



# Person / Vehicle Classifier

Summer-Fall 2021 Capstone

Team B

Team Members: Ashley Maddix, Chiharu Akiyama, Ritvik Chitram, Sanad Thapa,  
Tim Hall, Zhe Han

<b>Summary</b>	<b>2</b>
<b>Test Results</b>	<b>2</b>
Baseline	3
Test 1	3
Test 2	5
Test 3	8
Test 4	11
Test 5 - New datasets	17
Test 6	19
Test 7	29
Test 8	38
Test 9	49
<b>3-class vs 4-class</b>	<b>61</b>
<b>Size of the Dataset</b>	<b>62</b>
<b>Differences in Datasets</b>	<b>63</b>
<b>Tools and Scripts</b>	<b>64</b>
JPEGCrops	64
Converter.py (Image formatting script)	64
Test Automation Script (run.py file)	65
<b>Further Improvements</b>	<b>66</b>
<b>Resources</b>	<b>67</b>

## Summary

The purpose of this project is to create an image classifier that can distinguish cars and people in images with an accuracy of > 95%. This entailed creating a new dataset and training a new classifier. The dataset consists of images from existing datasets and royalty free videos. The team also sourced content from videos we took ourselves. We were able to obtain 5,091 images through the course of development. We went for a brute force-like approach for testing. Starting with epochs, we would try many values over a range. Taking the best results from that test, we would try each of them with a range of learning rate values and take the best runs from those tests. This process was repeated for each setting until we were satisfied with the results. By the end the team ran over 1,200 tests. We were not able to reach the goal of a classifier with an accuracy of 95%, our best performing model had an accuracy of 65%. The size and diversity of the dataset held us back and there was likely some overfitting to the training data. Switching to a 3 class model from a 4 class yielded a good performance boost but some of that was likely superficial. By developing this model we were able to create situations that exposed bugs in the software that utilized the classifier.

## Test Results

For the entirety of this document, “default settings” will refer to the default settings used in the sample classifier. For reference, these are:

```
quick_solver settings
max_iter = 8000
base_lr = 0.002
momentum = 0.9
weight_decay = 0.004
random_seed = 34
lr_policy = "fixed"

quick_solver_lr1 settings
lr1_max_iter = 11000
lr1_base_lr = 0.0006
lr1_momentum = 0.9
lr1_weight_decay = 0.004
lr1_random_seed = 34
lr1_lr_policy = "fixed"
```

## Baseline

All settings were set to the default settings.

**Accuracy: 83.019%**

	Bkgd	Vehicle	Person	Other
Bkgd	11	0	0	3
Vehicle	0	34	1	1
Person	3	0	32	6
Other	2	2	0	11
Accuracy: 83.019% (incorrect=18, total=106)				

## Test 1

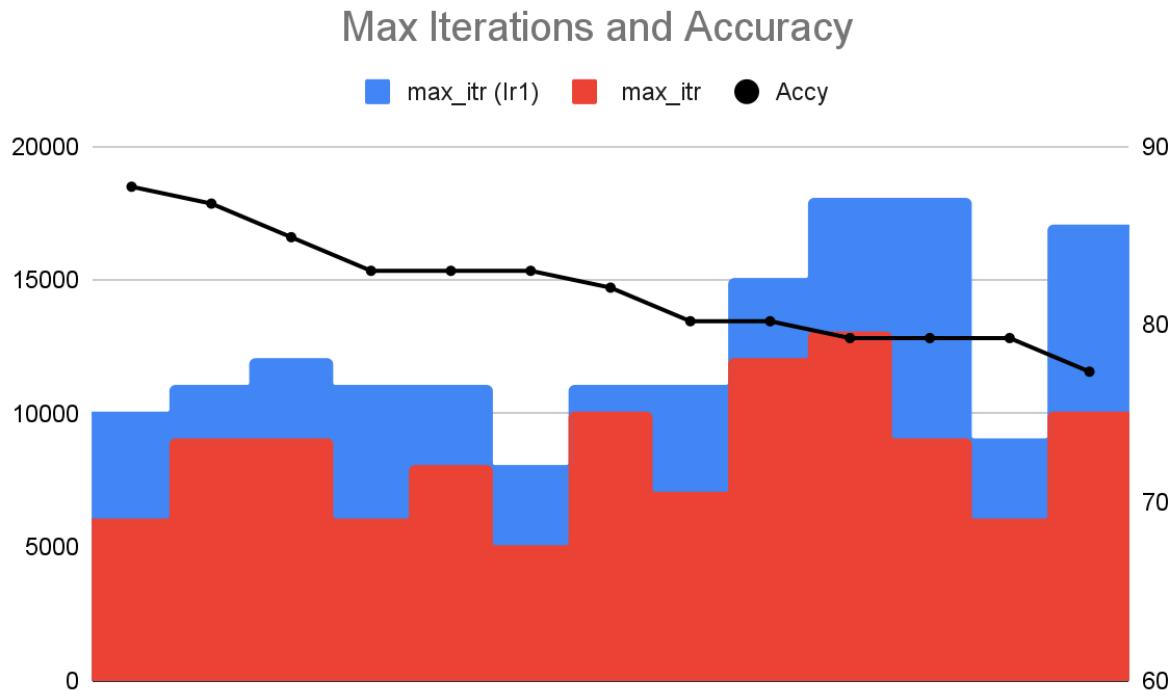
**Objectives:** To observe the effects of varying the total number of epochs and the interval between the two training phases.

**Settings:**

Max iterations varied between 6000 - 13000, layer 1 max iterations varied between 8000 - 18000.

