Graphics Bundle

Chapter 1: Become an Adaptive Thinker

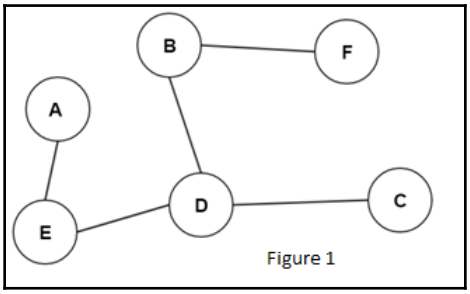


Figure 1

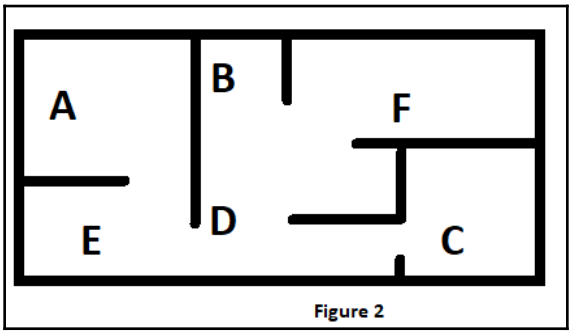
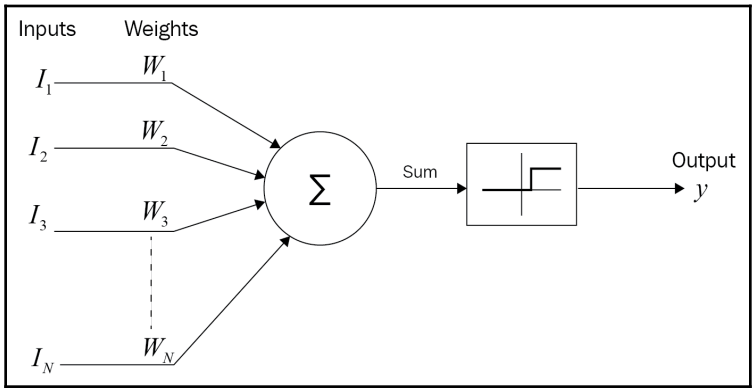
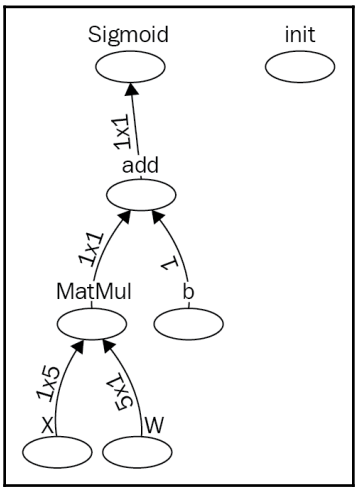
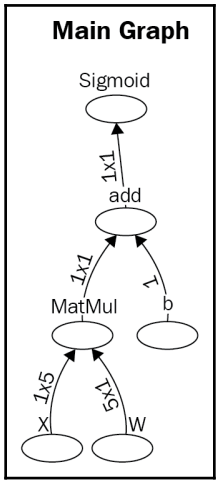


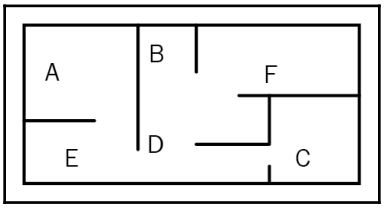
Figure 2

Chapter 2: Think like a Machine

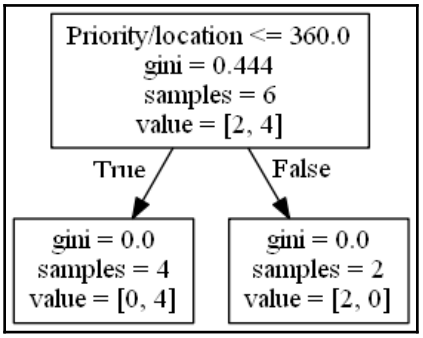




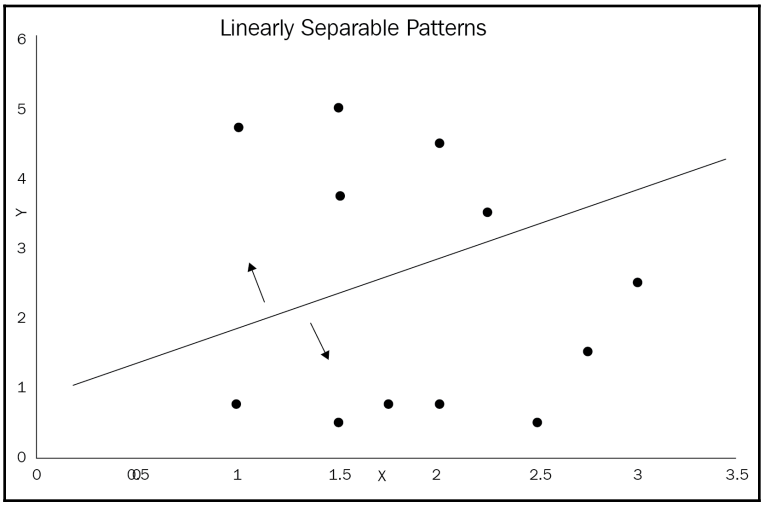

Main Graph
Sigmoid
1x1
add
1x1
1
MatMul
b
1x5
1x5
X
W

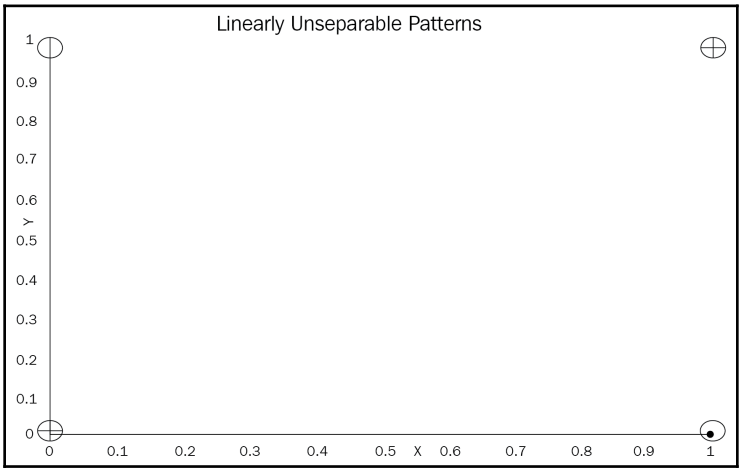

A
B
F
D
E
C

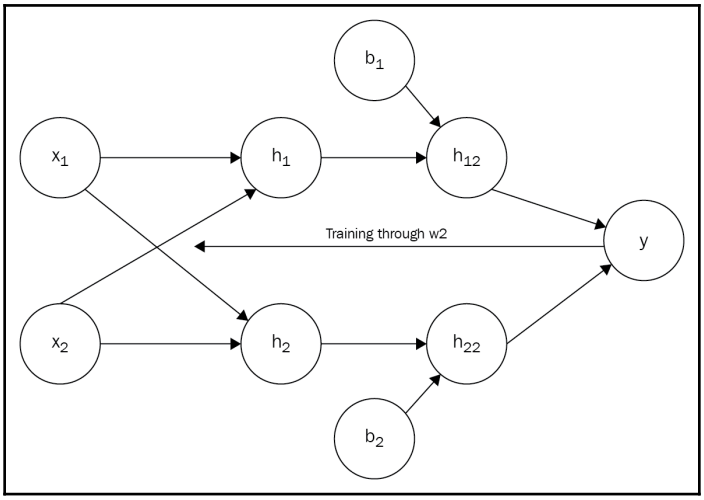
Chapter 3: Apply Machine Thinking to a Human Problem

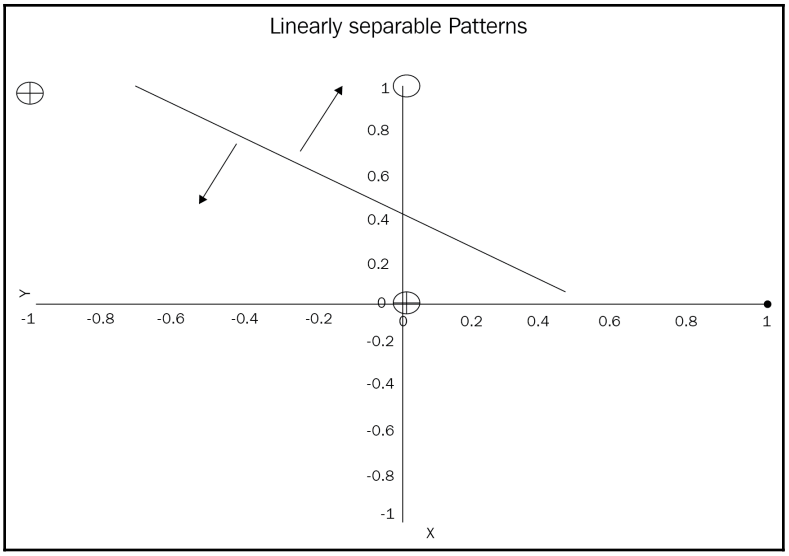


Chapter 4: Become an Unconventional Innovator

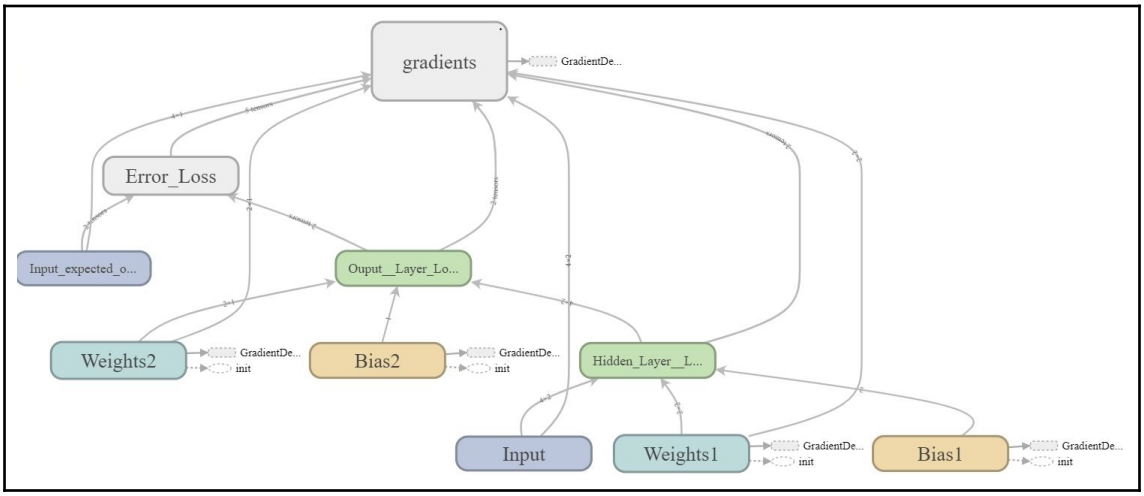


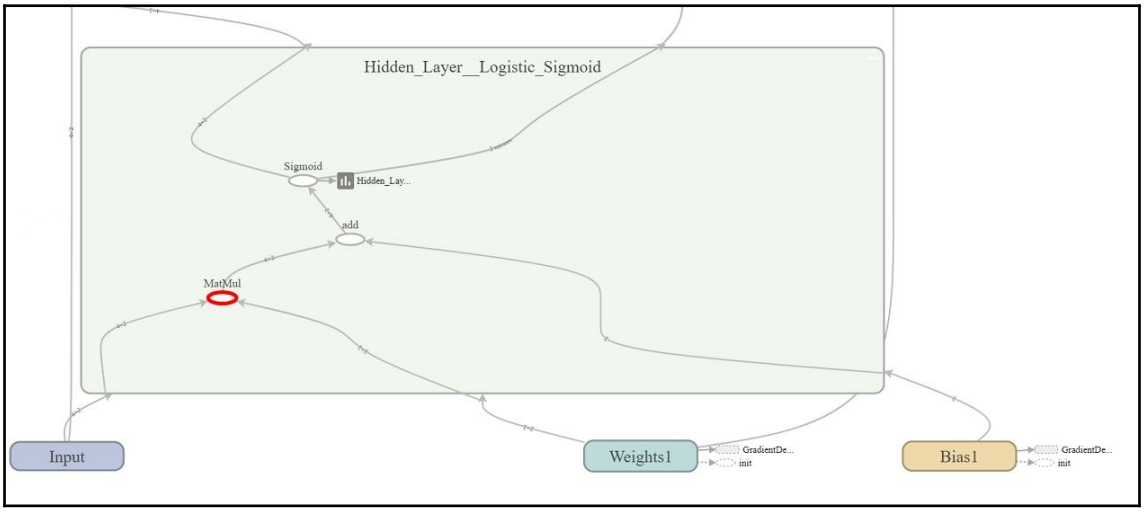


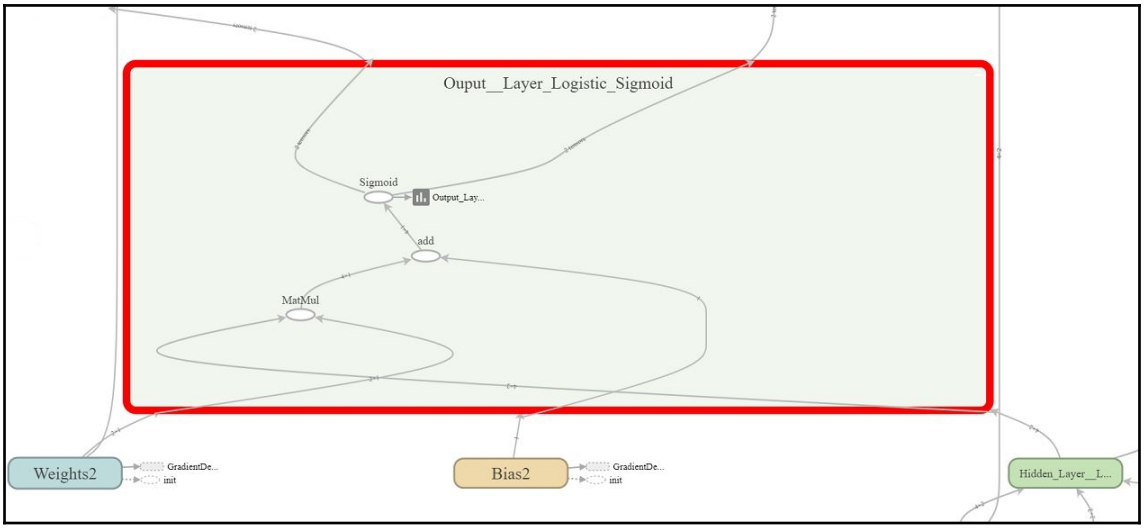

b1
x1
h1
h12
Training through w2
y
x2
h2
h22
b2

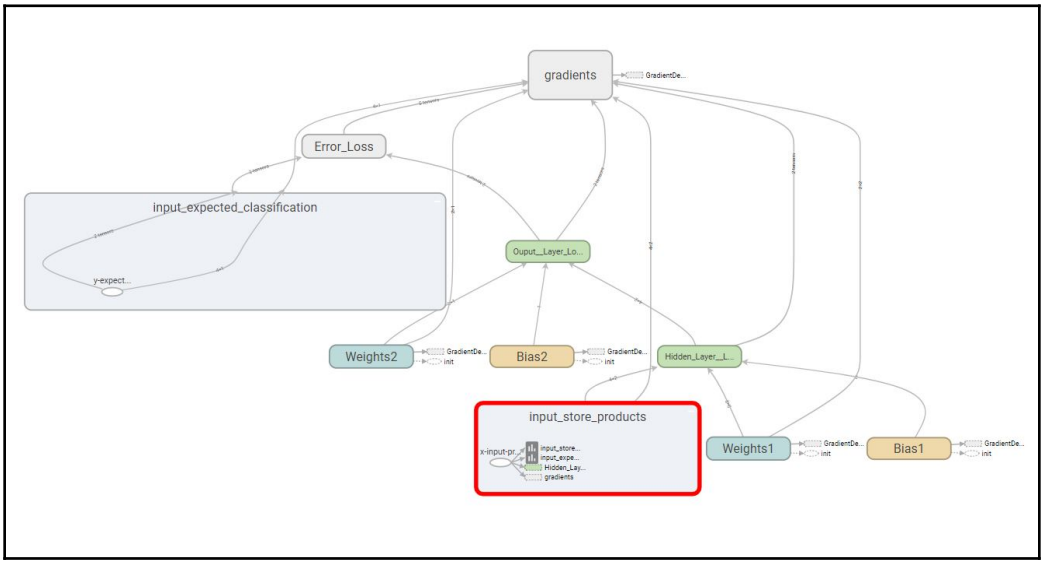

Linearly separable Patterns
1
0.8
0.6
0.4
0.2
Y
0
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
-0.2
-0.4
-0.6
-0.8
-1
X

Chapter 5: Manage the Power of Machine Learning and Deep Learning

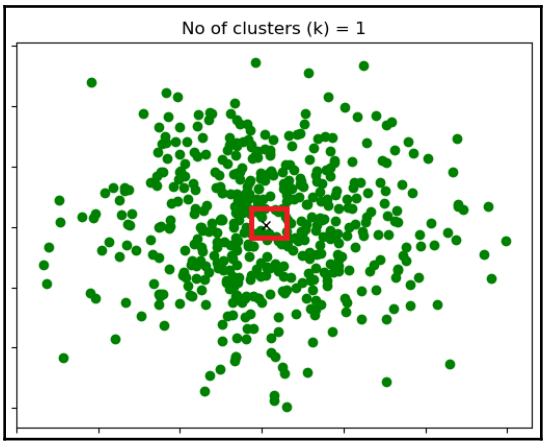


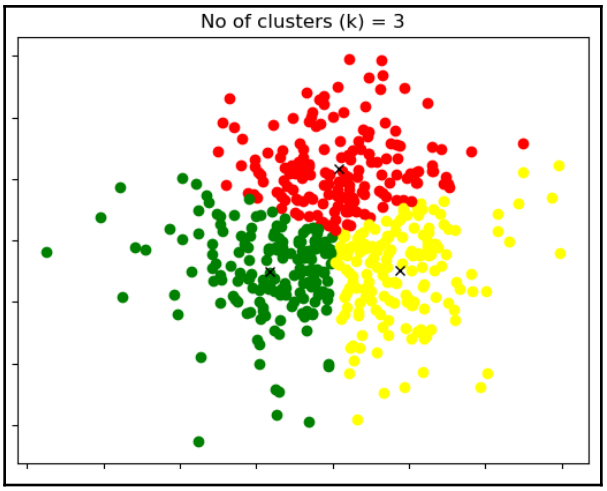


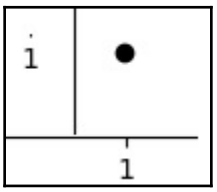

Ouput__Layer_Logistic_Sigmoid
Sigmoid
Output_Lay...
add
MatMul
Weights2
GradientDe...
init
Bias2
GradientDe...
init
Hidden_Layer__L...

