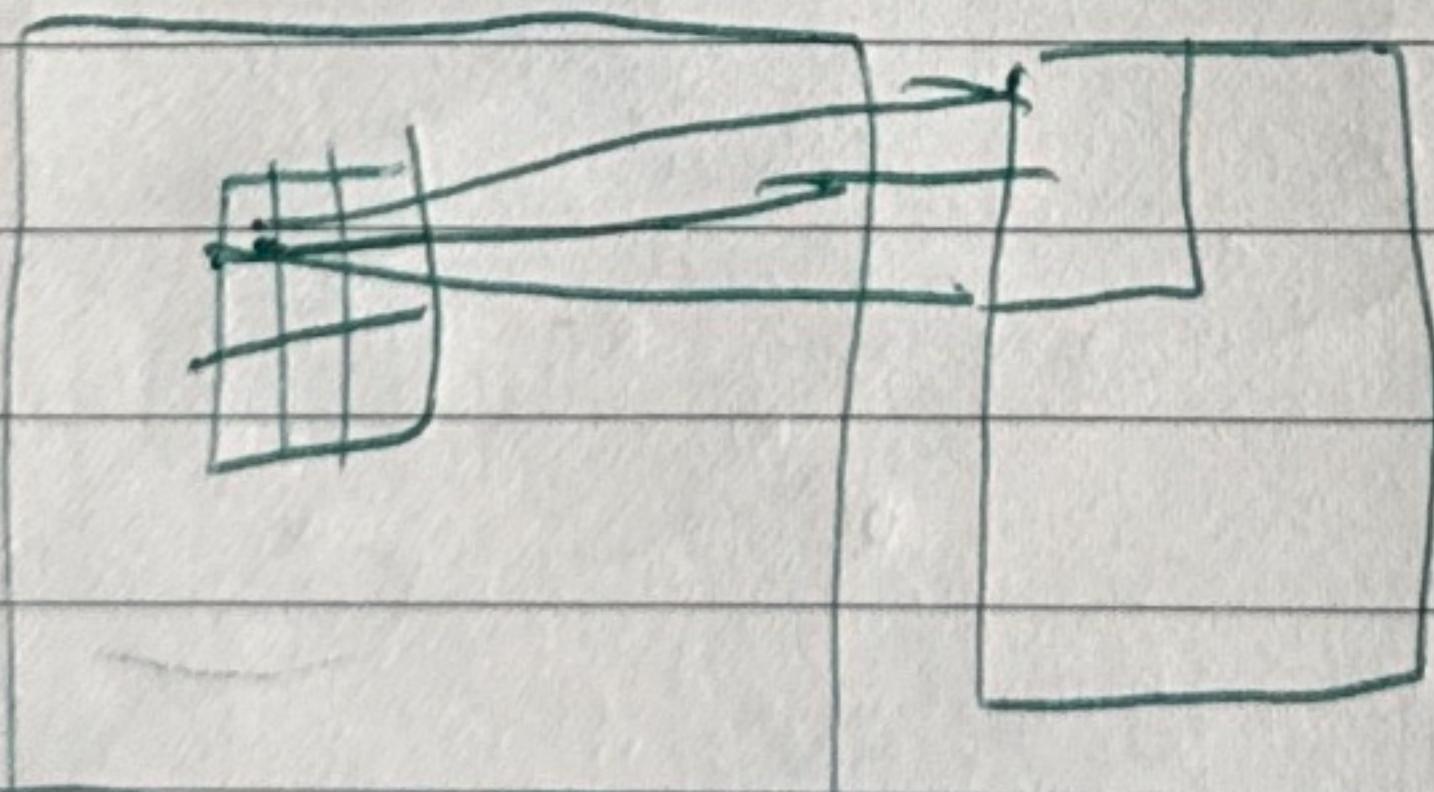
Convolutional neural network



This is a neural network made to play golf

the left two layers convert the pixels into coordinates & then based on the coordinates they move.