Quick_solver_max_iter	Quick_solver_lr1_max_iter	Accuracy (%)	Matrix																																			
9000	11000	86.792	<table border="1"><thead><tr><th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr></thead><tbody><tr><td>Bkgd</td><td>16</td><td>1</td><td>0</td><td>2</td></tr><tr><td>Vehicle</td><td>0</td><td>35</td><td>0</td><td>3</td></tr><tr><td>Person</td><td>2</td><td>0</td><td>29</td><td>3</td></tr><tr><td>Other</td><td>2</td><td>0</td><td>1</td><td>12</td></tr><tr><td colspan="5">Accuracy: 86.792% (incorrect=14, total=106)</td></tr></tbody></table>		Bkgd	Vehicle	Person	Other	Bkgd	16	1	0	2	Vehicle	0	35	0	3	Person	2	0	29	3	Other	2	0	1	12	Accuracy: 86.792% (incorrect=14, total=106)									
	Bkgd	Vehicle	Person	Other																																		
Bkgd	16	1	0	2																																		
Vehicle	0	35	0	3																																		
Person	2	0	29	3																																		
Other	2	0	1	12																																		
Accuracy: 86.792% (incorrect=14, total=106)																																						
9000	12000	84.906	<table border="1"><thead><tr><th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr></thead><tbody><tr><td>Bkgd</td><td>18</td><td>1</td><td>1</td><td>0</td></tr><tr><td>Vehicle</td><td>1</td><td>33</td><td>1</td><td>3</td></tr><tr><td>Person</td><td>2</td><td>0</td><td>27</td><td>2</td></tr><tr><td>Other</td><td>2</td><td>1</td><td>2</td><td>12</td></tr><tr><td colspan="5">Accuracy: 84.906% (incorrect=10, total=106)</td></tr></tbody></table>		Bkgd	Vehicle	Person	Other	Bkgd	18	1	1	0	Vehicle	1	33	1	3	Person	2	0	27	2	Other	2	1	2	12	Accuracy: 84.906% (incorrect=10, total=106)									
	Bkgd	Vehicle	Person	Other																																		
Bkgd	18	1	1	0																																		
Vehicle	1	33	1	3																																		
Person	2	0	27	2																																		
Other	2	1	2	12																																		
Accuracy: 84.906% (incorrect=10, total=106)																																						
5000	8000	83.019	<table border="1"><thead><tr><th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr></thead><tbody><tr><td>Bkgd</td><td>10</td><td>2</td><td>0</td><td>2</td></tr><tr><td>Vehicle</td><td>1</td><td>44</td><td>0</td><td>1</td></tr><tr><td>Person</td><td>0</td><td>2</td><td>27</td><td>3</td></tr><tr><td>Other</td><td>2</td><td>2</td><td>3</td><td>7</td></tr><tr><td colspan="5">Accuracy: 83.019% (incorrect=18, total=106)</td></tr><tr><td colspan="5">(py35) C:\SightLine Applications\SLA-Classifier-Tools 3.04.02\ClassifierTraining&gt;</td></tr></tbody></table>		Bkgd	Vehicle	Person	Other	Bkgd	10	2	0	2	Vehicle	1	44	0	1	Person	0	2	27	3	Other	2	2	3	7	Accuracy: 83.019% (incorrect=18, total=106)					(py35) C:\SightLine Applications\SLA-Classifier-Tools 3.04.02\ClassifierTraining>				
	Bkgd	Vehicle	Person	Other																																		
Bkgd	10	2	0	2																																		
Vehicle	1	44	0	1																																		
Person	0	2	27	3																																		
Other	2	2	3	7																																		
Accuracy: 83.019% (incorrect=18, total=106)																																						
(py35) C:\SightLine Applications\SLA-Classifier-Tools 3.04.02\ClassifierTraining>																																						
8000	11000	83.019	<table border="1"><thead><tr><th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr></thead><tbody><tr><td>Bkgd</td><td>11</td><td>0</td><td>0</td><td>3</td></tr><tr><td>Vehicle</td><td>0</td><td>34</td><td>1</td><td>1</td></tr><tr><td>Person</td><td>3</td><td>0</td><td>32</td><td>6</td></tr><tr><td>Other</td><td>2</td><td>2</td><td>0</td><td>11</td></tr><tr><td colspan="5">Accuracy: 83.019% (incorrect=18, total=106)</td></tr></tbody></table>		Bkgd	Vehicle	Person	Other	Bkgd	11	0	0	3	Vehicle	0	34	1	1	Person	3	0	32	6	Other	2	2	0	11	Accuracy: 83.019% (incorrect=18, total=106)									
	Bkgd	Vehicle	Person	Other																																		
Bkgd	11	0	0	3																																		
Vehicle	0	34	1	1																																		
Person	3	0	32	6																																		
Other	2	2	0	11																																		
Accuracy: 83.019% (incorrect=18, total=106)																																						

10000	11000	82.075	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>1</td><td>4</td></tr> <tr> <td>Vehicle</td><td>0</td><td>27</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>46</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>1</td><td>0</td><td>9</td></tr> <tr> <td>Accuracy:</td><td>82.075% (incorrect=19, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	11	0	1	4	Vehicle	0	27	1	2	Person	2	0	46	4	Other	4	1	0	9	Accuracy:	82.075% (incorrect=19, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	11	0	1	4																													
Vehicle	0	27	1	2																													
Person	2	0	46	4																													
Other	4	1	0	9																													
Accuracy:	82.075% (incorrect=19, total=106)																																
12000	15000	80.189	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>0</td><td>1</td><td>4</td></tr> <tr> <td>Vehicle</td><td>1</td><td>32</td><td>1</td><td>0</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>25</td><td>5</td></tr> <tr> <td>Other</td><td>4</td><td>0</td><td>3</td><td>11</td></tr> <tr> <td>Accuracy:</td><td>80.189% (incorrect=21, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	17	0	1	4	Vehicle	1	32	1	0	Person	2	0	25	5	Other	4	0	3	11	Accuracy:	80.189% (incorrect=21, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	17	0	1	4																													
Vehicle	1	32	1	0																													
Person	2	0	25	5																													
Other	4	0	3	11																													
Accuracy:	80.189% (incorrect=21, total=106)																																
6000	9000	79.245	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>9</td><td>1</td><td>1</td><td>7</td></tr> <tr> <td>Vehicle</td><td>0</td><td>48</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>29</td><td>3</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>2</td><td>6</td></tr> <tr> <td>Accuracy:</td><td>79.245% (incorrect=22, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	9	1	1	7	Vehicle	0	48	0	3	Person	1	1	29	3	Other	2	1	2	6	Accuracy:	79.245% (incorrect=22, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	9	1	1	7																													
Vehicle	0	48	0	3																													
Person	1	1	29	3																													
Other	2	1	2	6																													
Accuracy:	79.245% (incorrect=22, total=106)																																
9000	18000	79.245	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>0</td><td>1</td><td>6</td></tr> <tr> <td>Vehicle</td><td>1</td><td>32</td><td>1</td><td>0</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>25</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>0</td><td>3</td><td>10</td></tr> <tr> <td>Accuracy:</td><td>79.245% (incorrect=22, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	17	0	1	6	Vehicle	1	32	1	0	Person	2	0	25	4	Other	4	0	3	10	Accuracy:	79.245% (incorrect=22, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	17	0	1	6																													
Vehicle	1	32	1	0																													
Person	2	0	25	4																													
Other	4	0	3	10																													
Accuracy:	79.245% (incorrect=22, total=106)																																
13000	18000	79.245	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>0</td><td>1</td><td>6</td></tr> <tr> <td>Vehicle</td><td>1</td><td>32</td><td>1</td><td>0</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>25</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>0</td><td>3</td><td>10</td></tr> <tr> <td>Accuracy:</td><td>79.245% (incorrect=22, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	17	0	1	6	Vehicle	1	32	1	0	Person	2	0	25	4	Other	4	0	3	10	Accuracy:	79.245% (incorrect=22, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	17	0	1	6																													
Vehicle	1	32	1	0																													
Person	2	0	25	4																													
Other	4	0	3	10																													
Accuracy:	79.245% (incorrect=22, total=106)																																
10000	17000	77.358	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>1</td><td>4</td></tr> <tr> <td>Vehicle</td><td>1</td><td>31</td><td>1</td><td>0</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>24</td><td>5</td></tr> <tr> <td>Other</td><td>5</td><td>1</td><td>4</td><td>11</td></tr> <tr> <td>Accuracy:</td><td>77.358% (incorrect=24, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	1	4	Vehicle	1	31	1	0	Person	2	0	24	5	Other	5	1	4	11	Accuracy:	77.358% (incorrect=24, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	16	0	1	4																													
Vehicle	1	31	1	0																													
Person	2	0	24	5																													
Other	5	1	4	11																													
Accuracy:	77.358% (incorrect=24, total=106)																																
6000	10000	87.74%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>0</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>44</td><td>2</td><td>2</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>29</td><td>1</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>1</td><td>7</td></tr> <tr> <td>Accuracy:</td><td>87.736% (incorrect=13, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	13	0	1	1	Vehicle	0	44	2	2	Person	2	0	29	1	Other	2	1	1	7	Accuracy:	87.736% (incorrect=13, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	13	0	1	1																													
Vehicle	0	44	2	2																													
Person	2	0	29	1																													
Other	2	1	1	7																													
Accuracy:	87.736% (incorrect=13, total=106)																																
6000	11000	83.02%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>2</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>34</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>33</td><td>7</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>2</td><td>9</td></tr> <tr> <td>Accuracy:</td><td>83.019% (incorrect=18, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	12	2	1	1	Vehicle	0	34	1	2	Person	0	0	33	7	Other	1	1	2	9	Accuracy:	83.019% (incorrect=18, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	12	2	1	1																													
Vehicle	0	34	1	2																													
Person	0	0	33	7																													
Other	1	1	2	9																													
Accuracy:	83.019% (incorrect=18, total=106)																																
7000	11000	80.19%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>0</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>32</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>24</td><td>5</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>3</td><td>14</td></tr> <tr> <td>Accuracy:</td><td>80.189% (incorrect=21, total=106)</td><td></td><td></td><td></td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	15	0	2	3	Vehicle	1	32	1	2	Person	1	0	24	5	Other	1	2	3	14	Accuracy:	80.189% (incorrect=21, total=106)			
	Bkgd	Vehicle	Person	Other																													
Bkgd	15	0	2	3																													
Vehicle	1	32	1	2																													
Person	1	0	24	5																													
Other	1	2	3	14																													
Accuracy:	80.189% (incorrect=21, total=106)																																