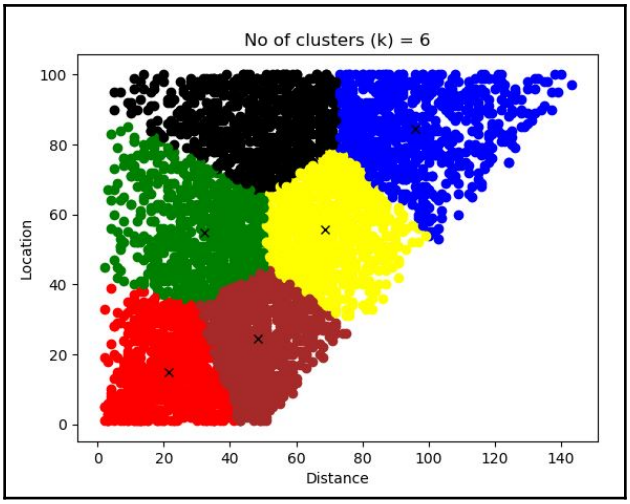

gradients
GradientDe...
Error_Loss
input_expected_classification
y-expect...
Ouput__Layer_Lo...
Weights2
GradientDe...
init
Bias2
GradientDe...
init
Hidden_Layer__L...
input_store_products
x-input-pr...
input_store...
input_expe...
Hidden_Lay...
gradients
Weights1
GradientDe...
init
Bias1
GradientDe...
init

Chapter 6: Don't Get Lost in Techniques – Focus on Optimizing Your Solutions





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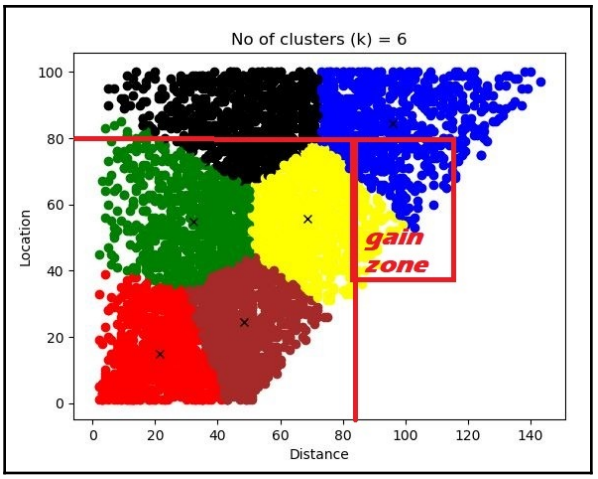
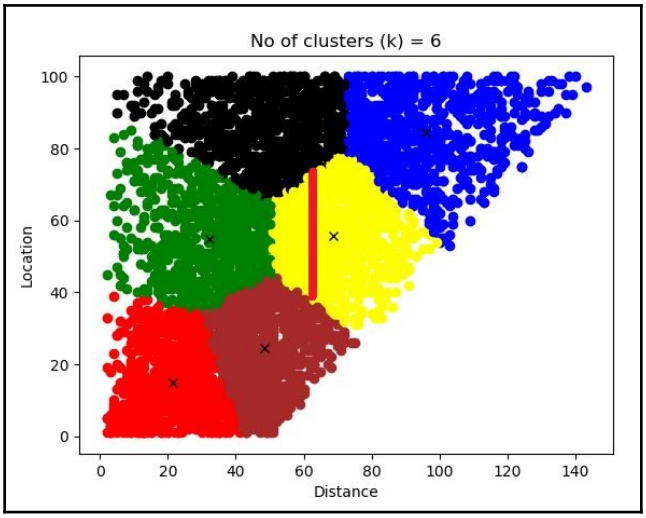
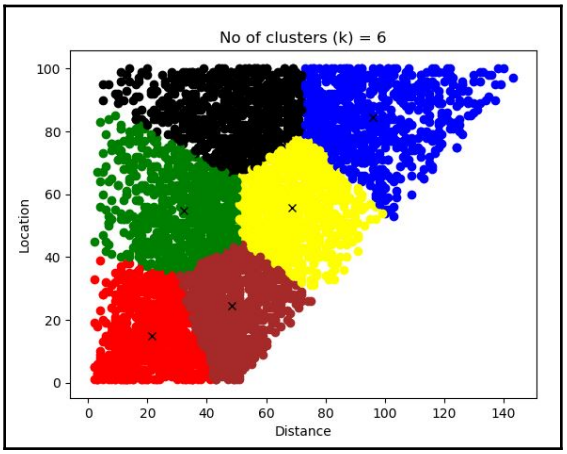
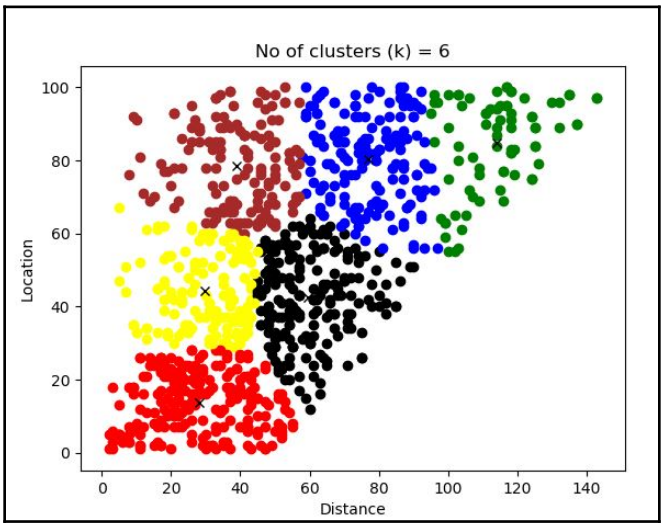
Location
Distance
0
20
40
60
80
100
120
140

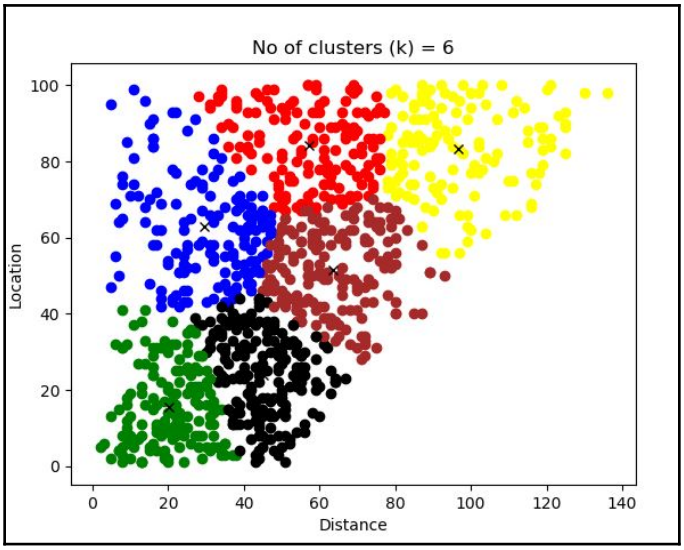

No of clusters (k) = 6
Location
Distance
gain
zone
0
20
40
60
80
100
120
140

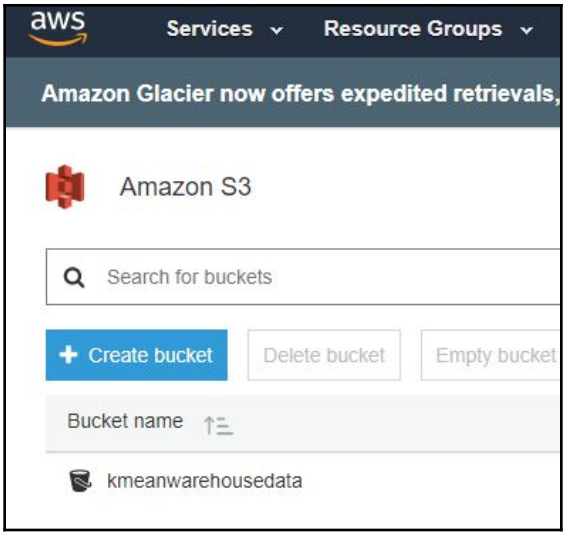

No of clusters (k) = 6
Location
Distance
0
20
40
60
80
100
120
140

Chapter 7: When and How to Use Artificial Intelligence






No of clusters (k) = 6
Location
Distance
0
20
40
60
80
100
120
140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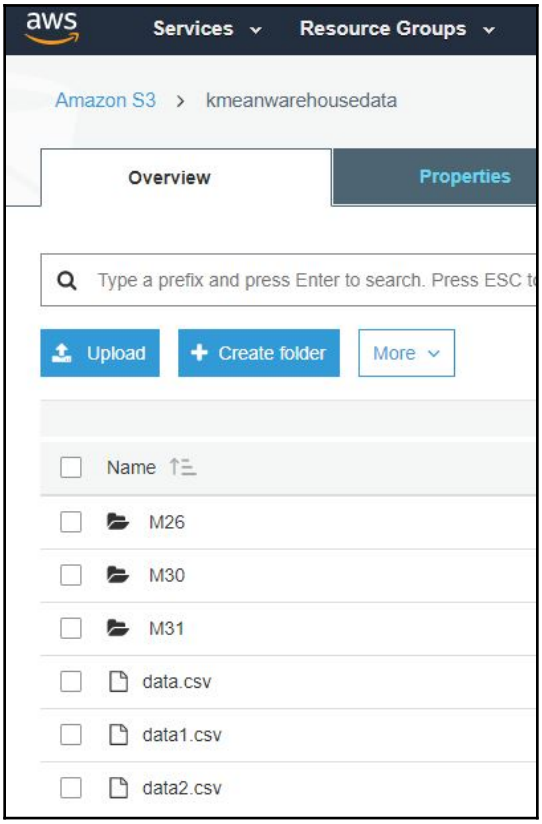
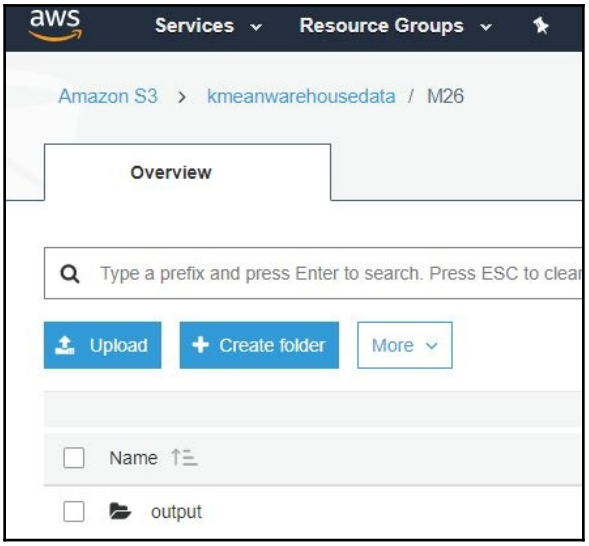
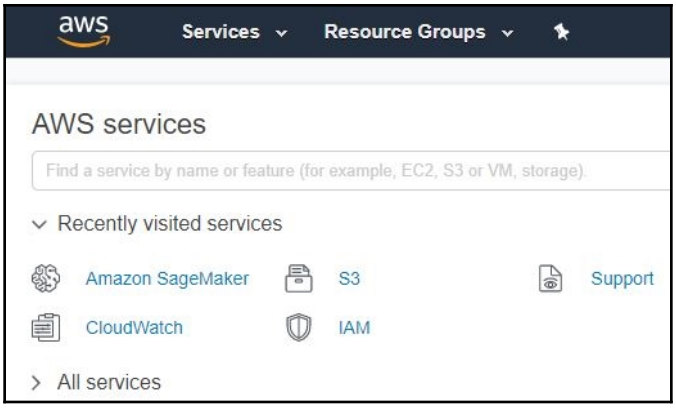
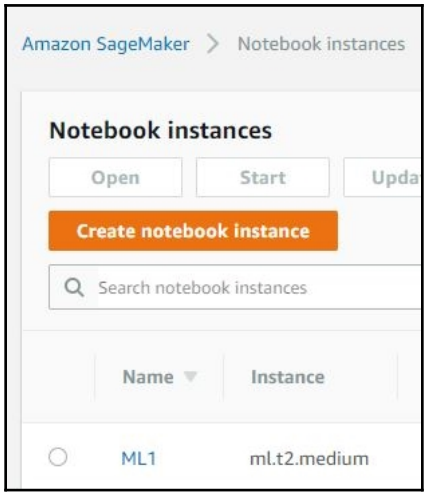
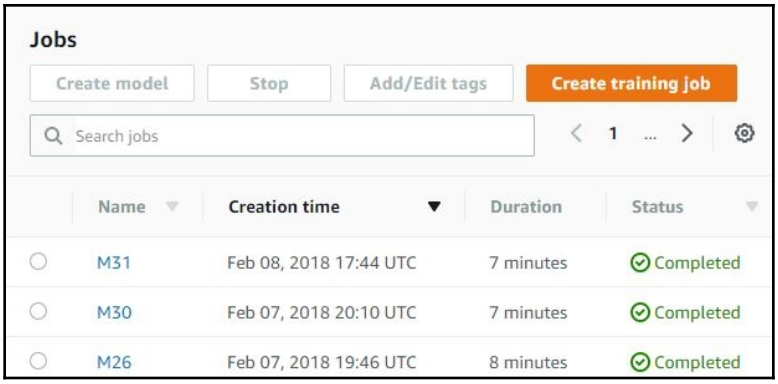
Services
Resource Groups
Amazon Glacier now offers expedited retrievals.
Amazon S3
Search for buckets
Create bucket
Delete bucket
Empty bucket
Bucket name
kmeanwarehousedata

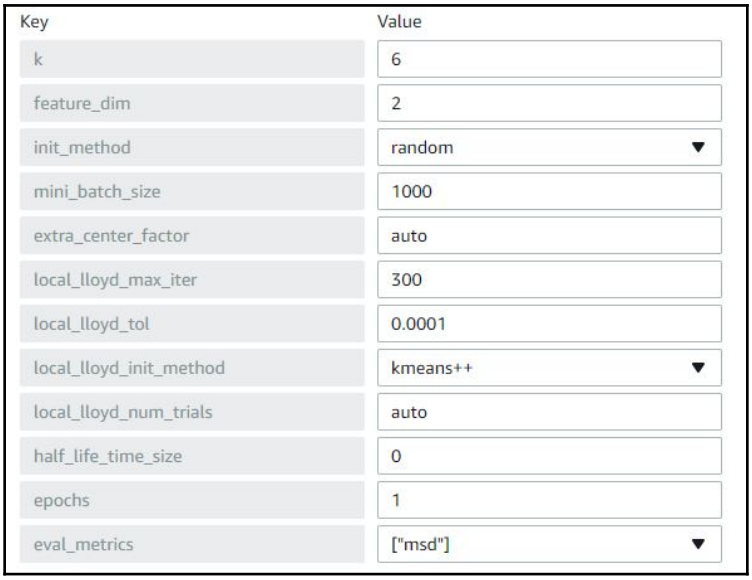

aws
Services
Resource Groups
Amazon S3 > kmeanwarehousedata
Overview
Properties
Type a prefix and press Enter to search. Press ESC t
Upload
Create folder
More
Name
M26
M30
M31
data.csv
data1.csv
data2.csv


aws
Services
Resource Groups
Amazon S3 › kmeanwarehousedata / M26
Overview
Type a prefix and press Enter to search. Press ESC to clear
Upload
Create folder
More
Name
output


aws
Services
Resource Groups
AWS services
Find a service by name or feature (for example, EC2, S3 or VM, storage).
Recently visited services
Amazon SageMaker
S3
Support
CloudWatch
IAM
All services

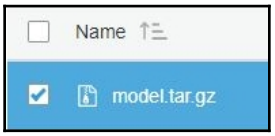

Amazon SageMaker
Notebook instances
Notebook instances
Open
Start
Upda
Create notebook instance
Search notebook instances
Name
Instance
ML1
ml.t2.medium


Jobs
Create model
Stop
Add/Edit tags
Create training job
Search jobs
1
...
Name
Creation time
Duration
Status
M31
Feb 08, 2018 17:44 UTC
7 minutes
Completed
M30
Feb 07, 2018 20:10 UTC
7 minutes
Completed
M26
Feb 07, 2018 19:46 UTC
8 minutes
Completed


Key
Value
k
6
feature_dim
2
init_method
random
mini_batch_size
1000
extra_center_factor
auto
local_lloyd_max_iter
300
local_lloyd_tol
0.0001
local_lloyd_init_method
kmeans++
local_lloyd_num_trials
auto
half_life_time_size
0
epochs
1
eval_metrics
["msd"]

Create training job

Name
Creation time
Duration
Status
M31
Feb 08, 2018 17:44 UTC
7 minutes
Completed


Name
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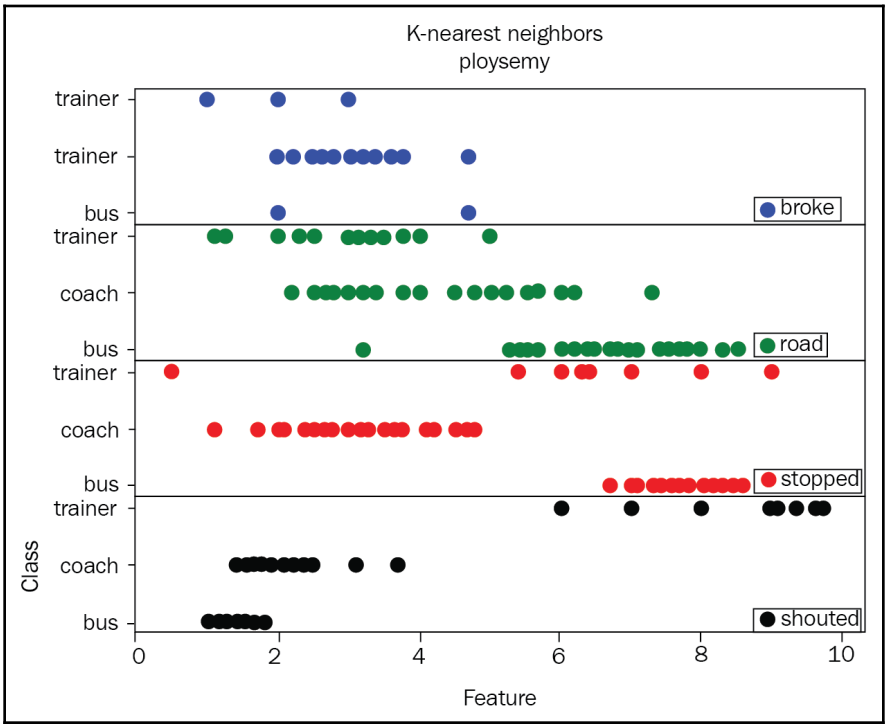
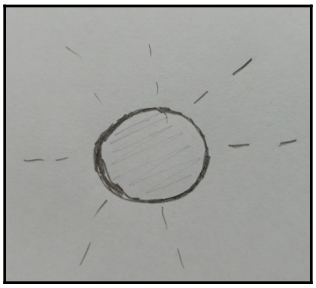
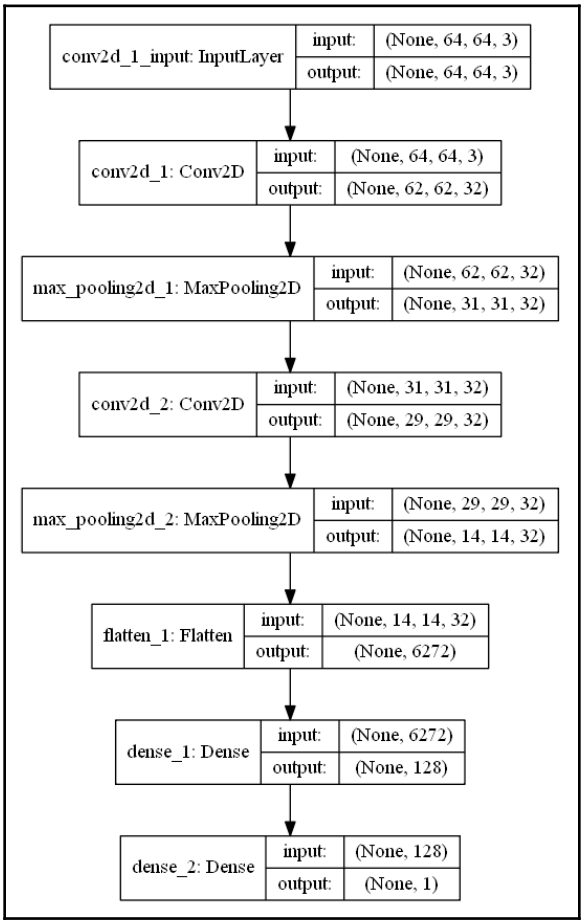
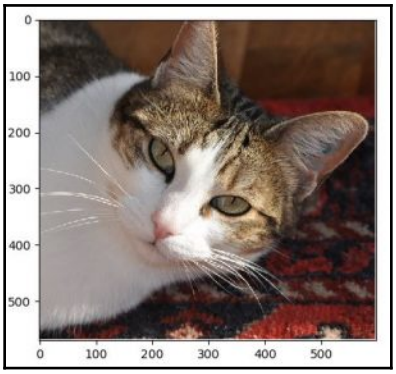
Chapter 8: Revolutions Designed for Some Corporations and Disruptive Innovations for Small to Large Companies