original image convolution 1



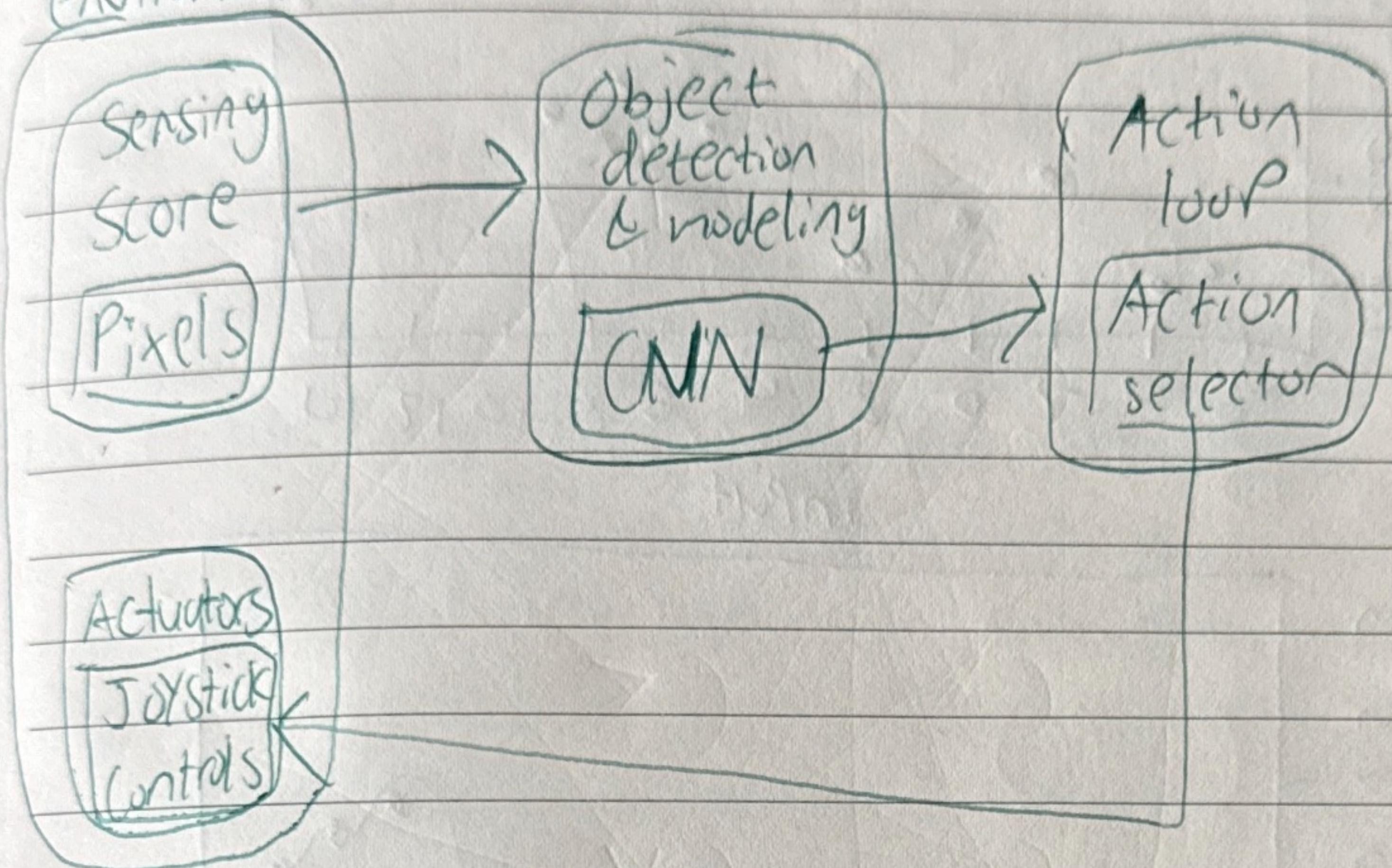
the filter scans the image and produces a image where one pixel = a patch of the input image.

Architecture for Atari Playing agent

Arcade
Learning
environment

Perception

Planning



Overfitting in Neural Network