**Observations:** The model preferred 6000 to 9000 iterations for the first phase and a second phase with 2000-4000 iterations. Models with the most iterations didn't perform as well as iterations with fewer iterations overall.

## Test 2

**Objectives:** To observe the effects of varying the learning rates.

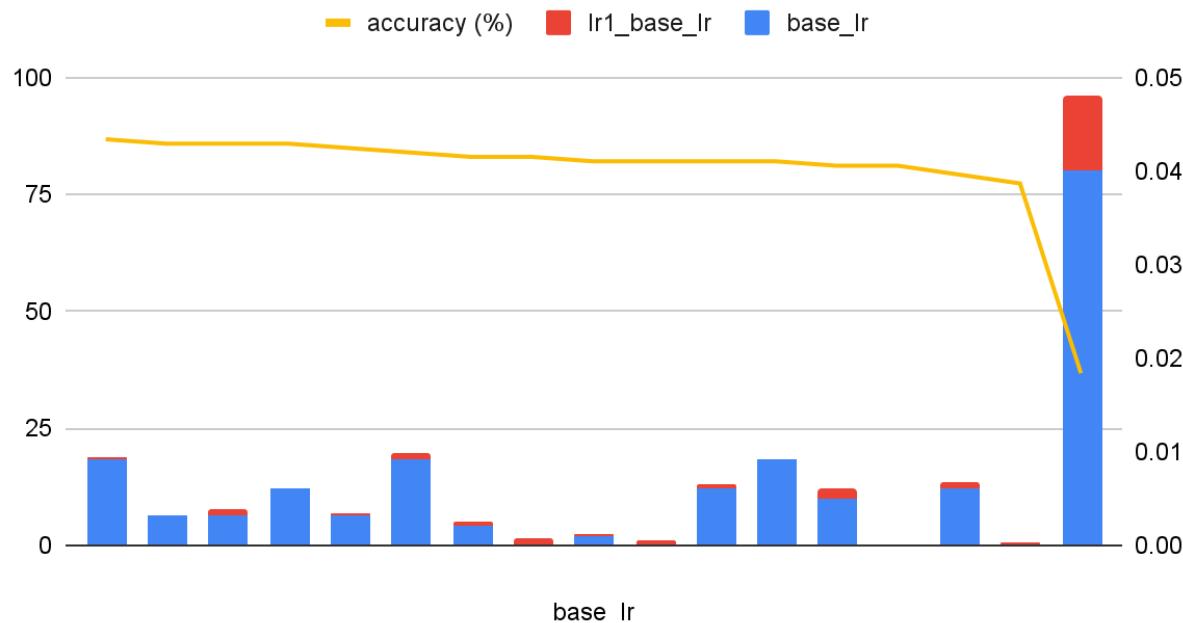
**Settings:** Learning rates for the first phase were set to 0.04, 0.001, 0.002, 0.0031, 0.0061, 0.0091, 0.0001, 0.0002. Learning rates for the second phase were set to 0.001, 0.008, 0.0001, 0.0003, 0.0004, 0.0006, 0.0007, 0.00006. Other settings are default.