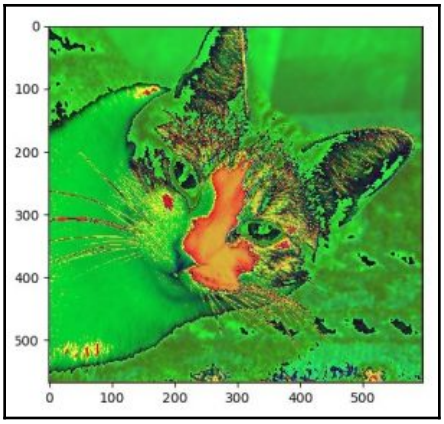


Chapter 9: Getting Your Neurons to Work

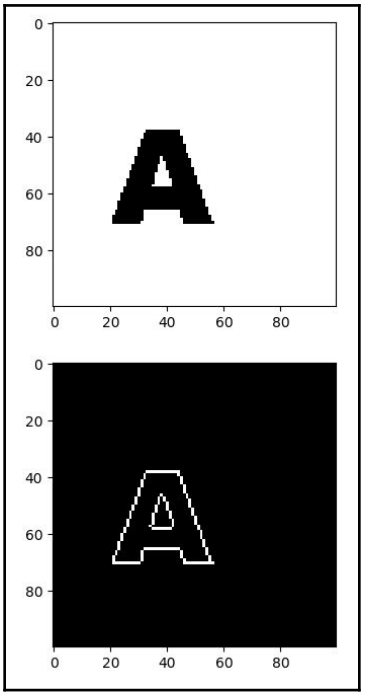





0
100
200
300
400
500
0
100
200
300
400
500


0
100
200
300
400
500
0
100
200
300
400
500

A


0
20
40
60
80
0
20
40
60
80
0
20
40
60
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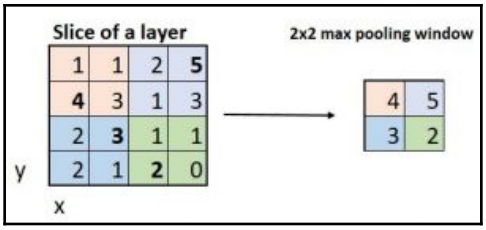
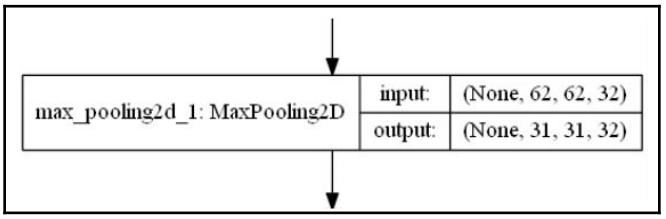
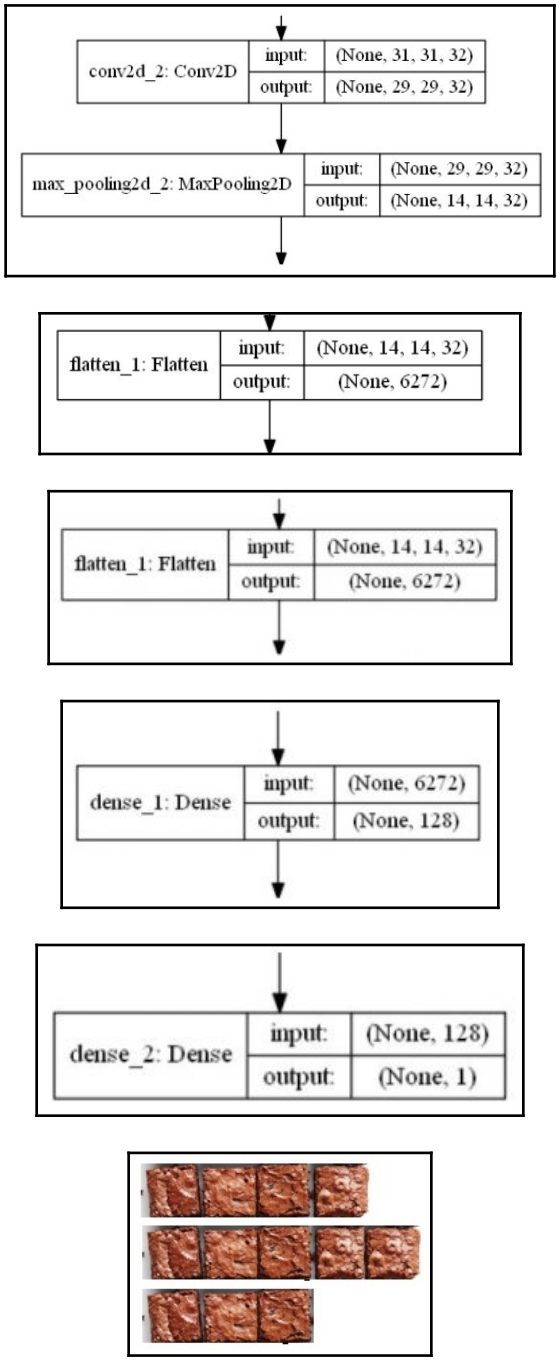
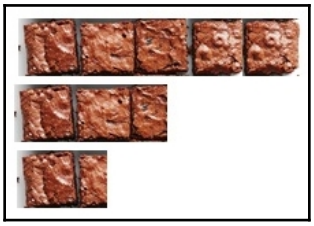
0
20
40
60
80

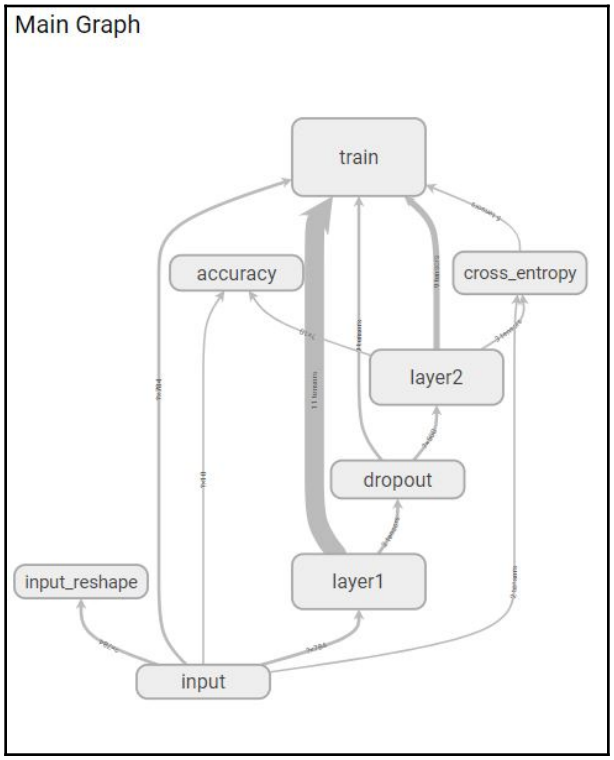

Slice of a layer
2x2 max pooling window
1 1 2 5
4 3 1 3
2 3 1 1
2 1 2 0
4 5
3 2
y
x

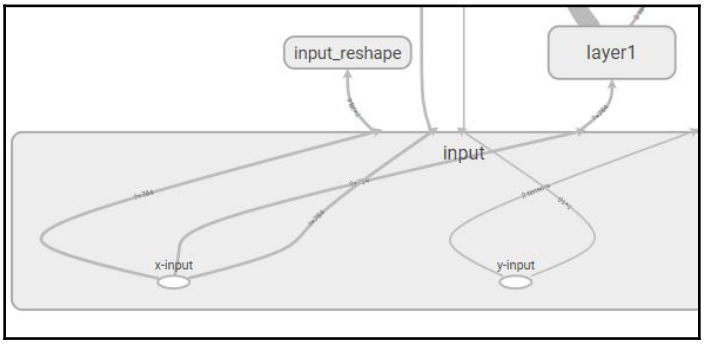

max_pooling2d_1: MaxPooling2D
input: (None, 62, 62, 32)
output: (None, 31, 31, 32)

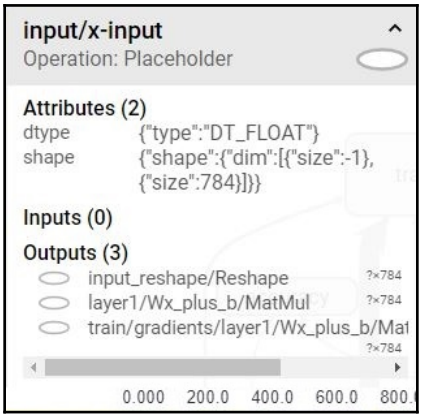

conv2d_2: Conv2D
input: (None, 31, 31, 32)
output: (None, 29, 29, 32)
max_pooling2d_2: MaxPooling2D
input: (None, 29, 29, 32)
output: (None, 14, 14, 32)
flatten_1: Flatten
input: (None, 14, 14, 32)
output: (None, 6272)
flatten_1: Flatten
input: (None, 14, 14, 32)
output: (None, 6272)
dense_1: Dense
input: (None, 6272)
output: (None, 128)
dense_2: Dense
input: (None, 128)
output: (None, 1)

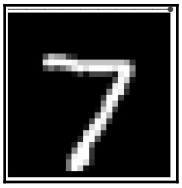


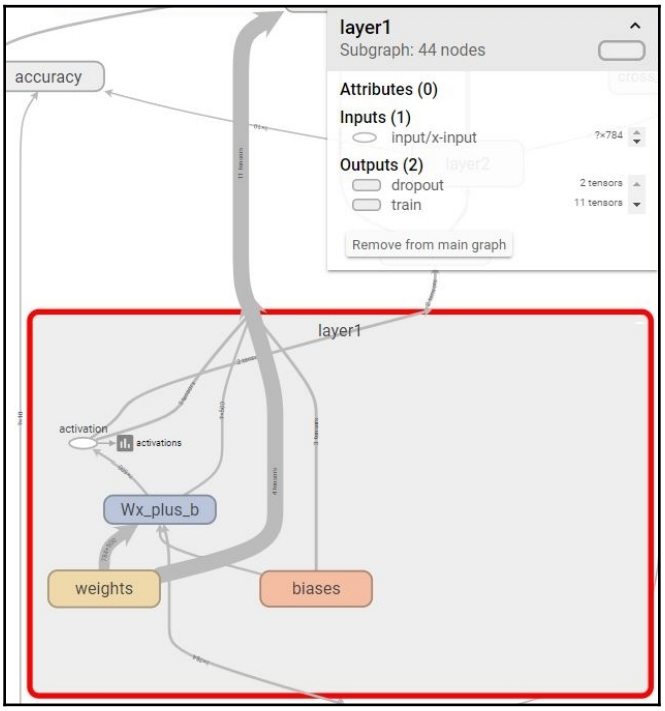
Chapter 10: Applying Biomimicking to Artificial Intelligence

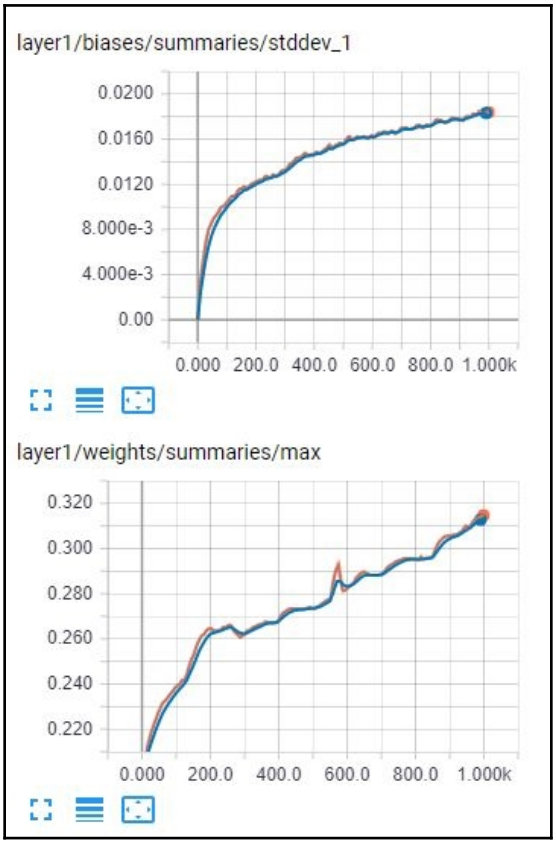


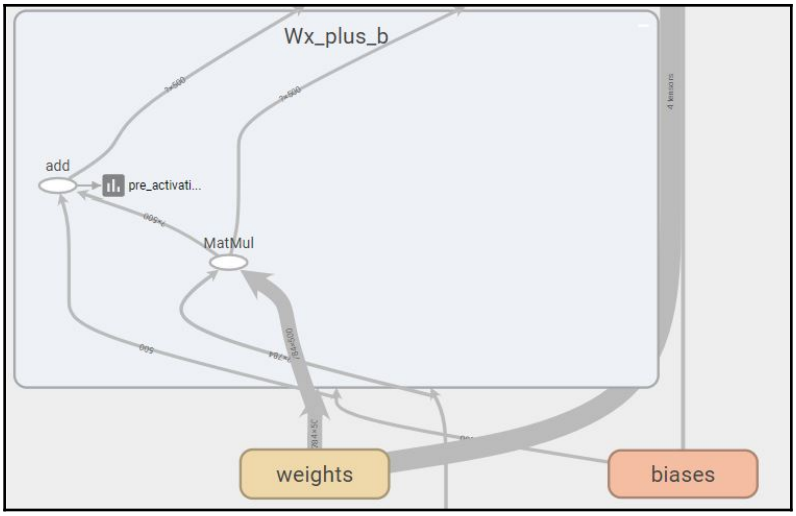


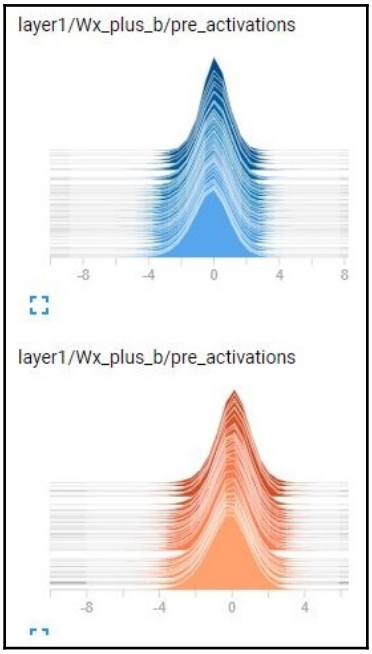

input/x-input
Operation: Placeholder
Attributes (2)
dtype {"type":"DT_FLOAT"}
shape {"shape":{"dim":[{"size":-1},
{"size":784}]}}
Inputs (0)
Outputs (3)
input_reshape/Reshape ?×784
layer1/Wx_plus_b/MatMul ?×784
train/gradients/layer1/Wx_plus_b/Mat
?×784
0.000 200.0 400.0 600.0 800.

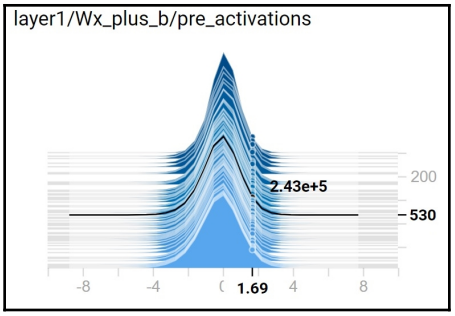


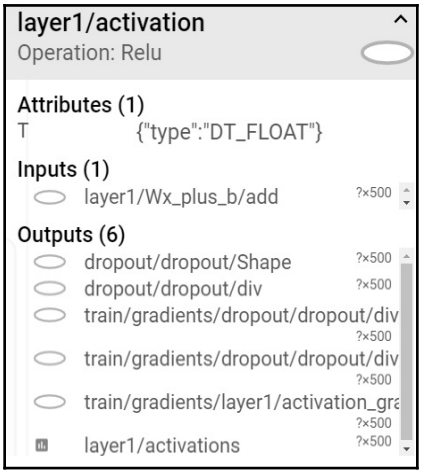

accuracy
layer1
Subgraph: 44 nodes
Attributes (0)
Inputs (1)
input/x-input ?×784
Outputs (2)
dropout 2 tensors
train 11 tensors
Remove from main graph
layer1
activation
activations
Wx_plus_b
weights
biases

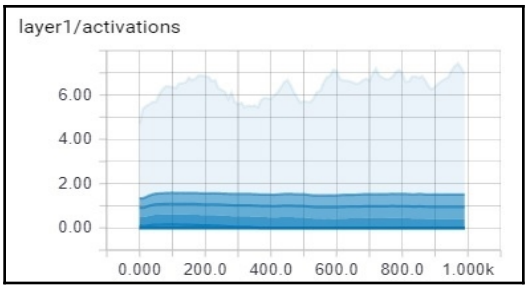

layer1/biases/summaries/stddev_1
0.0200
0.0160
0.0120
8.000e-3
4.000e-3
0.00
0.000 200.0 400.0 600.0 800.0 1.000k
layer1/weights/summaries/max
0.320
0.300
0.280
0.260
0.240
0.220
0.000 200.0 400.0 600.0 800.0 1.000k

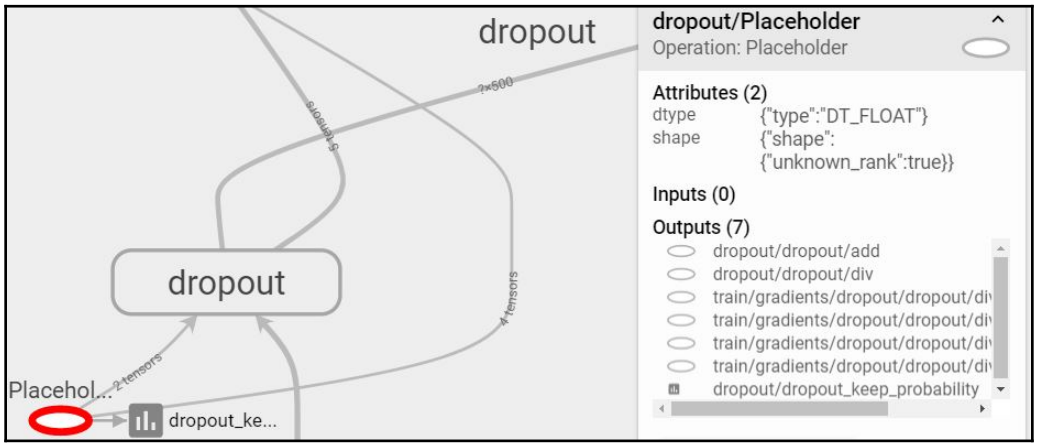

Wx_plus_b
add
pre_activati...
MatMul
weights
biases

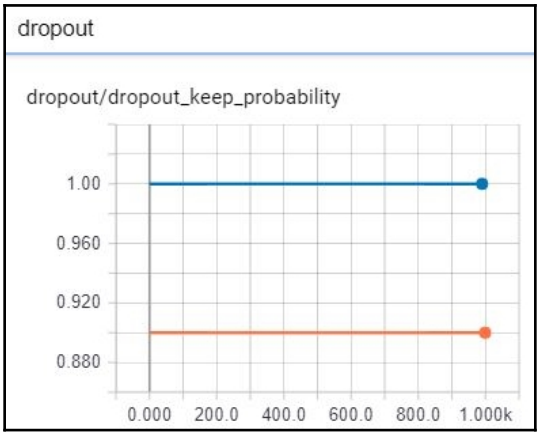

layer1/Wx_plus_b/pre_activations
-8
-4
0
4
8
layer1/Wx_plus_b/pre_activations
-8
-4
0
4