Quick_solver_base_lr	Quick_solver_lr1_base_lr	Accuracy (%)	Matrix			
			Bkgd	Vehicle	Person	Other
0.0091	0.0004	86.792	Bkgd Vehicle Person Other	21 0 0 2	1 37 18 0	1 1 16 3
			Accuracy: 86.792% (incorrect=14, total=106)			
0.0031	0.0001	85.849	Bkgd Vehicle Person Other	11 0 3 2	0 30 0 1	1 1 3 11
			Accuracy: 85.849% (incorrect=15, total=106)			

0.0031	0.0007	85.849	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>22</td><td>0</td><td>0</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>32</td><td>0</td><td>2</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>28</td><td>4</td></tr> <tr> <td>Other</td><td>0</td><td>3</td><td>0</td><td>9</td></tr> <tr> <td colspan="5">Accuracy: 85.849% (incorrect=15, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	22	0	0	3	Vehicle	0	32	0	2	Person	3	0	28	4	Other	0	3	0	9	Accuracy: 85.849% (incorrect=15, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	22	0	0	3																													
Vehicle	0	32	0	2																													
Person	3	0	28	4																													
Other	0	3	0	9																													
Accuracy: 85.849% (incorrect=15, total=106)																																	
0.0061	0.0001	85.849	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>0</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>41</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>23</td><td>5</td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>2</td><td>12</td></tr> <tr> <td colspan="5">Accuracy: 85.849% (incorrect=15, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	15	0	1	2	Vehicle	0	41	0	3	Person	0	0	23	5	Other	2	0	2	12	Accuracy: 85.849% (incorrect=15, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	15	0	1	2																													
Vehicle	0	41	0	3																													
Person	0	0	23	5																													
Other	2	0	2	12																													
Accuracy: 85.849% (incorrect=15, total=106)																																	
0.0031	0.0004	84.906																															
0.0091	0.0007	83.962	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>2</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>31</td><td>0</td><td>2</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>33</td><td>4</td></tr> <tr> <td>Other</td><td>0</td><td>0</td><td>4</td><td>9</td></tr> <tr> <td colspan="5">Accuracy: 83.962% (incorrect=17, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	2	2	Vehicle	1	31	0	2	Person	2	0	33	4	Other	0	0	4	9	Accuracy: 83.962% (incorrect=17, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	16	0	2	2																													
Vehicle	1	31	0	2																													
Person	2	0	33	4																													
Other	0	0	4	9																													
Accuracy: 83.962% (incorrect=17, total=106)																																	
0.002	0.0006	83.019	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>0</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>34</td><td>1</td><td>1</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>32</td><td>6</td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>0</td><td>11</td></tr> <tr> <td colspan="5">Accuracy: 83.019% (incorrect=18, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	11	0	0	3	Vehicle	0	34	1	1	Person	3	0	32	6	Other	2	2	0	11	Accuracy: 83.019% (incorrect=18, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	11	0	0	3																													
Vehicle	0	34	1	1																													
Person	3	0	32	6																													
Other	2	2	0	11																													
Accuracy: 83.019% (incorrect=18, total=106)																																	
0.0001	0.0007	83.019	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>1</td><td>3</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>38</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>25</td><td>2</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>4</td><td>7</td></tr> <tr> <td colspan="5">Accuracy: 83.019% (incorrect=18, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	18	1	3	2	Vehicle	0	38	0	1	Person	2	0	25	2	Other	2	1	4	7	Accuracy: 83.019% (incorrect=18, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	18	1	3	2																													
Vehicle	0	38	0	1																													
Person	2	0	25	2																													
Other	2	1	4	7																													
Accuracy: 83.019% (incorrect=18, total=106)																																	
0.001	0.0003	82.075	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>0</td><td>0</td><td>2</td></tr> <tr> <td>Vehicle</td><td>3</td><td>33</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>27</td><td>4</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>3</td><td>9</td></tr> <tr> <td colspan="5">Accuracy: 82.075% (incorrect=19, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	18	0	0	2	Vehicle	3	33	0	1	Person	3	0	27	4	Other	1	2	3	9	Accuracy: 82.075% (incorrect=19, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	18	0	0	2																													
Vehicle	3	33	0	1																													
Person	3	0	27	4																													
Other	1	2	3	9																													
Accuracy: 82.075% (incorrect=19, total=106)																																	
0.0001	0.0004	82.075	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>29</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>34</td><td>6</td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>5</td><td>10</td></tr> <tr> <td colspan="5">Accuracy: 82.075% (incorrect=19, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	1	1	Vehicle	1	29	0	1	Person	0	0	34	6	Other	2	2	5	10	Accuracy: 82.075% (incorrect=19, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	14	0	1	1																													
Vehicle	1	29	0	1																													
Person	0	0	34	6																													
Other	2	2	5	10																													
Accuracy: 82.075% (incorrect=19, total=106)																																	
0.0061	0.0004	82.075	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>1</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>35</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>31</td><td>3</td></tr> <tr> <td>Other</td><td>4</td><td>2</td><td>1</td><td>5</td></tr> <tr> <td colspan="5">Accuracy: 82.075% (incorrect=19, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	16	1	1	2	Vehicle	1	35	0	1	Person	3	0	31	3	Other	4	2	1	5	Accuracy: 82.075% (incorrect=19, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	16	1	1	2																													
Vehicle	1	35	0	1																													
Person	3	0	31	3																													
Other	4	2	1	5																													
Accuracy: 82.075% (incorrect=19, total=106)																																	
0.0091	0.0001	82.075	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>1</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>35</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>31</td><td>3</td></tr> <tr> <td>Other</td><td>4</td><td>2</td><td>1</td><td>5</td></tr> <tr> <td colspan="5">Accuracy: 82.075% (incorrect=19, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	16	1	1	2	Vehicle	1	35	0	1	Person	3	0	31	3	Other	4	2	1	5	Accuracy: 82.075% (incorrect=19, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	16	1	1	2																													
Vehicle	1	35	0	1																													
Person	3	0	31	3																													
Other	4	2	1	5																													
Accuracy: 82.075% (incorrect=19, total=106)																																	
0.005	0.001	81.132	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>0</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>32</td><td>2</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>31</td><td>3</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>0</td><td>8</td></tr> <tr> <td colspan="5">Accuracy: 81.132% (incorrect=20, total=106)</td></tr> </tbody> </table>		Bkgd	Vehicle	Person	Other	Bkgd	15	0	2	3	Vehicle	1	32	2	3	Person	2	1	31	3	Other	2	1	0	8	Accuracy: 81.132% (incorrect=20, total=106)				
	Bkgd	Vehicle	Person	Other																													
Bkgd	15	0	2	3																													
Vehicle	1	32	2	3																													
Person	2	1	31	3																													
Other	2	1	0	8																													
Accuracy: 81.132% (incorrect=20, total=106)																																	

0.0001	0.0001	81.132	<table border="1"> <thead> <tr><th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr><td>Bkgd</td><td>15</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>Vehicle</td><td>0</td><td>43</td><td>0</td><td>3</td></tr> <tr><td>Person</td><td>3</td><td>2</td><td>23</td><td>3</td></tr> <tr><td>Other</td><td>1</td><td>4</td><td>3</td><td>5</td></tr> </tbody> </table> <p>Accuracy: 81.132% (incorrect=20, total=106)</p>		Bkgd	Vehicle	Person	Other	Bkgd	15	0	0	1	Vehicle	0	43	0	3	Person	3	2	23	3	Other	1	4	3	5
	Bkgd	Vehicle	Person	Other																								
Bkgd	15	0	0	1																								
Vehicle	0	43	0	3																								
Person	3	2	23	3																								
Other	1	4	3	5																								
0.0061	0.0007	79.245	<table border="1"> <thead> <tr><th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr><td>Bkgd</td><td>12</td><td>0</td><td>0</td><td>3</td></tr> <tr><td>Vehicle</td><td>1</td><td>37</td><td>1</td><td>1</td></tr> <tr><td>Person</td><td>1</td><td>1</td><td>25</td><td>3</td></tr> <tr><td>Other</td><td>3</td><td>3</td><td>5</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 79.245% (incorrect=22, total=106)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	0	0	3	Vehicle	1	37	1	1	Person	1	1	25	3	Other	3	3	5	10
	Bkgd	Vehicle	Person	Other																								
Bkgd	12	0	0	3																								
Vehicle	1	37	1	1																								
Person	1	1	25	3																								
Other	3	3	5	10																								
0.0002	0.00006	77.358	<table border="1"> <thead> <tr><th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr><td>Bkgd</td><td>9</td><td>0</td><td>1</td><td>3</td></tr> <tr><td>Vehicle</td><td>1</td><td>41</td><td>2</td><td>2</td></tr> <tr><td>Person</td><td>3</td><td>1</td><td>19</td><td>5</td></tr> <tr><td>Other</td><td>2</td><td>2</td><td>2</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 77.358% (incorrect=24, total=106)</p>		Bkgd	Vehicle	Person	Other	Bkgd	9	0	1	3	Vehicle	1	41	2	2	Person	3	1	19	5	Other	2	2	2	13
	Bkgd	Vehicle	Person	Other																								
Bkgd	9	0	1	3																								
Vehicle	1	41	2	2																								
Person	3	1	19	5																								
Other	2	2	2	13																								
0.04	0.008	36.792	<table border="1"> <thead> <tr><th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr><td>Bkgd</td><td>13</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Vehicle</td><td>0</td><td>39</td><td>1</td><td>5</td></tr> <tr><td>Person</td><td>2</td><td>0</td><td>31</td><td>4</td></tr> <tr><td>Other</td><td>0</td><td>0</td><td>2</td><td>7</td></tr> </tbody> </table> <p>Accuracy: 84.906% (incorrect=16, total=106)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	1	0	1	Vehicle	0	39	1	5	Person	2	0	31	4	Other	0	0	2	7
	Bkgd	Vehicle	Person	Other																								
Bkgd	13	1	0	1																								
Vehicle	0	39	1	5																								
Person	2	0	31	4																								
Other	0	0	2	7																								

## LR vs Accuracy (%)



**Observations:** A moderately high base learning rate of around 0.0091 with the layer 1 learning rate relatively low yielded the best results; the higher the base learning rate went, the lower our accuracies, likely due to the overfitting of the model. A sweet spot was determined with our initial small dataset, though our accuracies still didn't break into the 90's yet.

## Test 3

**Objectives:** To improve the accuracy by combining the best results of both the Epoch and LR tests.

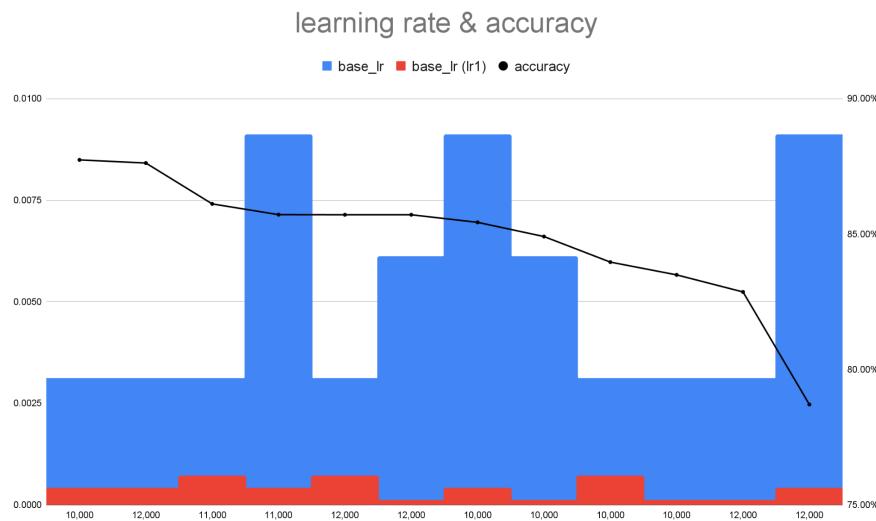
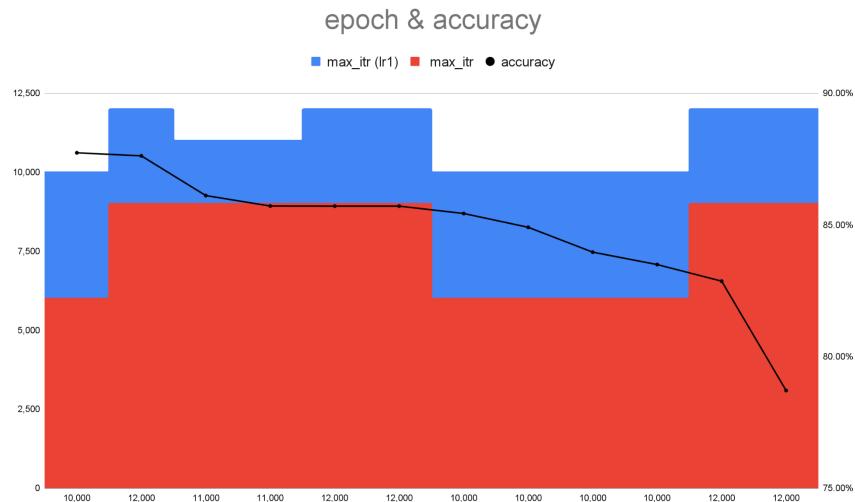
**Settings:** Varied epochs from .0026-.0031 and learning rates of .0001, .00015, and .0002.