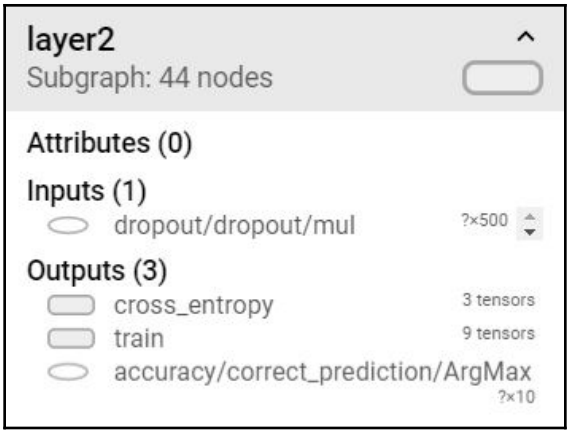

layer1/Wx_plus_b/pre_activations
2.43e+5
200
530
-8
-4
1.69
4
8

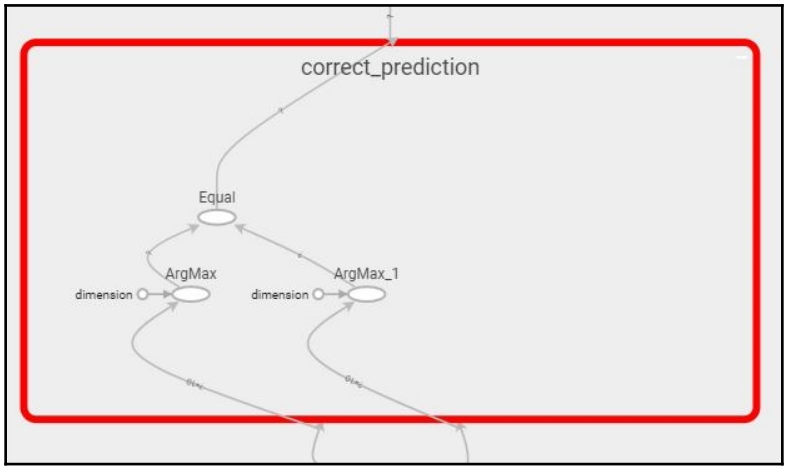

layer1/activation
Operation: Relu
Attributes (1)
T {"type":"DT_FLOAT"}
Inputs (1)
layer1/Wx_plus_b/add ?×500
Outputs (6)
dropout/dropout/Shape ?×500
dropout/dropout/div ?×500
train/gradients/dropout/dropout/div ?×500
train/gradients/dropout/dropout/div ?×500
train/gradients/layer1/activation_gra ?×500
layer1/activations ?×500

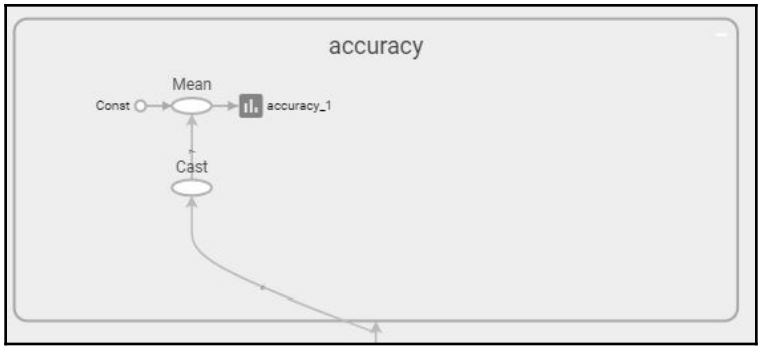

layer1/activations
6.00
4.00
2.00
0.00
0.000
200.0
400.0
600.0
800.0
1.000k

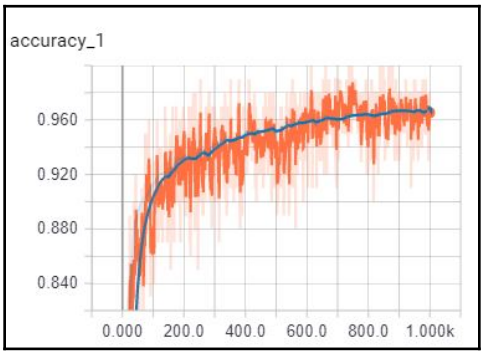

dropout
?×500
5 tensors
dropout
4 tensors
Placehol...
2 tensors
dropout_ke...
dropout/Placeholder
Operation: Placeholder
Attributes (2)
dtype {"type":"DT_FLOAT"}
shape {"shape":
{"unknown_rank":true}}
Inputs (0)
Outputs (7)
dropout/dropout/add
dropout/dropout/div
train/gradients/dropout/dropout/di
train/gradients/dropout/dropout/di
train/gradients/dropout/dropout/di
train/gradients/dropout/dropout/di
dropout/dropout_keep_probability

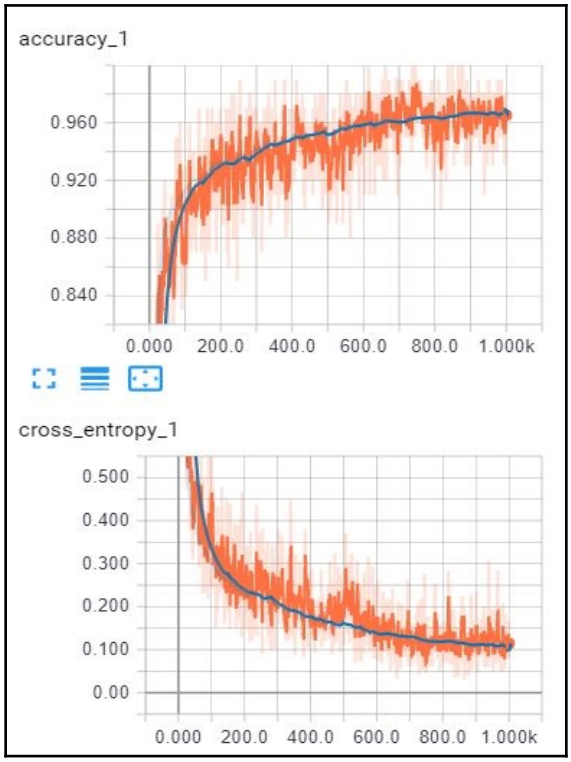

dropout
dropout/dropout_keep_probability
1.00
0.960
0.920
0.880
0.000
200.0
400.0
600.0
800.0
1.000k

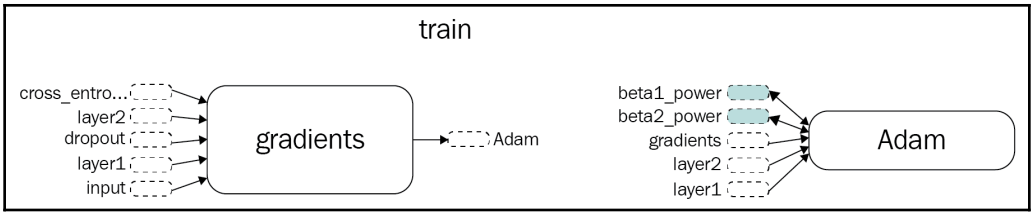

layer2
Subgraph: 44 nodes
Attributes (0)
Inputs (1)
dropout/dropout/mul
?×500
Outputs (3)
cross_entropy
3 tensors
train
9 tensors
accuracy/correct_prediction/ArgMax
?×10

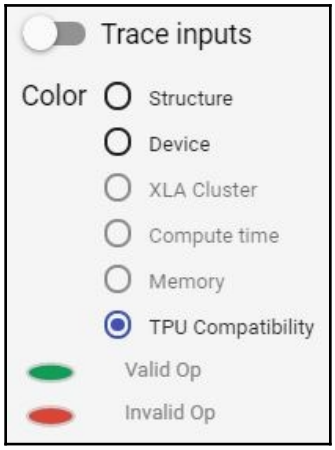

correct_prediction
Equal
ArgMax
ArgMax_1
dimension
dimension

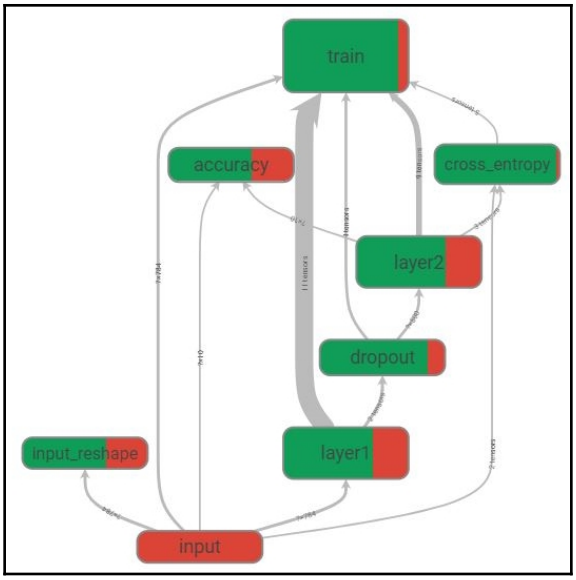

accuracy
Mean
Const
accuracy_1
Cast

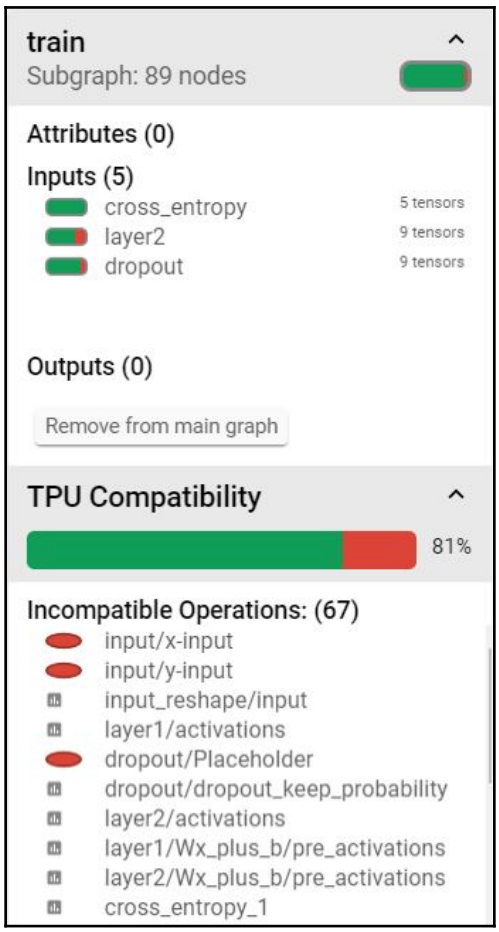

accuracy_1
0.960
0.920
0.880
0.840
0.000
200.0
400.0
600.0
800.0
1.000k

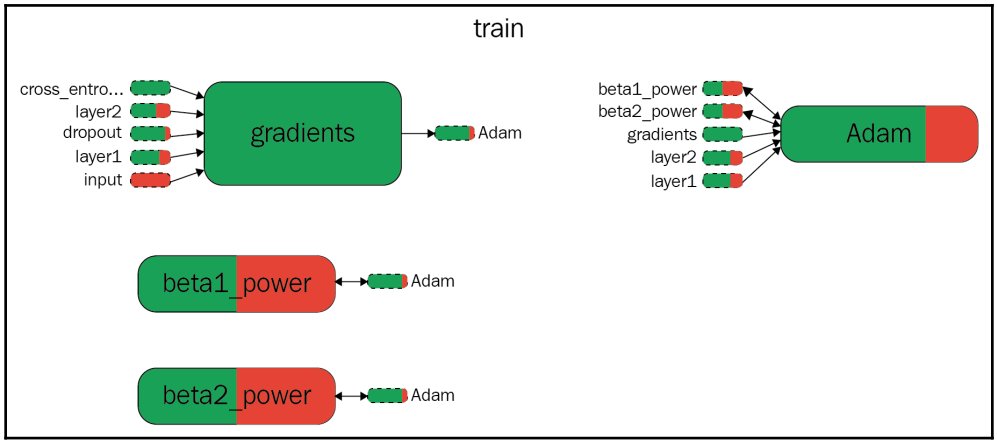

accuracy_1
0.960
0.920
0.880
0.840
0.000
200.0
400.0
600.0
800.0
1.000k
cross_entropy_1
0.500
0.400
0.300
0.200
0.100
0.00
0.000
200.0
400.0
600.0
800.0
1.000k


train
cross_entro...
layer2
dropout
layer1
input
gradients
Adam
beta1_power
beta2_power
gradients
layer2
layer1
Adam

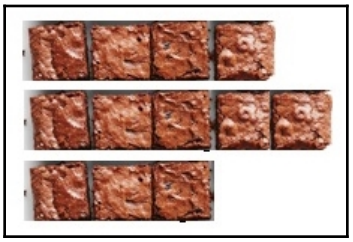

Trace inputs
Color
Structure
Device
XLA Cluster
Compute time
Memory
TPU Compatibility
Valid Op
Invalid Op

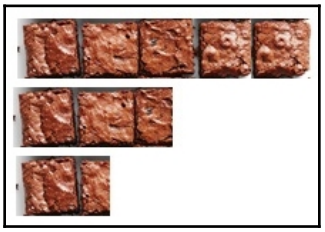

train
accuracy
cross_entropy
layer2
dropout
layer1
input_reshape
input

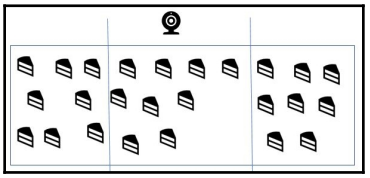

train
Subgraph: 89 nodes
Attributes (0)
Inputs (5)
cross_entropy
5 tensors
layer2
9 tensors
dropout
9 tensors
Outputs (0)
Remove from main graph
TPU Compatibility
81%
Incompatible Operations: (67)
input/x-input
input/y-input
input_reshape/input
layer1/activations
dropout/Placeholder
dropout/dropout_keep_probability
layer2/activations
layer1/Wx_plus_b/pre_activations
layer2/Wx_plus_b/pre_activations
cross_entropy_1

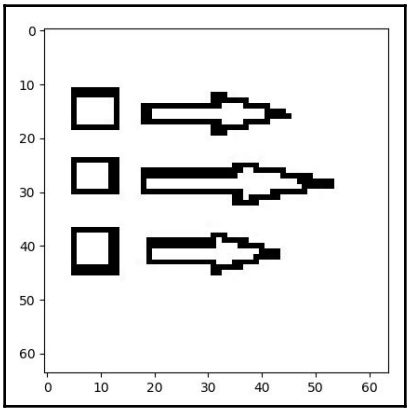

train
cross_entro...
layer2
dropout
layer1
input
gradients
Adam
beta1_power
beta2_power
gradients
layer2
layer1
Adam
beta1_power
Adam
beta2_power
Adam

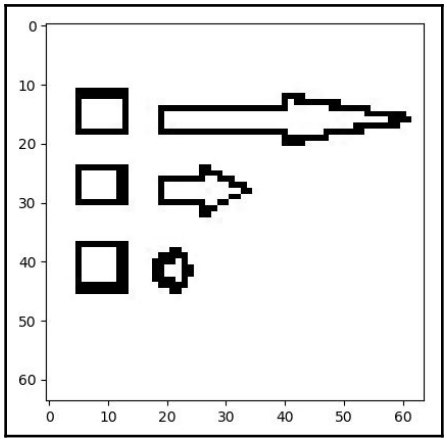
Chapter 11: Conceptual Representation Learning