Other settings were left to default.

q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix				
9,500	11,000	0.0031	0.0001	87.04%	Bkgd	11	0	1	1
					Vehicle	0	32	0	2
					Person	1	0	40	3
					Other	3	1	2	11
					Accuracy: 87.03% (incorrect=14, total=108)				
9,500	11,500	0.0026	0.0002	86.68%	Bkgd	11	1	1	1
					Vehicle	0	38	1	1
					Person	1	0	30	2
					Other	3	0	3	12
					Accuracy: 86.667% (incorrect=14, total=105)				
9,500	11,500	0.0036	0.0002	86.67%	Bkgd	9	0	0	3
					Vehicle	0	41	2	0
					Person	2	0	38	4
					Other	0	2	1	3
					Accuracy: 86.667% (incorrect=14, total=105)				
9,500	11,000	0.0026	0.0002	86.11%	Bkgd	16	2	2	3
					Vehicle	0	39	0	0
					Person	1	0	34	1
					Other	3	2	1	4
					Accuracy: 86.111% (incorrect=15, total=108)				
9,000	11,500	0.0026	0.0001	85.71%	Bkgd	18	1	0	4
					Vehicle	0	38	0	4
					Person	0	1	27	1
					Other	2	1	1	7
					Accuracy: 85.714% (incorrect=15, total=105)				
9,000	11,000	0.0031	0.0002	85.43%	Bkgd	18	0	1	5
					Vehicle	1	36	2	0
					Person	1	0	25	2
					Other	1	1	1	9
					Accuracy: 85.437% (incorrect=15, total=103)				
9,500	11,000	0.0026	0.0001	85.19%	Bkgd	19	0	1	3
					Vehicle	0	38	0	1
					Person	3	0	29	4
					Other	1	1	2	6
					Accuracy: 85.185% (incorrect=16, total=108)				
9,500	11,000	0.0036	0.0002	85.19%	Bkgd	15	0	0	2
					Vehicle	0	35	0	2
					Person	2	1	30	4
					Other	2	1	2	12
					Accuracy: 85.185% (incorrect=16, total=108)				
9,000	11,500	0.0036	0.0001	84.76%	Bkgd	14	0	1	2
					Vehicle	0	38	0	3
					Person	2	2	27	2
					Other	2	1	1	10
					Accuracy: 84.762% (incorrect=16, total=105)				
9,500	11,500	0.0031	0.00015	84.76%	Bkgd	16	0	3	3
					Vehicle	1	33	0	1
					Person	0	2	27	0
					Other	3	2	1	13
					Accuracy: 84.762% (incorrect=16, total=105)				
9,000	11,000	0.0026	0.00015	84.46%	Bkgd	17	0	2	0
					Vehicle	2	32	1	1
					Person	2	1	30	3
					Other	0	1	3	8
					Accuracy: 84.466% (incorrect=16, total=103)				