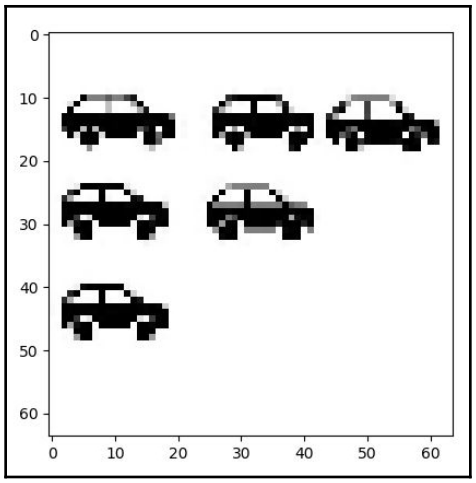


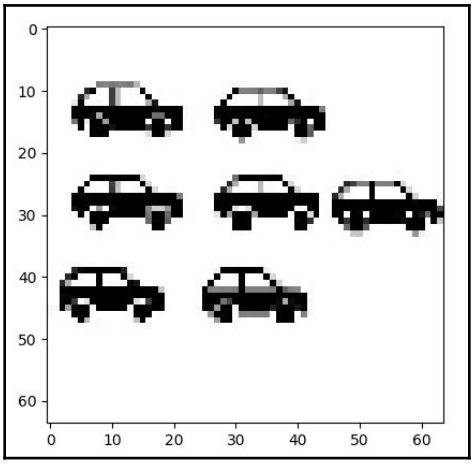


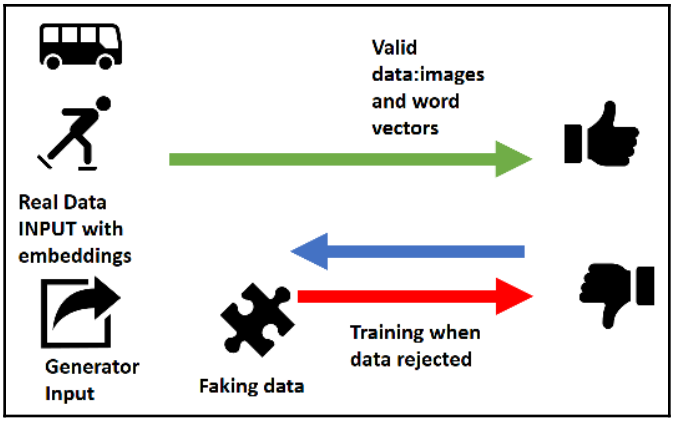


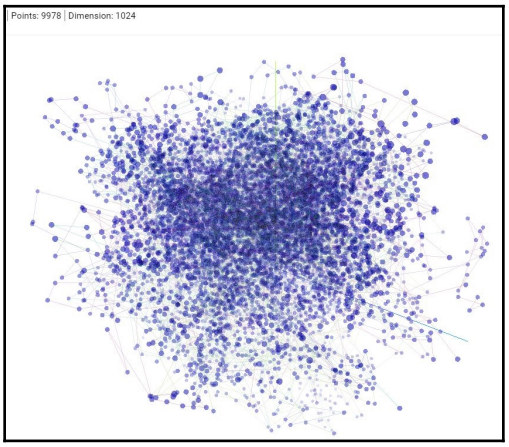



0
10
20
30
40
50
60
0
10
20
30
40
50
60

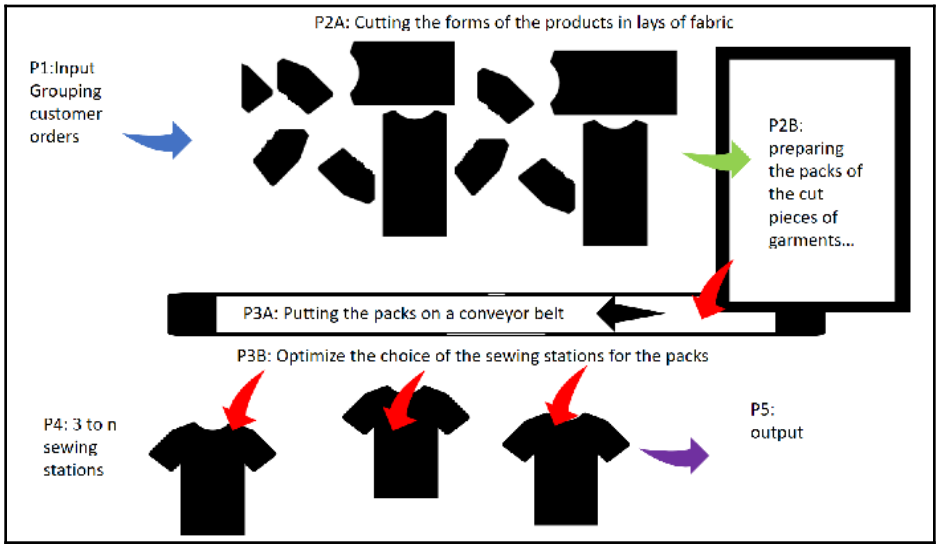

0
10
20
30
40
50
60
0
10
20
30
40
50
60

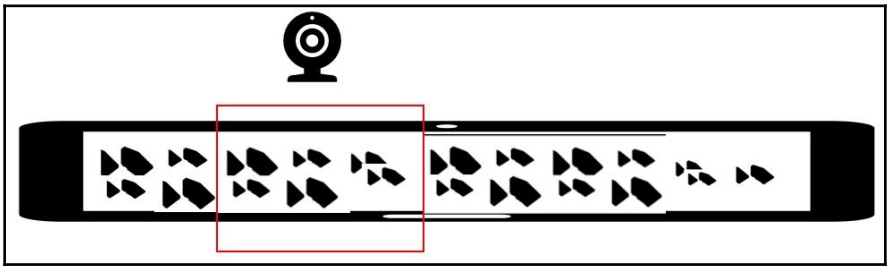

0
10
20
30
40
50
60
0
10
20
30
40
50
60

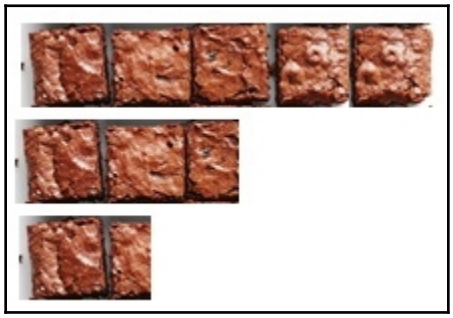

Valid
data:images
and word
vectors
Real Data
INPUT with
embeddings
Generator
Input
Faking data
Training when
data rejected

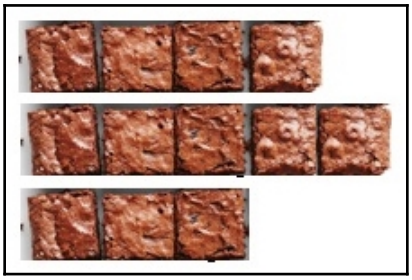

Points: 9978 | Dimension: 1024

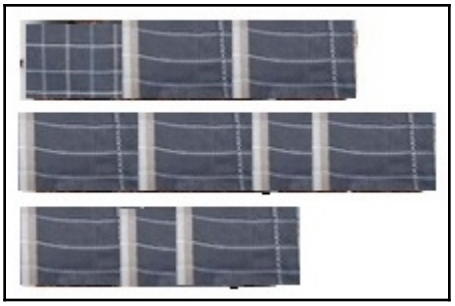
Chapter 12: Automated Planning and Scheduling

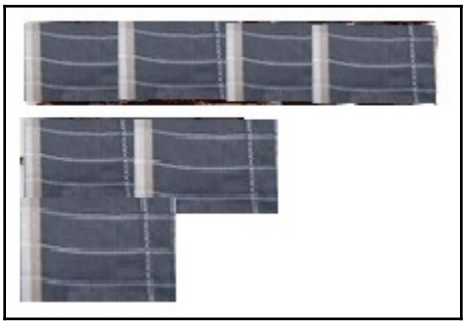


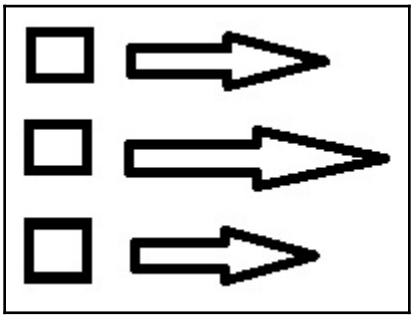


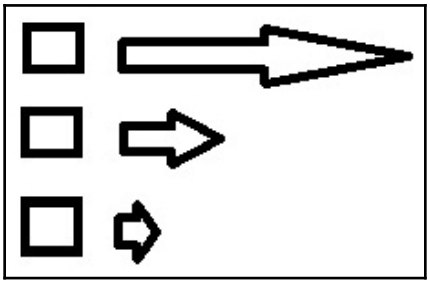


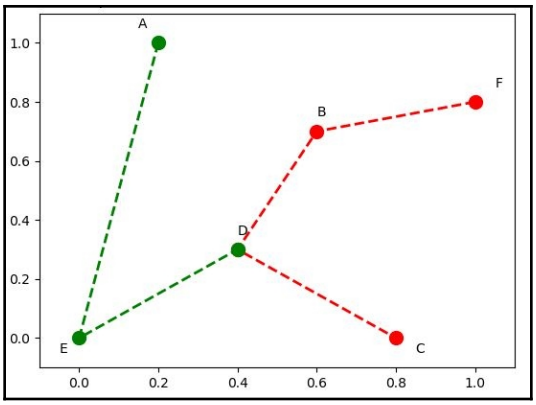


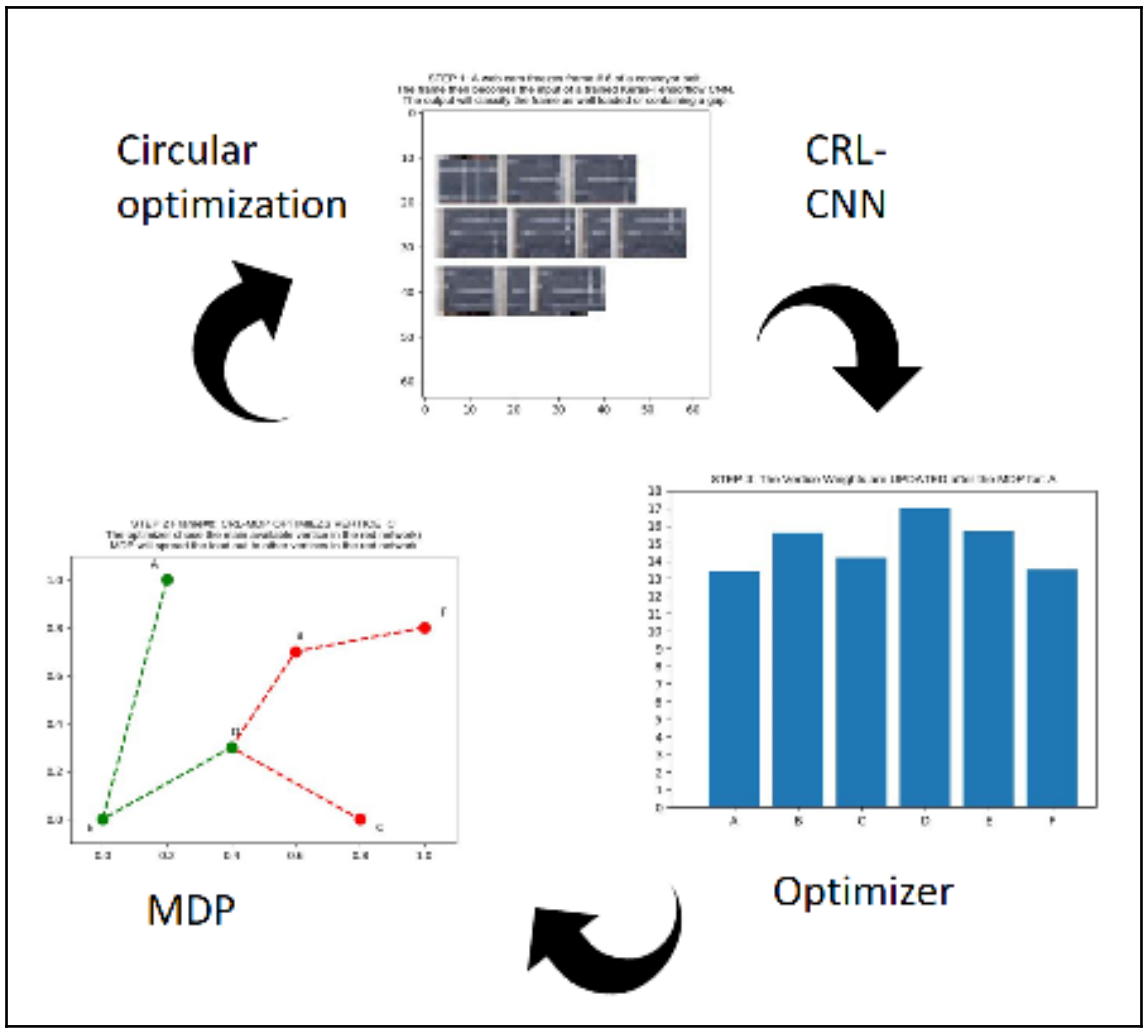


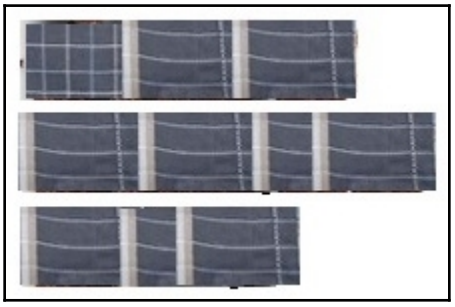


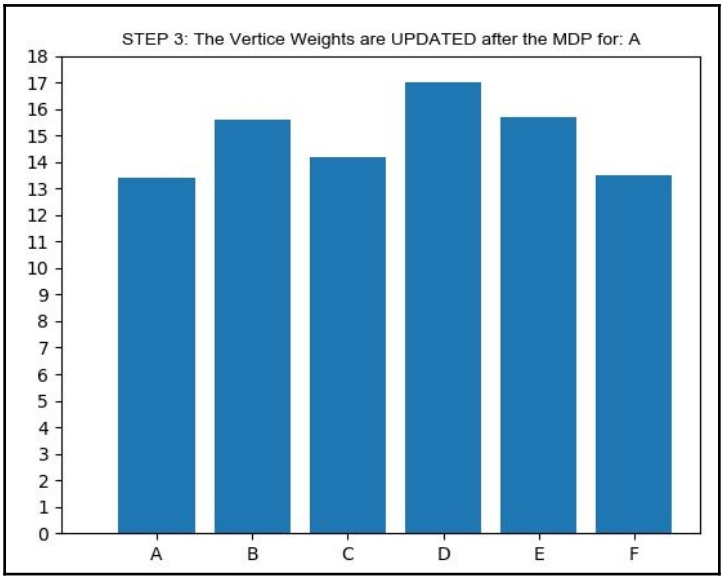


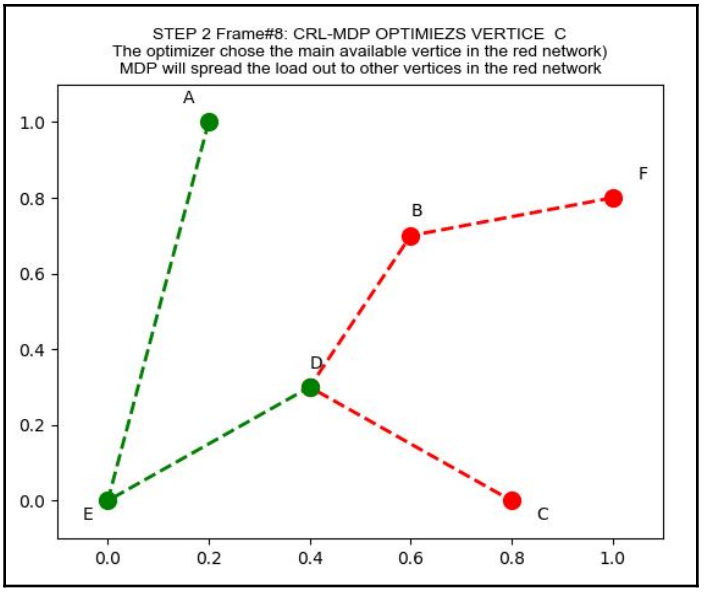



A
B
C
D
E
F
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

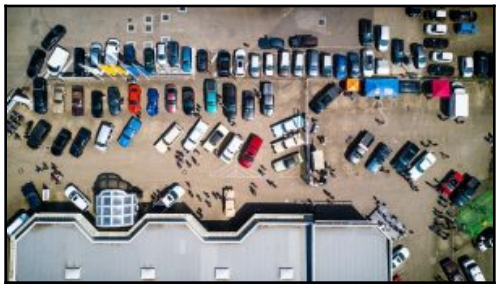

Circular optimization
CRL-CNN
MDP
Optimizer

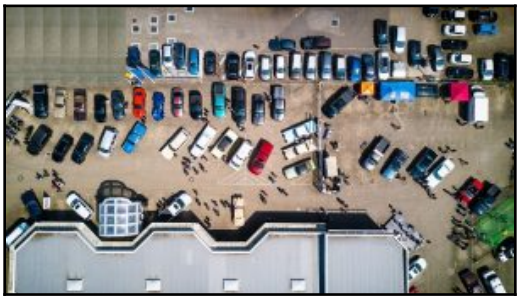


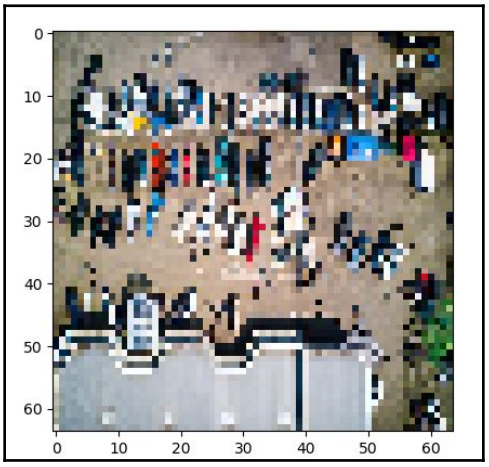

STEP 3: The Vertice Weights are UPDATED after the MDP for: A
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
A
B
C
D
E
F

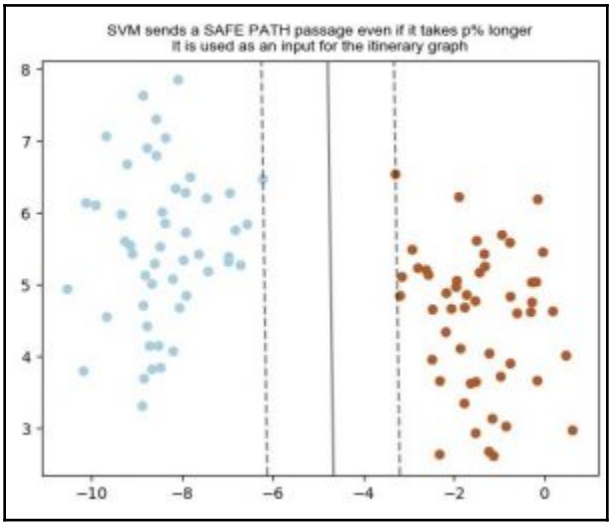

STEP 2 Frame#8: CRL-MDP OPTIMIEZS VERTICE C
The optimizer chose the main available vertice in the red network)
MDP will spread the load out to other vertices in the red network
A
F
B
D
E
C
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

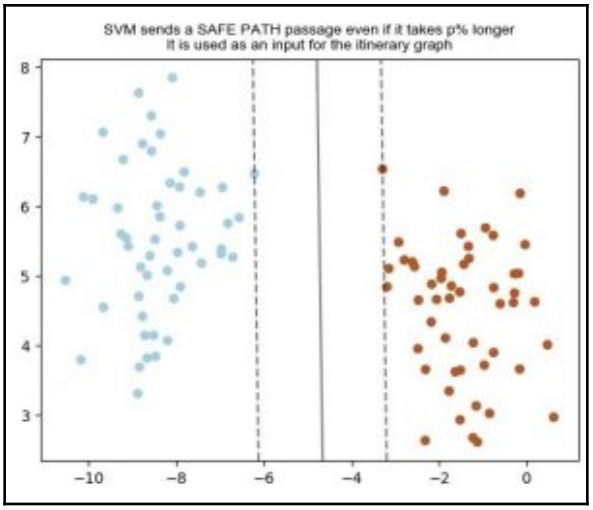
Chapter 13: AI and the Internet of Things (IoT)

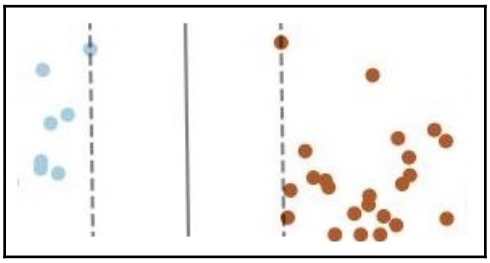


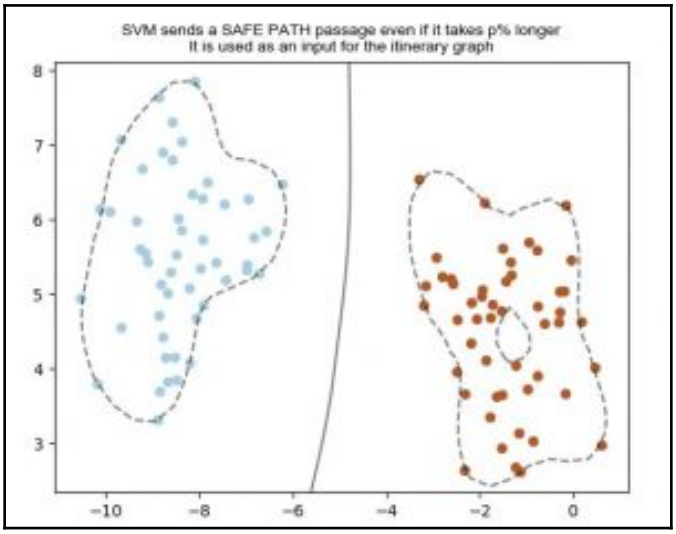


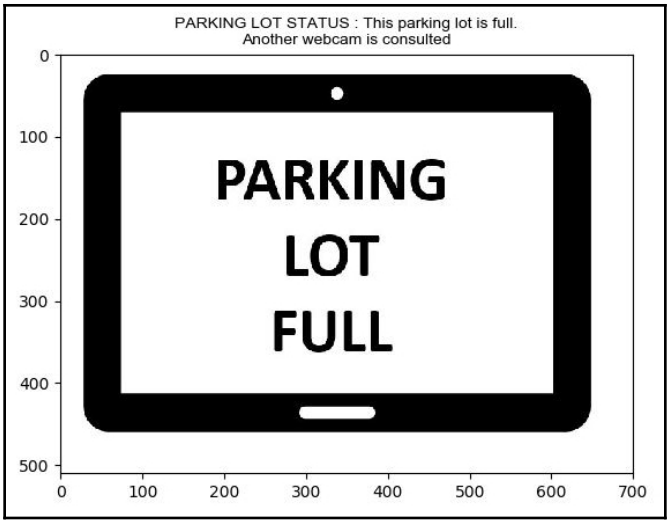


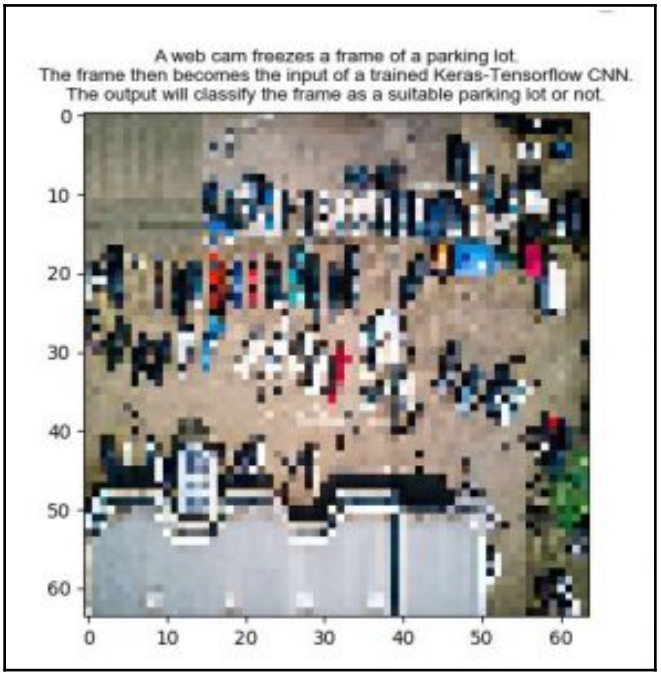

SVM sends a SAFE PATH passage even if it takes p% longer
It is used as an input for the itinerary graph
8
7
6
5
4
3
−10
−8
−6
−4
−2
0


SVM sends a SAFE PATH passage even if it takes p% longer
It is used as an input for the itinerary graph
8
7
6
5
4
3
−10
−8
−6
−4
−2
0

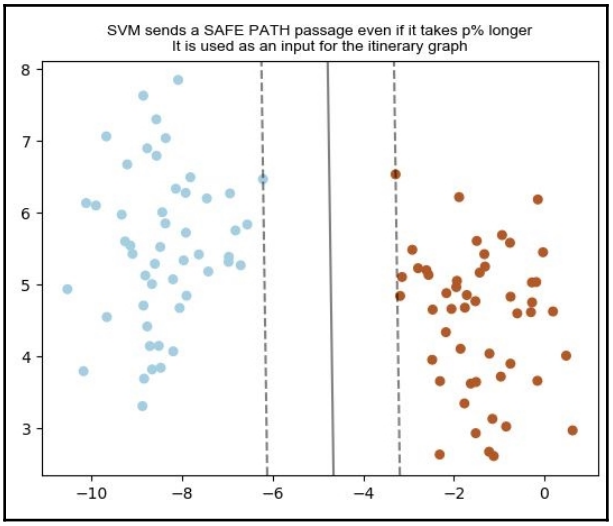


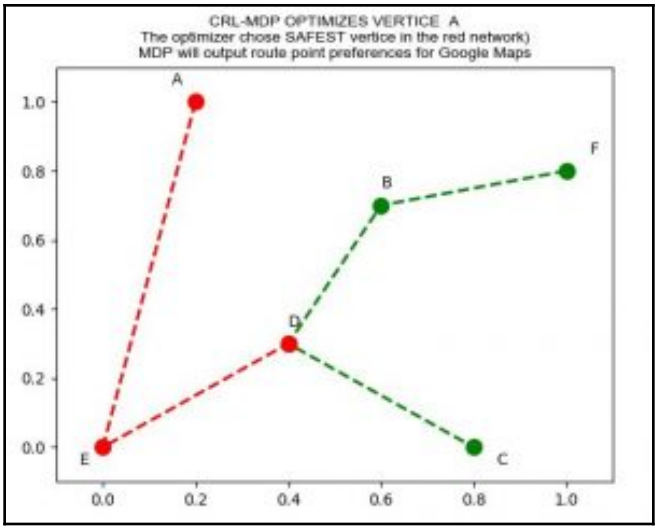

SVM sends a SAFE PATH passage even if it takes p% longer
It is used as an input for the itinerary graph
8
7
6
5
4
3
−10
−8
−6
−4
−2
0

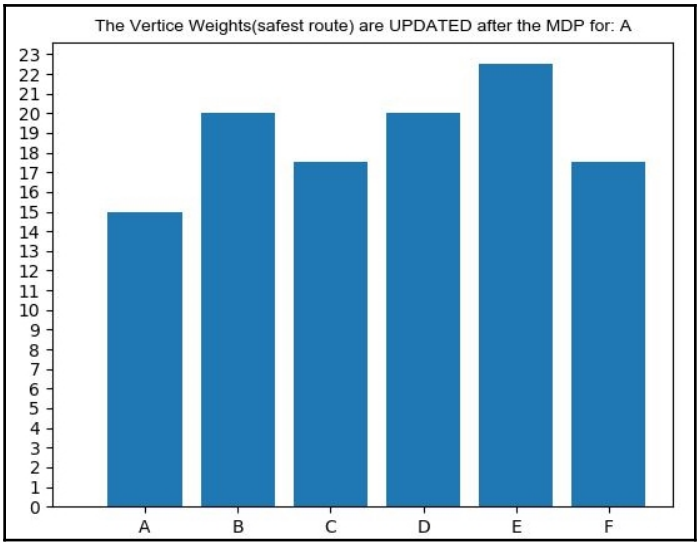

PARKING LOT STATUS : This parking lot is full.
Another webcam is consulted
PARKING
LOT
FULL
0
100
200
300
400
500
0
100
200
300
400
500
600
700


A web cam freezes a frame of a parking lot.
The frame then becomes the input of a trained Keras-Tensorflow CNN.
The output will classify the frame as a suitable parking lot or not.
0
10
20
30
40
50
60
0
10
20
30
40
50
60

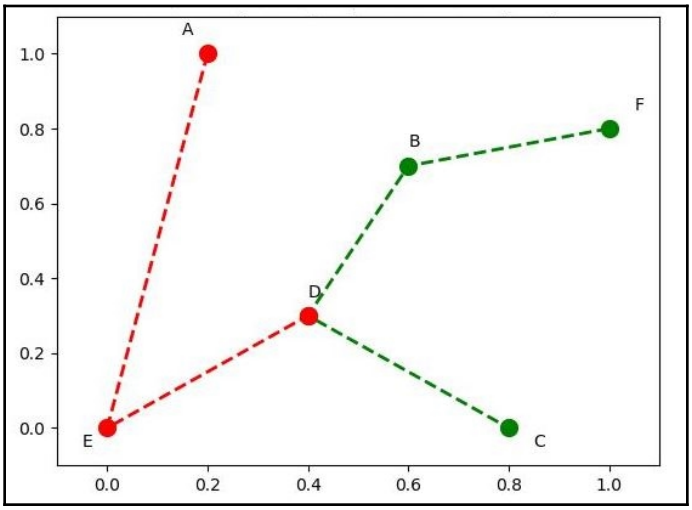
PARKING LOT STATUS : This parking lot has available space.
Now an SVM will suggest safe route
0
100
200
300
400
PARKING
SPACE
AVAILABLE
0
100
200
300
400
500
600

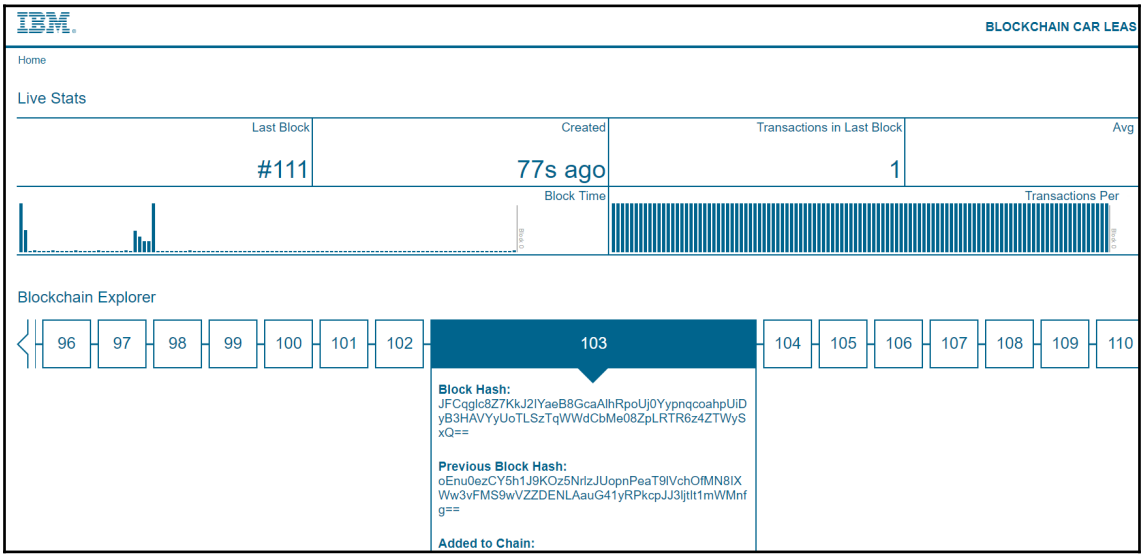

SVM sends a SAFE PATH passage even if it takes p% longer
It is used as an input for the itinerary graph
8
7
6
5
4
3
−10
−8
−6
−4
−2
0

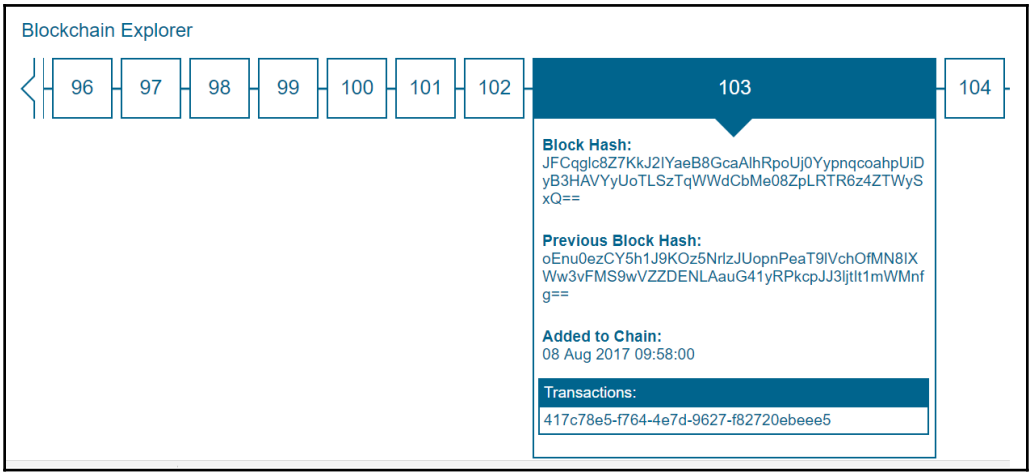

CRL-MDP OPTIMIZES VERTICE A
The optimizer chose SAFEST vertice in the red network)
MDP will output route point preferences for Google Maps
A
B
C
D
E
F
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

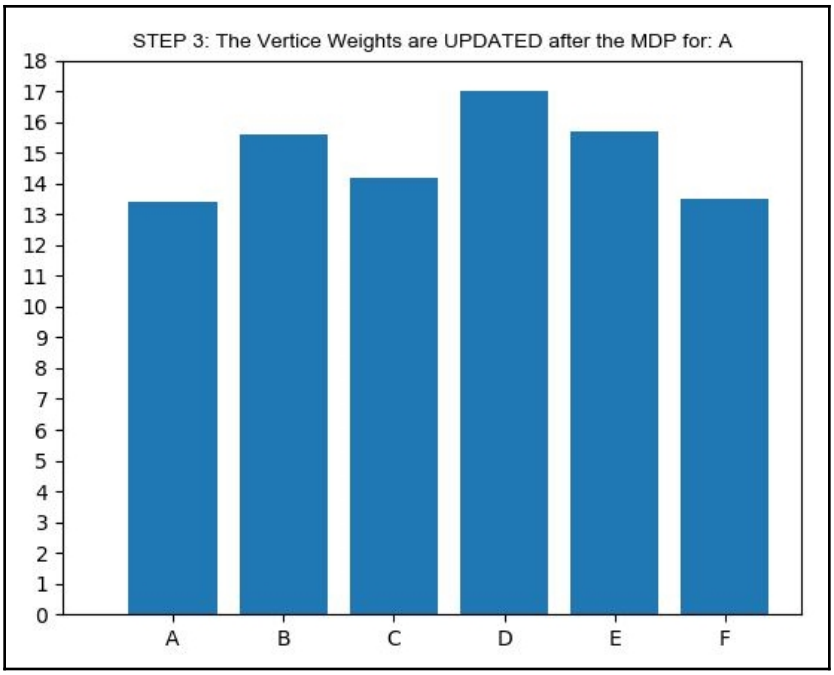

The Vertice Weights(safest route) are UPDATED after the MDP for: A
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
A
B
C
D
E
F

Chapter 14: Optimizing Blockchains with AI






Blockchain Explorer
96
97
98
99
100
101
102
103
104
Block Hash:
JFCqglc8Z7KkJ2IYaeB8GcaAlhRpoUj0YypnqcoahpUiDyB3HAVYyUoTLSzTqWWdCbMe08ZpLRTR6z4ZTWySxQ==
Previous Block Hash:
oEnu0ezCY5h1J9KOz5NrlzJUopnPeaT9lVchOfMN8IXWw3vFMS9wVZZDENLAauG41yRPkcpJJ3ljtlt1mWMnfg==
Added to Chain:
08 Aug 2017 09:58:00
Transactions:
417c78e5-f764-4e7d-9627-f82720ebeee5


STEP 3: The Vertice Weights are UPDATED after the MDP for: A
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
A
B
C
D
E
F

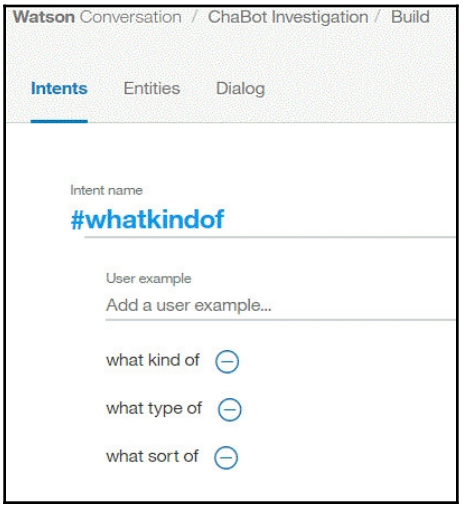
BLOCKS	STATUS
Blocks	No
Some_blocks	Yes
No_Blocks	Yes
Blocks	Yes
Blocks	Yes
Some_blocks	Yes
Blocks	Yes
No_Blocks	No
Blocks	Yes
No_Blocks	Yes

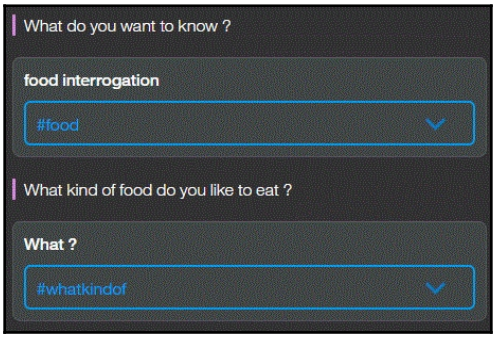
STATUS:	**No**	**No**	**No**	**Yes**	**Yes**	**Yes**
	Some_blocks	No_Blocks	Blocks	Some_blocks	No_Blocks	Blocks
			1			
				1		
					1	
						1
						1
				1		
						1
		1				
						1
					1	
FREQUENCY	0	1	1	2	2	4

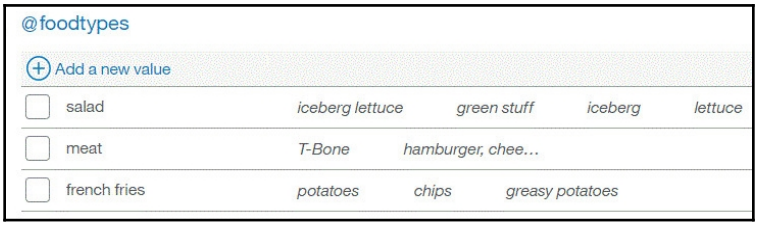
Weather	No	Yes
Some_block	0	2
No_Blocks	1	2
Blocks	1	4
	2	8
	0,2	0,8