q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix																									
9,500	11,000	0.0031	0.0002	84.26%	<table> <tr><td>Bkgd</td><td>12</td><td>0</td><td>3</td><td>1</td></tr> <tr><td>Vehicle</td><td>0</td><td>41</td><td>1</td><td>1</td></tr> <tr><td>Person</td><td>2</td><td>0</td><td>34</td><td>5</td></tr> <tr><td>Other</td><td>1</td><td>1</td><td>2</td><td>4</td></tr> <tr><td colspan="5">Accuracy: 84.259% (incorrect=17, total=108)</td></tr> </table>	Bkgd	12	0	3	1	Vehicle	0	41	1	1	Person	2	0	34	5	Other	1	1	2	4	Accuracy: 84.259% (incorrect=17, total=108)				
Bkgd	12	0	3	1																										
Vehicle	0	41	1	1																										
Person	2	0	34	5																										
Other	1	1	2	4																										
Accuracy: 84.259% (incorrect=17, total=108)																														
9,000	11,000	0.0036	0.0002	83.96%	<table> <tr><td>Bkgd</td><td>16</td><td>1</td><td>1</td><td>3</td></tr> <tr><td>Vehicle</td><td>1</td><td>30</td><td>1</td><td>1</td></tr> <tr><td>Person</td><td>0</td><td>0</td><td>37</td><td>2</td></tr> <tr><td>Other</td><td>2</td><td>2</td><td>3</td><td>6</td></tr> <tr><td colspan="5">Accuracy: 83.962% (incorrect=17, total=106)</td></tr> </table>	Bkgd	16	1	1	3	Vehicle	1	30	1	1	Person	0	0	37	2	Other	2	2	3	6	Accuracy: 83.962% (incorrect=17, total=106)				
Bkgd	16	1	1	3																										
Vehicle	1	30	1	1																										
Person	0	0	37	2																										
Other	2	2	3	6																										
Accuracy: 83.962% (incorrect=17, total=106)																														
9,000	11,500	0.0036	0.00015	83.81%	<table> <tr><td>Bkgd</td><td>13</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>Vehicle</td><td>1</td><td>36</td><td>1</td><td>2</td></tr> <tr><td>Person</td><td>1</td><td>0</td><td>34</td><td>4</td></tr> <tr><td>Other</td><td>1</td><td>0</td><td>4</td><td>5</td></tr> <tr><td colspan="5">Accuracy: 83.810% (incorrect=17, total=105)</td></tr> </table>	Bkgd	13	0	1	2	Vehicle	1	36	1	2	Person	1	0	34	4	Other	1	0	4	5	Accuracy: 83.810% (incorrect=17, total=105)				
Bkgd	13	0	1	2																										
Vehicle	1	36	1	2																										
Person	1	0	34	4																										
Other	1	0	4	5																										
Accuracy: 83.810% (incorrect=17, total=105)																														
9,500	11,000	0.0031	0.00015	83.33%	<table> <tr><td>Bkgd</td><td>13</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>Vehicle</td><td>0</td><td>32</td><td>0</td><td>5</td></tr> <tr><td>Person</td><td>0</td><td>0</td><td>32</td><td>4</td></tr> <tr><td>Other</td><td>3</td><td>1</td><td>2</td><td>13</td></tr> <tr><td colspan="5">Accuracy: 83.333% (incorrect=18, total=108)</td></tr> </table>	Bkgd	13	0	1	2	Vehicle	0	32	0	5	Person	0	0	32	4	Other	3	1	2	13	Accuracy: 83.333% (incorrect=18, total=108)				
Bkgd	13	0	1	2																										
Vehicle	0	32	0	5																										
Person	0	0	32	4																										
Other	3	1	2	13																										
Accuracy: 83.333% (incorrect=18, total=108)																														
9,500	11,500	0.0036	0.00015	82.88%	<table> <tr><td>Bkgd</td><td>16</td><td>2</td><td>1</td><td>1</td></tr> <tr><td>Vehicle</td><td>1</td><td>40</td><td>1</td><td>3</td></tr> <tr><td>Person</td><td>3</td><td>1</td><td>22</td><td>3</td></tr> <tr><td>Other</td><td>0</td><td>1</td><td>1</td><td>9</td></tr> <tr><td colspan="5">Accuracy: 82.857% (incorrect=18, total=105)</td></tr> </table>	Bkgd	16	2	1	1	Vehicle	1	40	1	3	Person	3	1	22	3	Other	0	1	1	9	Accuracy: 82.857% (incorrect=18, total=105)				
Bkgd	16	2	1	1																										
Vehicle	1	40	1	3																										
Person	3	1	22	3																										
Other	0	1	1	9																										
Accuracy: 82.857% (incorrect=18, total=105)																														
9,000	11,500	0.0026	0.00015	82.86%	<table> <tr><td>Bkgd</td><td>12</td><td>1</td><td>4</td><td>2</td></tr> <tr><td>Vehicle</td><td>0</td><td>50</td><td>2</td><td>4</td></tr> <tr><td>Person</td><td>2</td><td>0</td><td>21</td><td>3</td></tr> <tr><td>Other</td><td>0</td><td>0</td><td>0</td><td>4</td></tr> <tr><td colspan="5">Accuracy: 82.857% (incorrect=18, total=105)</td></tr> </table>	Bkgd	12	1	4	2	Vehicle	0	50	2	4	Person	2	0	21	3	Other	0	0	0	4	Accuracy: 82.857% (incorrect=18, total=105)				
Bkgd	12	1	4	2																										
Vehicle	0	50	2	4																										
Person	2	0	21	3																										
Other	0	0	0	4																										
Accuracy: 82.857% (incorrect=18, total=105)																														
9,000	11,500	0.0026	0.0002	82.86%	<table> <tr><td>Bkgd</td><td>17</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>Vehicle</td><td>1</td><td>36</td><td>2</td><td>1</td></tr> <tr><td>Person</td><td>3</td><td>0</td><td>26</td><td>3</td></tr> <tr><td>Other</td><td>1</td><td>3</td><td>2</td><td>8</td></tr> <tr><td colspan="5">Accuracy: 82.857% (incorrect=18, total=105)</td></tr> </table>	Bkgd	17	0	1	1	Vehicle	1	36	2	1	Person	3	0	26	3	Other	1	3	2	8	Accuracy: 82.857% (incorrect=18, total=105)				
Bkgd	17	0	1	1																										
Vehicle	1	36	2	1																										
Person	3	0	26	3																										
Other	1	3	2	8																										
Accuracy: 82.857% (incorrect=18, total=105)																														
9,500	11,500	0.0031	0.0001	82.83%	<table> <tr><td>Bkgd</td><td>14</td><td>0</td><td>2</td><td>2</td></tr> <tr><td>Vehicle</td><td>0</td><td>32</td><td>2</td><td>4</td></tr> <tr><td>Person</td><td>1</td><td>1</td><td>30</td><td>3</td></tr> <tr><td>Other</td><td>1</td><td>0</td><td>2</td><td>11</td></tr> <tr><td colspan="5">Accuracy: 82.857% (incorrect=18, total=105)</td></tr> </table>	Bkgd	14	0	2	2	Vehicle	0	32	2	4	Person	1	1	30	3	Other	1	0	2	11	Accuracy: 82.857% (incorrect=18, total=105)				
Bkgd	14	0	2	2																										
Vehicle	0	32	2	4																										
Person	1	1	30	3																										
Other	1	0	2	11																										
Accuracy: 82.857% (incorrect=18, total=105)																														
9,500	11,000	0.0026	0.00015	81.48%	<table> <tr><td>Bkgd</td><td>13</td><td>1</td><td>2</td><td>4</td></tr> <tr><td>Vehicle</td><td>0</td><td>44</td><td>0</td><td>1</td></tr> <tr><td>Person</td><td>0</td><td>0</td><td>19</td><td>4</td></tr> <tr><td>Other</td><td>4</td><td>0</td><td>4</td><td>12</td></tr> <tr><td colspan="5">Accuracy: 81.481% (incorrect=20, total=108)</td></tr> </table>	Bkgd	13	1	2	4	Vehicle	0	44	0	1	Person	0	0	19	4	Other	4	0	4	12	Accuracy: 81.481% (incorrect=20, total=108)				
Bkgd	13	1	2	4																										
Vehicle	0	44	0	1																										
Person	0	0	19	4																										
Other	4	0	4	12																										
Accuracy: 81.481% (incorrect=20, total=108)																														
9,000	11,000	0.0026	0.0002	80.19%	<table> <tr><td>Bkgd</td><td>21</td><td>0</td><td>1</td><td>3</td></tr> <tr><td>Vehicle</td><td>0</td><td>30</td><td>0</td><td>2</td></tr> <tr><td>Person</td><td>0</td><td>1</td><td>28</td><td>6</td></tr> <tr><td>Other</td><td>2</td><td>3</td><td>3</td><td>6</td></tr> <tr><td colspan="5">Accuracy: 80.189% (incorrect=21, total=106)</td></tr> </table>	Bkgd	21	0	1	3	Vehicle	0	30	0	2	Person	0	1	28	6	Other	2	3	3	6	Accuracy: 80.189% (incorrect=21, total=106)				
Bkgd	21	0	1	3																										
Vehicle	0	30	0	2																										
Person	0	1	28	6																										
Other	2	3	3	6																										
Accuracy: 80.189% (incorrect=21, total=106)																														
9,500	11,000	0.0036	0.00015	79.63%	<table> <tr><td>Bkgd</td><td>14</td><td>1</td><td>2</td><td>4</td></tr> <tr><td>Vehicle</td><td>0</td><td>36</td><td>1</td><td>0</td></tr> <tr><td>Person</td><td>1</td><td>0</td><td>25</td><td>3</td></tr> <tr><td>Other</td><td>4</td><td>2</td><td>4</td><td>11</td></tr> <tr><td colspan="5">Accuracy: 79.630% (incorrect=22, total=108)</td></tr> </table>	Bkgd	14	1	2	4	Vehicle	0	36	1	0	Person	1	0	25	3	Other	4	2	4	11	Accuracy: 79.630% (incorrect=22, total=108)				
Bkgd	14	1	2	4																										
Vehicle	0	36	1	0																										
Person	1	0	25	3																										
Other	4	2	4	11																										
Accuracy: 79.630% (incorrect=22, total=108)																														

q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix																									
9,000	11,500	0.0036	0.0002	79.05%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>35</td><td>0</td><td>4</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>30</td><td>4</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>4</td><td>7</td></tr> </tbody> </table> <p>Accuracy: 79.048% (incorrect=22, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	11	0	1	2	Vehicle	1	35	0	4	Person	1	1	30	4	Other	3	1	4	7
	Bkgd	Vehicle	Person	Other																										
Bkgd	11	0	1	2																										
Vehicle	1	35	0	4																										
Person	1	1	30	4																										
Other	3	1	4	7																										
9,500	11,000	0.0036	0.0001	76.85%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>3</td><td>7</td></tr> <tr> <td>Vehicle</td><td>1</td><td>28</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>29</td><td>6</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>3</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 76.852% (incorrect=25, total=108)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	3	7	Vehicle	1	28	0	1	Person	0	1	29	6	Other	2	1	3	10
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	0	3	7																										
Vehicle	1	28	0	1																										
Person	0	1	29	6																										
Other	2	1	3	10																										
9,000	11,000	0.0036	0.0001	76.42%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>0</td><td>3</td><td>5</td></tr> <tr> <td>Vehicle</td><td>0</td><td>32</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>26</td><td>4</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>5</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 76.415% (incorrect=25, total=106)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	0	3	5	Vehicle	0	32	1	2	Person	1	1	26	4	Other	2	1	5	11
	Bkgd	Vehicle	Person	Other																										
Bkgd	12	0	3	5																										
Vehicle	0	32	1	2																										
Person	1	1	26	4																										
Other	2	1	5	11																										