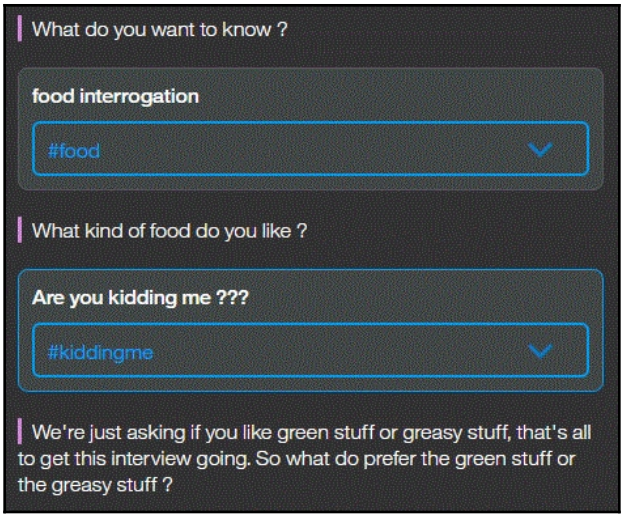
2	0,2
3	0,3
5	0,5

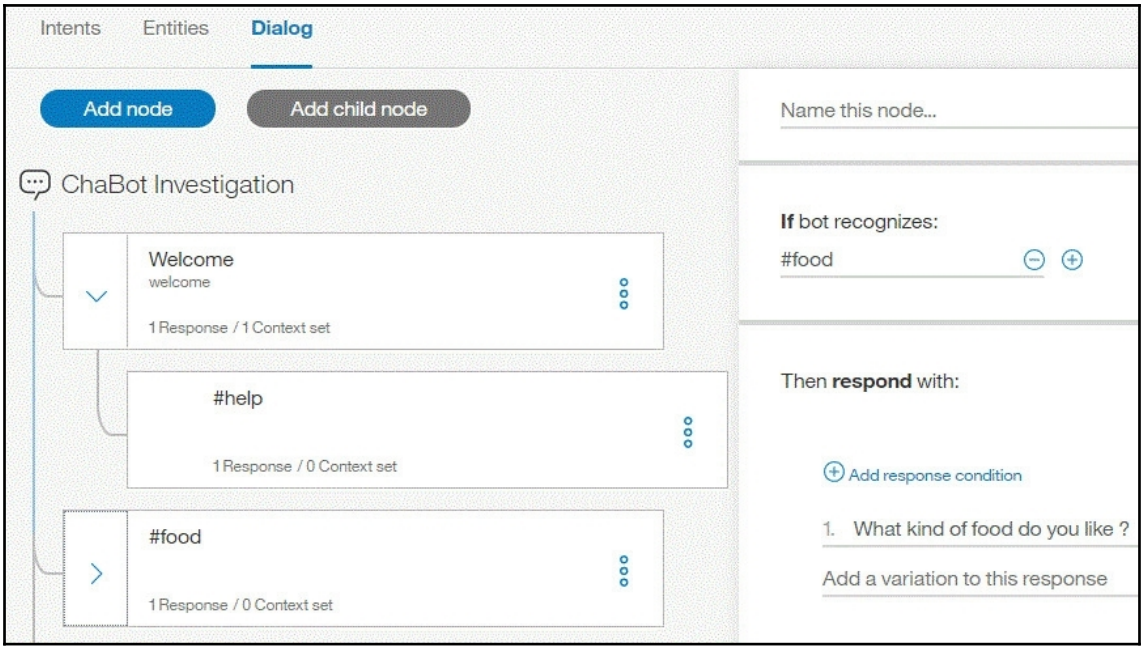
Chapter 15: Cognitive NLP Chatbots

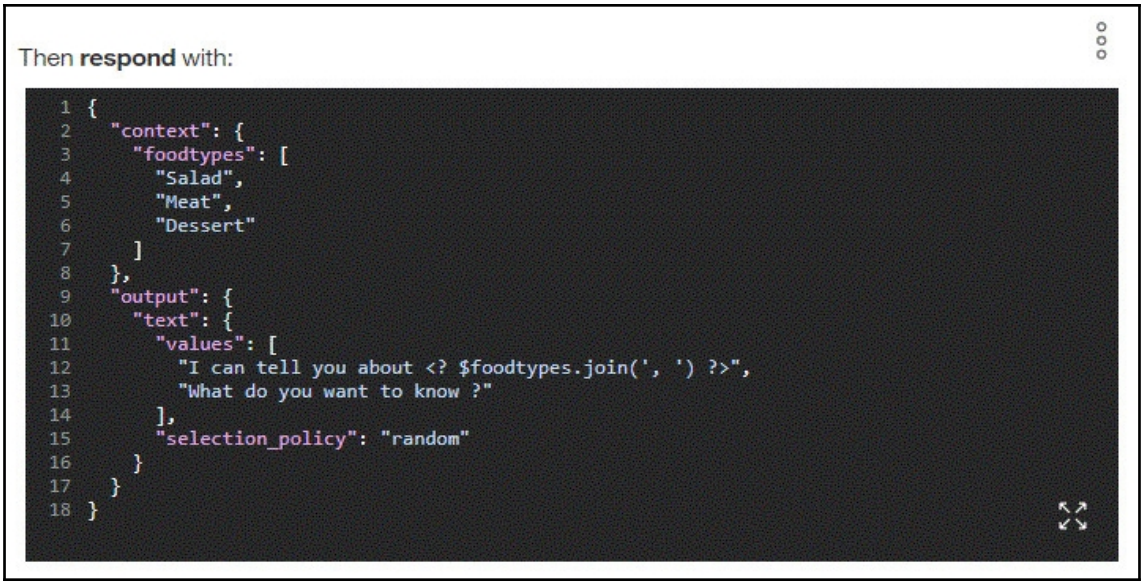


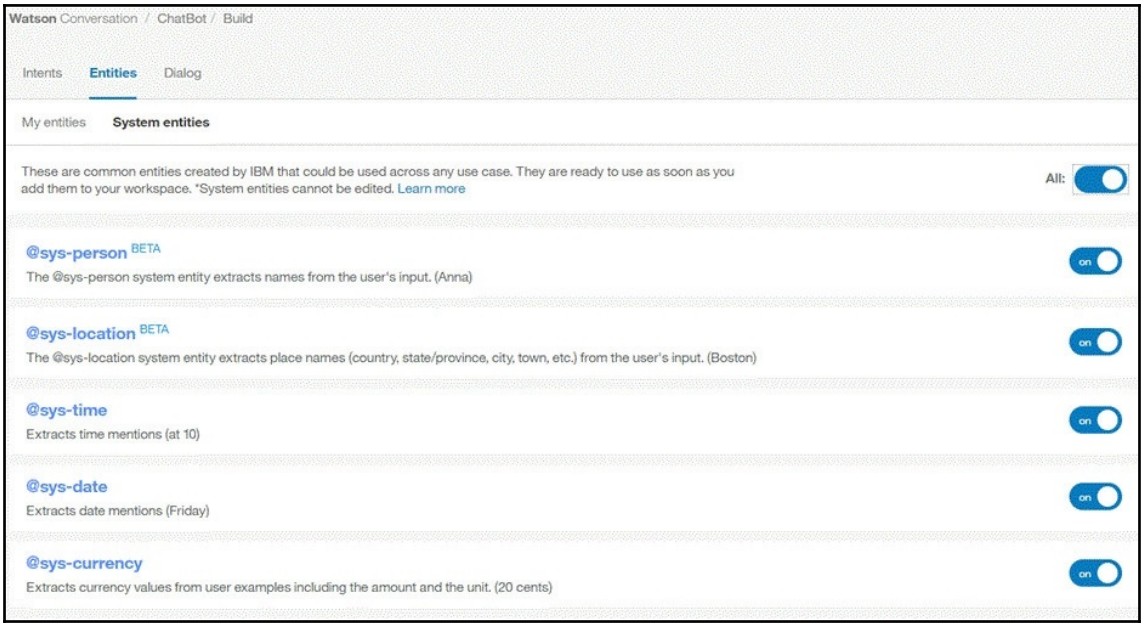


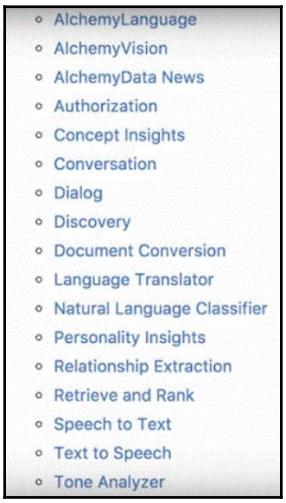

@foodtypes
Add a new value
salad
iceberg lettuce
green stuff
iceberg
lettuce
meat
T-Bone
hamburger, chee…
french fries
potatoes
chips
greasy potatoes


What do you want to know ?
food interrogation
#food
What kind of food do you like ?
Are you kidding me ???
#kiddingme
We're just asking if you like green stuff or greasy stuff, that's all to get this interview going. So what do prefer the green stuff or the greasy stuff ?


Intents
Entities
Dialog
Add node
Add child node
ChaBot Investigation
Welcome
welcome
1 Response / 1 Context set
#help
1 Response / 0 Context set
#food
1 Response / 0 Context set
Name this node...
If bot recognizes:
#food
Then respond with:
Add response condition
1. What kind of food do you like ?
Add a variation to this response

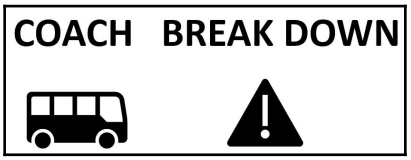

Then respond with:
{
"context": {
"foodtypes": [
"Salad",
"Meat",
"Dessert"
]
},
"output": {
"text": {
"values": [
"I can tell you about <? $foodtypes.join(', ') ?>",
"What do you want to know ?"
],
"selection_policy": "random"
}
}
}


Watson Conversation / ChatBot / Build
Intents
Entities
Dialog
My entities
System entities
These are common entities created by IBM that could be used across any use case. They are ready to use as soon as you add them to your workspace. *System entities cannot be edited. Learn more
All:
@sys-person BETA
The @sys-person system entity extracts names from the user's input. (Anna)
on
@sys-location BETA
The @sys-location system entity extracts place names (country, state/province, city, town, etc.) from the user's input. (Boston)
on
@sys-time
Extracts time mentions (at 10)
on
@sys-date
Extracts date mentions (Friday)
on
@sys-currency
Extracts currency values from user examples including the amount and the unit. (20 cents)
on

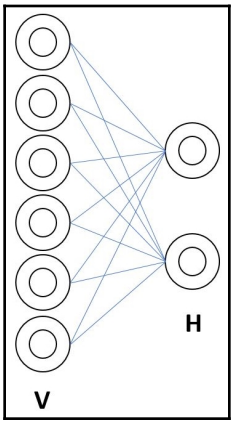

AlchemyLanguage
AlchemyVision
AlchemyData News
Authorization
Concept Insights
Conversation
Dialog
Discovery
Document Conversion
Language Translator
Natural Language Classifier
Personality Insights
Relationship Extraction
Retrieve and Rank
Speech to Text
Text to Speech
Tone Analyzer

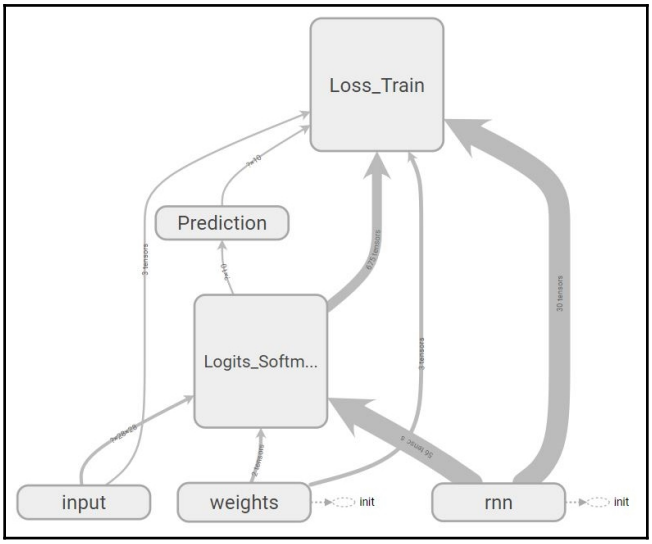
COACH

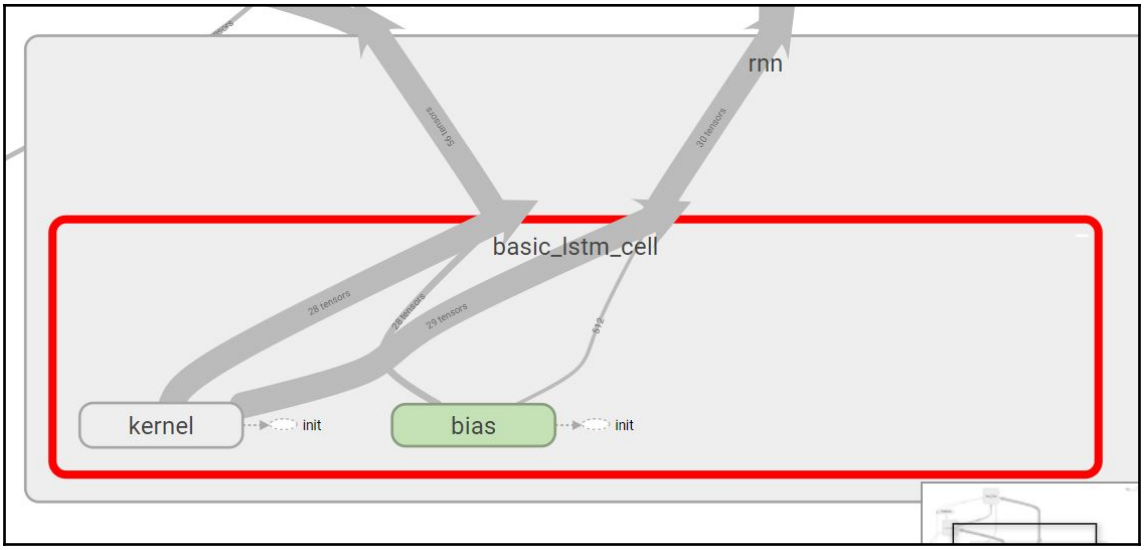
COACH


COACH BREAK DOWN

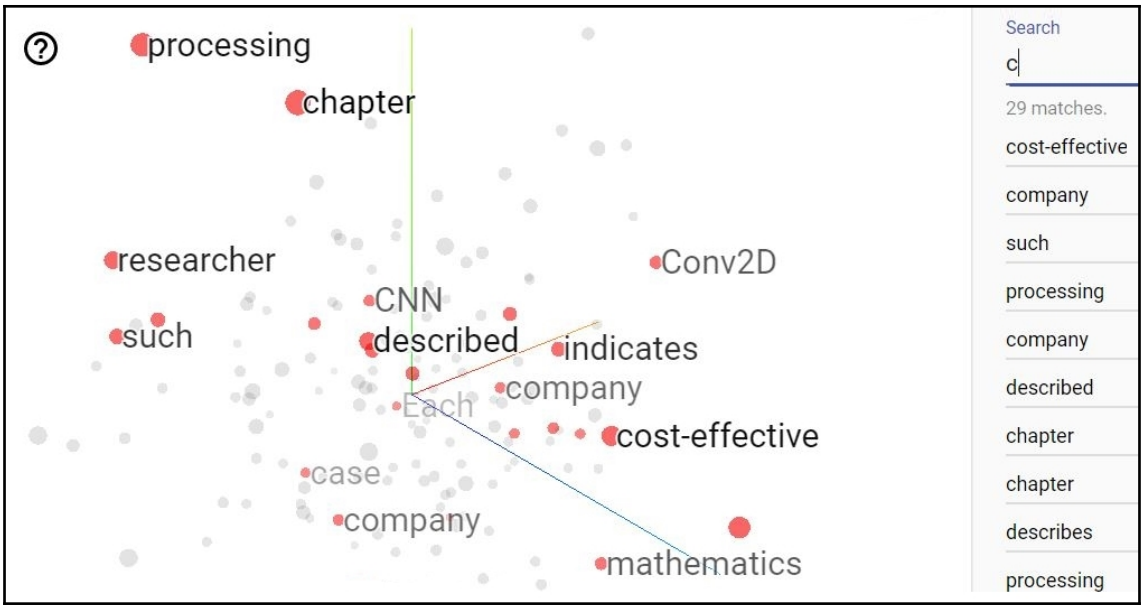
Chapter 16: Improve the Emotional Intelligence Deficiencies of Chatbots



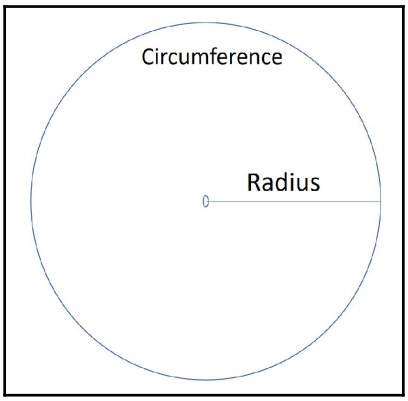

Loss_Train
Prediction
Logits_Softm...
input
weights
init
rnn
init

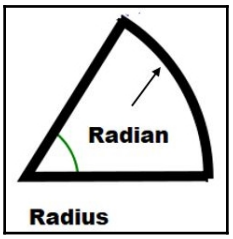

rnn
basic_lstm_cell
kernel
init
bias
init

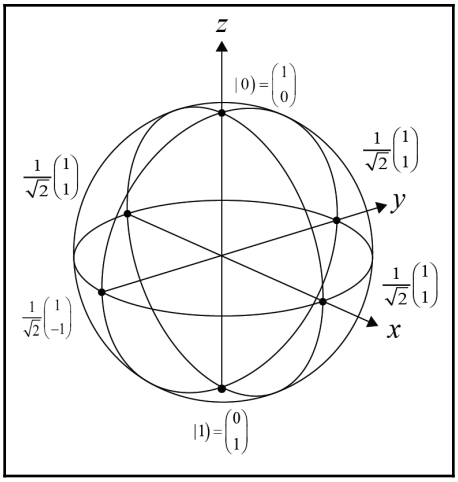
$$\begin{array}{|c|}\hline Monday \\ Tuesday \\ Wednesday \\ Thursday \\ Friday \\ Saturday \\ Sunday \\ \hline \end{array}$$

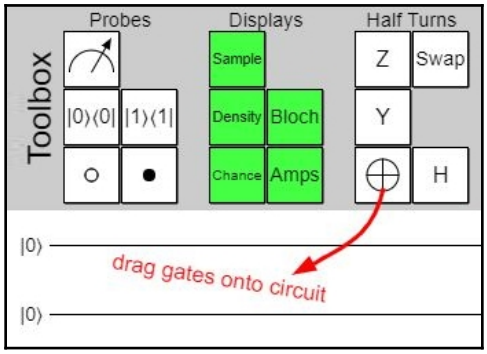


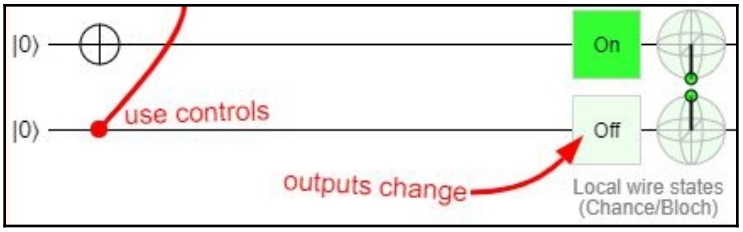
Chapter 17: Quantum Computers That Think

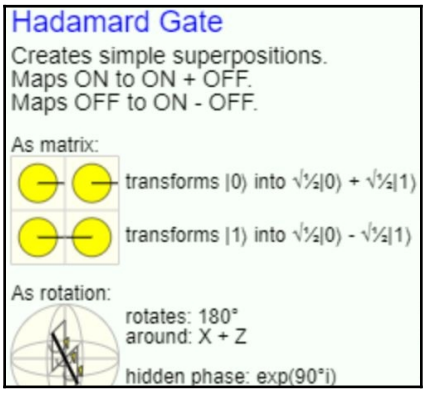


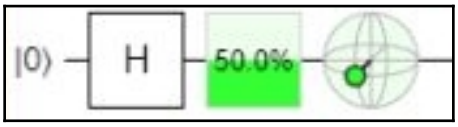


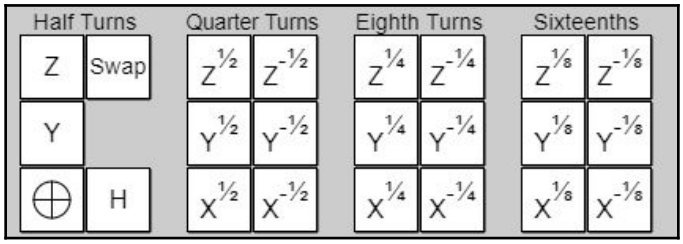


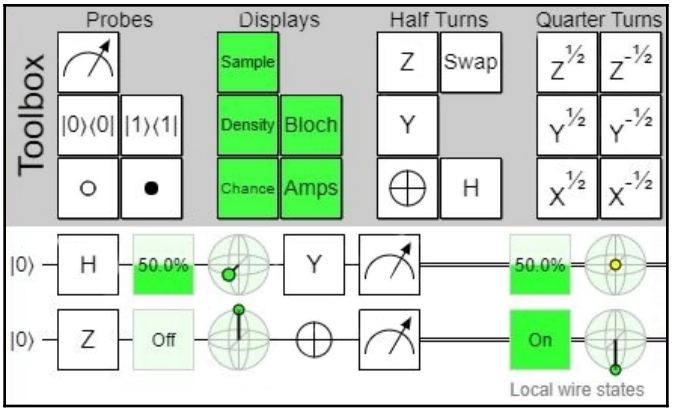

Toolbox
Probes
Displays
Half Turns
Sample
Density
Bloch
Chance
Amps
Z
Swap
Y
H
|0⟩⟨0|
|1⟩⟨1|
|0⟩
drag gates onto circuit
|0⟩

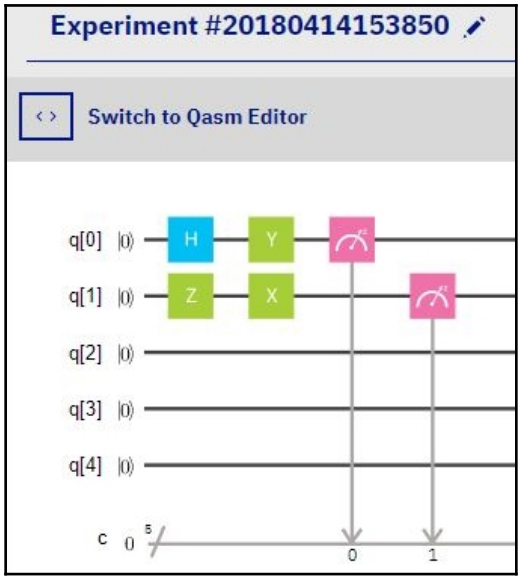

|0⟩
|0⟩
use controls
On
Off
outputs change
Local wire states
(Chance/Bloch)

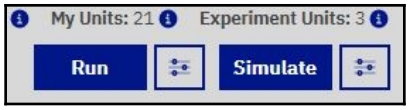

Hadamard Gate
Creates simple superpositions.
Maps ON to ON + OFF.
Maps OFF to ON - OFF.
As matrix:
transforms |0⟩ into √½|0⟩ + √½|1⟩
transforms |1⟩ into √½|0⟩ - √½|1⟩
As rotation:
rotates: 180°
around: X + Z
hidden phase: exp(90°i)

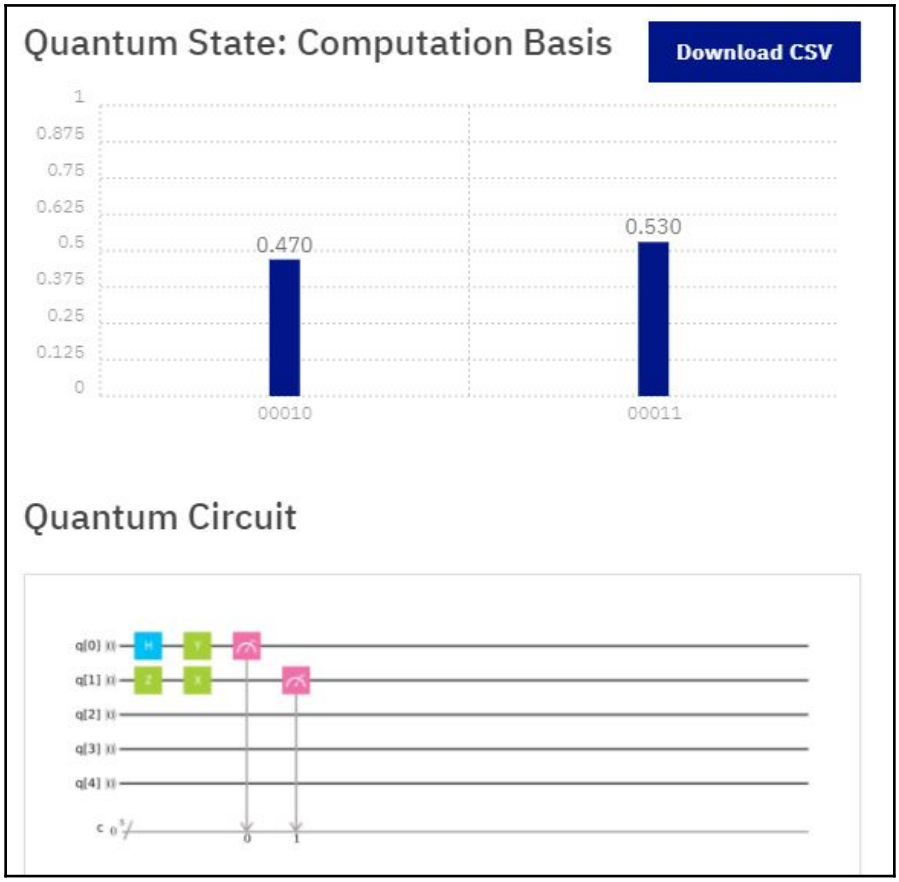

|0⟩
H
50.0%

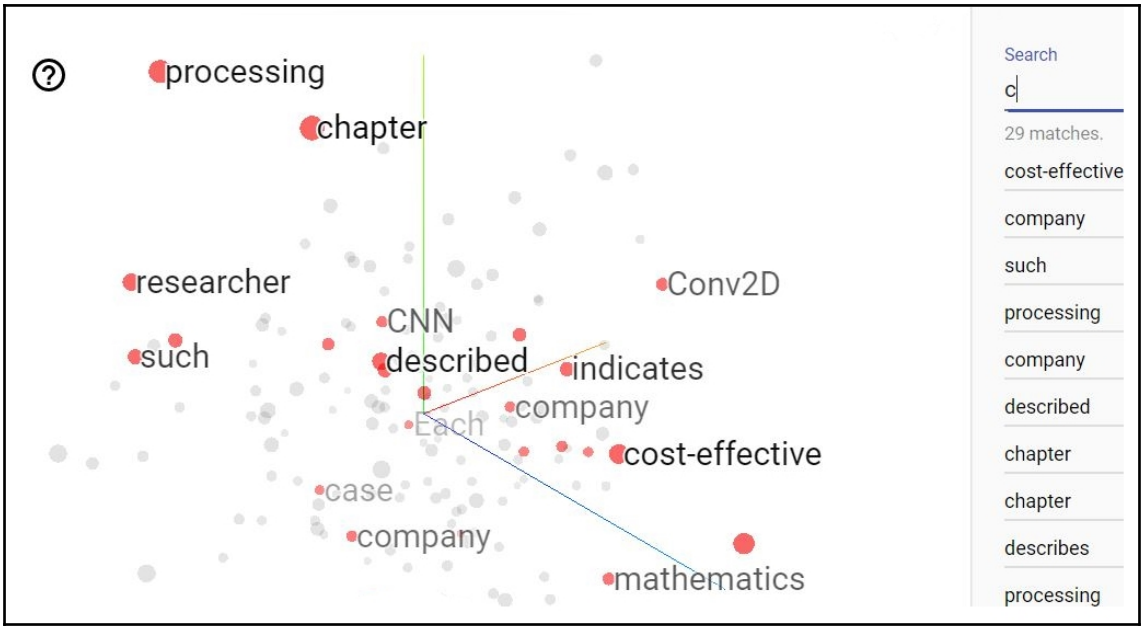

Half Turns
Quarter Turns
Eighth Turns
Sixteenths
Z
Swap
Y
H
$Z^{1/2}$ $Z^{-1/2}$
$Y^{1/2}$ $Y^{-1/2}$
$X^{1/2}$ $X^{-1/2}$
$Z^{1/4}$ $Z^{-1/4}$
$Y^{1/4}$ $Y^{-1/4}$
$X^{1/4}$ $X^{-1/4}$
$Z^{1/8}$ $Z^{-1/8}$
$Y^{1/8}$ $Y^{-1/8}$
$X^{1/8}$ $X^{-1/8}$

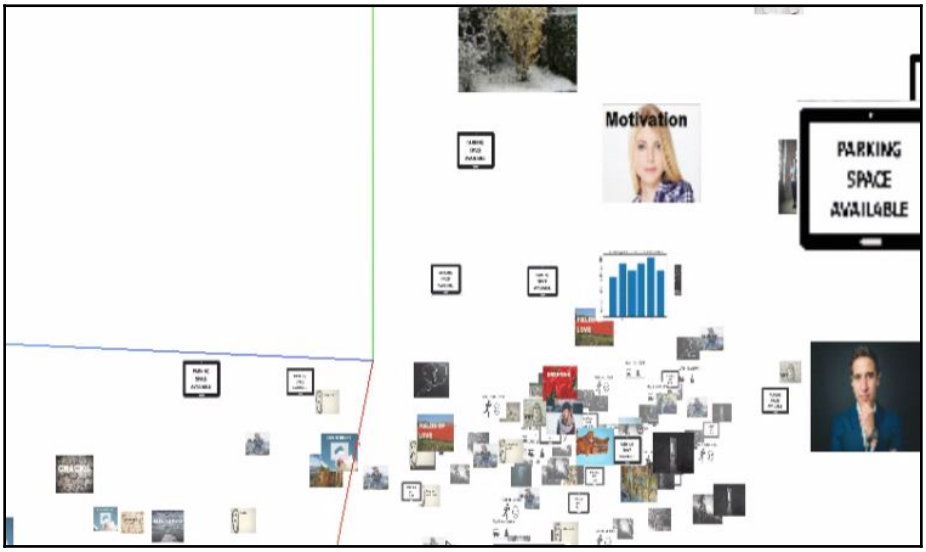

Toolbox
Probes
Displays
Half Turns
Quarter Turns
|0⟩⟨0|
|1⟩⟨1|
Sample
Density
Bloch
Chance
Amps
Z
Swap
Y
H
$Z^{1/2}$ $Z^{-1/2}$
$Y^{1/2}$ $Y^{-1/2}$
$X^{1/2}$ $X^{-1/2}$
|0⟩
H
50.0%
Y
50.0%
|0⟩
Z
Off
On
Local wire states

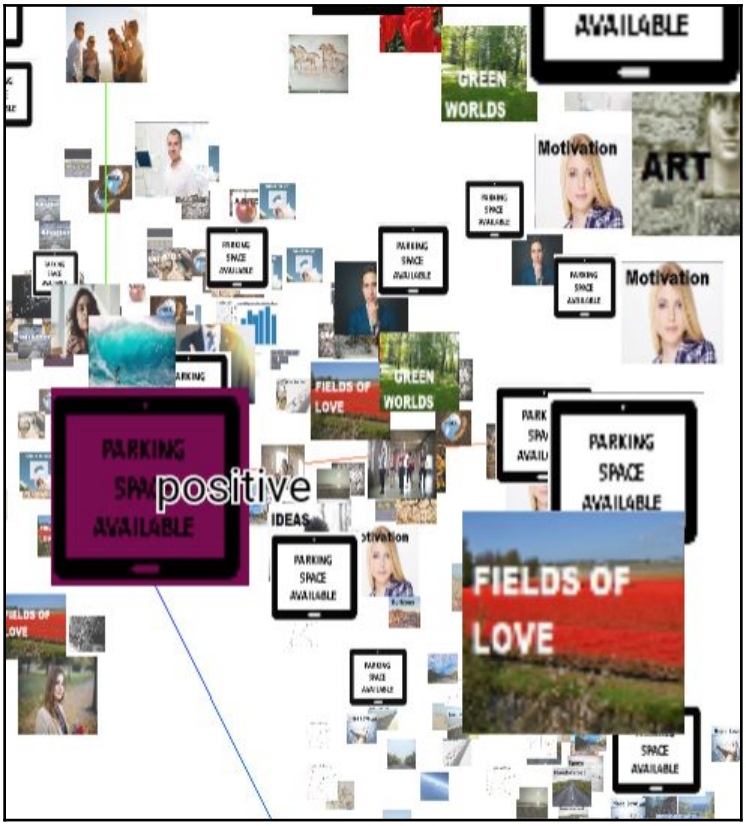

Experiment #20180414153850
Switch to Qasm Editor
q[0] |0⟩
q[1] |0⟩
q[2] |0⟩
q[3] |0⟩
q[4] |0⟩
H
Y
Z
X
c 0
5
0
1

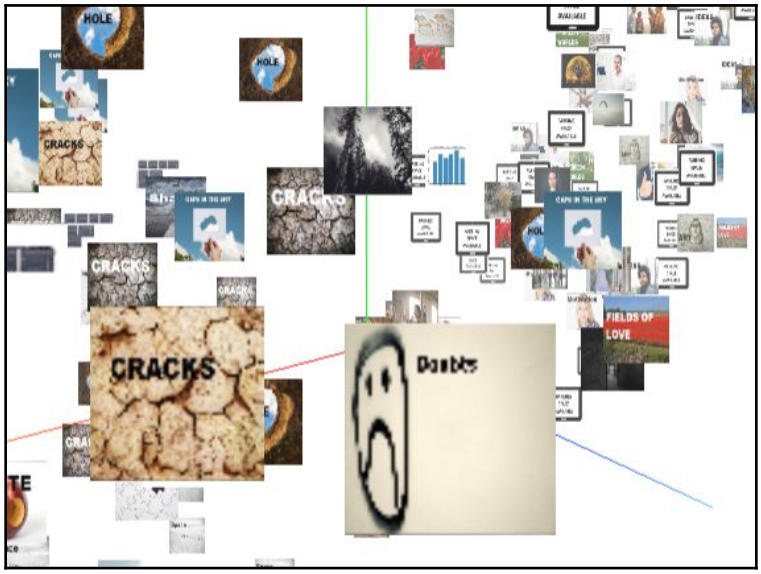

My Units: 21
Experiment Units: 3
Run
Simulate


Quantum State: Computation Basis
Download CSV
1
0.875
0.75
0.625
0.5
0.375
0.25
0.125
0
0.470
0.530
00010
00011
Quantum Circuit
q[0]
q[1]
q[2]
q[3]
q[4]
c
0
1

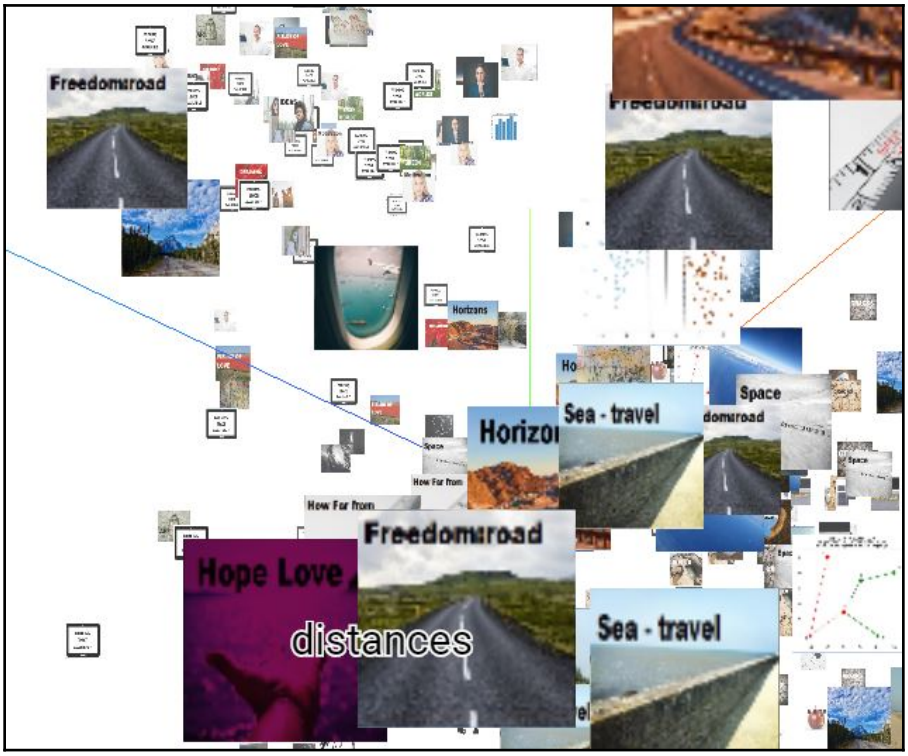

processing
chapter
researcher
such
CNN
described
Conv2D
indicates
company
Each
cost-effective
case
company
mathematics
Search
c
29 matches.
cost-effective
company
such
processing
company
described
chapter
chapter
describes
processing

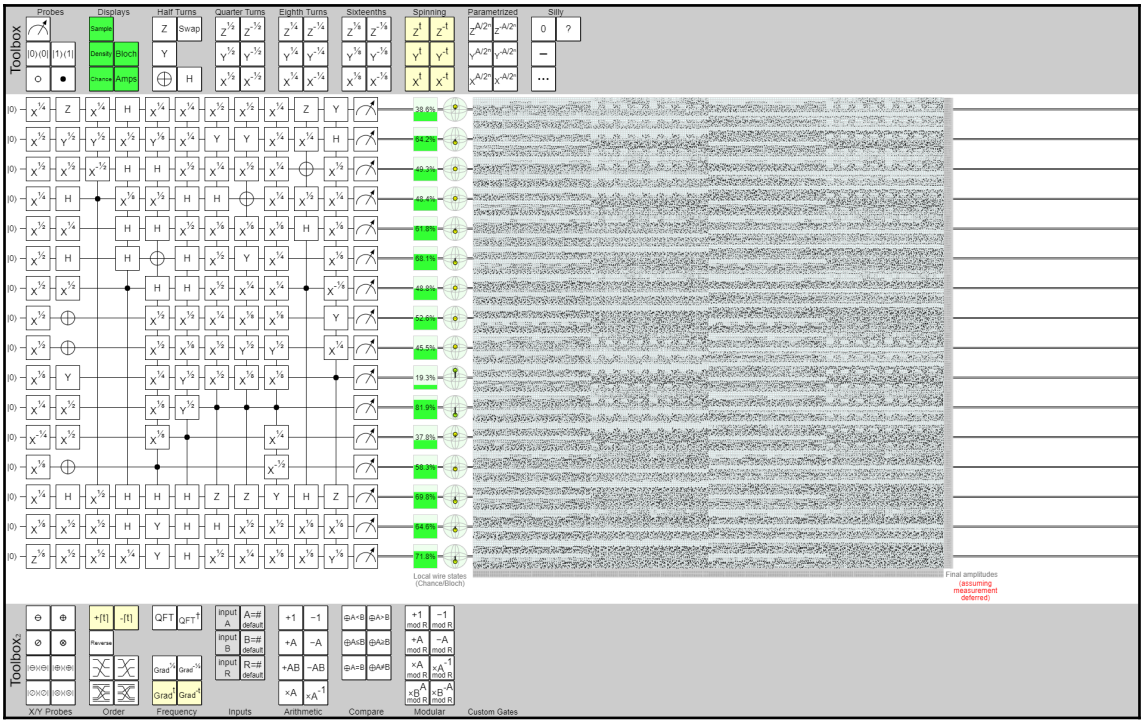

Motivation
PARKING
SPACE
AVAILABLE


AVAILABLE
GREEN WORLDS
Motivation
ART
Motivation
FIELDS OF LOVE
GREEN WORLDS
PARKING SPACE AVAILABLE
positive
IDEAS
PARKING SPACE AVAILABLE
PARKING SPACE AVAILABLE
FIELDS OF LOVE
SPACE AVAILABLE


HOLE
HOLE
CRACKS
CRACKS
CRACKS
FIELDS OF LOVE

MIND THE GAP
HOLE
HOLE
CAPS IN THE SKY
CRACKS


Freedomroad
Horizons
Space
Sea - travel
Freedomroad
Hope Love
distances
Freedomroad
Sea - travel


Toolbox
Probes
Displays
Half Turns
Quarter Turns
Eighth Turns
Sixteenths
Spinning
Parametrized
Silly
Sample
Density
Chance
Bloch
Amps
Swap
38.6%
64.2%
49.3%
48.4%
51.6%
68.1%
48.8%
52.6%
45.5%
19.3%
81.9%
37.8%
58.3%
69.8%
64.6%
71.3%
Local wire states (Chance/Bloch)
Final amplitudes (assuming measurement deferred)
Toolbox2
X/Y Probes
Order
Frequency
Inputs
Arithmetic
Compare
Modular
Custom Gates