**Observations:** There was no drastic difference between the learning rate and epoch combinations that we tested, however it was observed that a base max\_iterations value of around 9000-9500 along with a rather small value for the layer 1 learning rate (around 0.0001 - 0.0002) yielded the best accuracies. The layer 1 max iterations was always around 2000 epochs higher than the base lr, so it cannot account for any significant change in accuracy, and the base learning rate varied by a bit throughout, yet did not impact the accuracy in any noteworthy way.

## Test 4

**Objectives:** To run tests similar to the best performing Epoch and Learning Rate combinations.

**Settings:** Varied epochs and learning rates based on previous high scorers. Other settings were left to default. Max\_itr = 9000/9500, lr1\_max\_itr = 11000/11500, base\_lr = 0.0026/0.0031/0.0036, and lr1\_base\_lr = 0.0001/0.00015.

					matrix																									
q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy																										
9,000	11,000	0.0026	0.0001	99.03%	<table border="1"> <thead> <tr> <th></th> <th>Bkgd</th> <th>Vehicle</th> <th>Person</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Bkgd</td> <td>14</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Vehicle</td> <td>0</td> <td>39</td> <td>0</td> <td>0</td> </tr> <tr> <td>Person</td> <td>0</td> <td>0</td> <td>31</td> <td>0</td> </tr> <tr> <td>Other</td> <td>0</td> <td>1</td> <td>0</td> <td>18</td> </tr> </tbody> </table> <p>Accuracy: 99.029% (incorrect=1, total=103)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	0	0	Vehicle	0	39	0	0	Person	0	0	31	0	Other	0	1	0	18
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	0	0	0																										
Vehicle	0	39	0	0																										
Person	0	0	31	0																										
Other	0	1	0	18																										
9,000	11,000	0.0036	0.00015	91.51%	<table border="1"> <thead> <tr> <th></th> <th>Bkgd</th> <th>Vehicle</th> <th>Person</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Bkgd</td> <td>16</td> <td>0</td> <td>3</td> <td>0</td> </tr> <tr> <td>Vehicle</td> <td>0</td> <td>34</td> <td>0</td> <td>1</td> </tr> <tr> <td>Person</td> <td>0</td> <td>0</td> <td>35</td> <td>1</td> </tr> <tr> <td>Other</td> <td>2</td> <td>0</td> <td>2</td> <td>12</td> </tr> </tbody> </table> <p>Accuracy: 91.509% (incorrect=9, total=106)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	3	0	Vehicle	0	34	0	1	Person	0	0	35	1	Other	2	0	2	12
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	0	3	0																										
Vehicle	0	34	0	1																										
Person	0	0	35	1																										
Other	2	0	2	12																										
9,000	11,500	0.0031	0.0001	91.43%	<table border="1"> <thead> <tr> <th></th> <th>Bkgd</th> <th>Vehicle</th> <th>Person</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Bkgd</td> <td>17</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Vehicle</td> <td>1</td> <td>44</td> <td>0</td> <td>2</td> </tr> <tr> <td>Person</td> <td>0</td> <td>1</td> <td>23</td> <td>1</td> </tr> <tr> <td>Other</td> <td>3</td> <td>0</td> <td>1</td> <td>12</td> </tr> </tbody> </table> <p>Accuracy: 91.429% (incorrect=9, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	0	0	0	Vehicle	1	44	0	2	Person	0	1	23	1	Other	3	0	1	12
	Bkgd	Vehicle	Person	Other																										
Bkgd	17	0	0	0																										
Vehicle	1	44	0	2																										
Person	0	1	23	1																										
Other	3	0	1	12																										
9,500	11,500	0.0031	0.0002	90.48%	<table border="1"> <thead> <tr> <th></th> <th>Bkgd</th> <th>Vehicle</th> <th>Person</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Bkgd</td> <td>16</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>Vehicle</td> <td>0</td> <td>41</td> <td>0</td> <td>3</td> </tr> <tr> <td>Person</td> <td>1</td> <td>0</td> <td>32</td> <td>2</td> </tr> <tr> <td>Other</td> <td>2</td> <td>0</td> <td>1</td> <td>6</td> </tr> </tbody> </table> <p>Accuracy: 90.476% (incorrect=10, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	1	0	Vehicle	0	41	0	3	Person	1	0	32	2	Other	2	0	1	6
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	0	1	0																										
Vehicle	0	41	0	3																										
Person	1	0	32	2																										
Other	2	0	1	6																										
9,000	11,000	0.0031	0.00015	90.29%	<table border="1"> <thead> <tr> <th></th> <th>Bkgd</th> <th>Vehicle</th> <th>Person</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Bkgd</td> <td>10</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Vehicle</td> <td>0</td> <td>52</td> <td>2</td> <td>4</td> </tr> <tr> <td>Person</td> <td>0</td> <td>0</td> <td>25</td> <td>0</td> </tr> <tr> <td>Other</td> <td>2</td> <td>1</td> <td>1</td> <td>6</td> </tr> </tbody> </table> <p>Accuracy: 90.291% (incorrect=10, total=103)</p>		Bkgd	Vehicle	Person	Other	Bkgd	10	0	0	0	Vehicle	0	52	2	4	Person	0	0	25	0	Other	2	1	1	6
	Bkgd	Vehicle	Person	Other																										
Bkgd	10	0	0	0																										
Vehicle	0	52	2	4																										
Person	0	0	25	0																										
Other	2	1	1	6																										
9,000	11,500	0.0031	0.00015	89.52%	<table border="1"> <thead> <tr> <th></th> <th>Bkgd</th> <th>Vehicle</th> <th>Person</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Bkgd</td> <td>14</td> <td>0</td> <td>2</td> <td>0</td> </tr> <tr> <td>Vehicle</td> <td>0</td> <td>35</td> <td>2</td> <td>1</td> </tr> <tr> <td>Person</td> <td>1</td> <td>0</td> <td>37</td> <td>1</td> </tr> <tr> <td>Other</td> <td>0</td> <td>2</td> <td>2</td> <td>8</td> </tr> </tbody> </table> <p>Accuracy: 89.524% (incorrect=11, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	2	0	Vehicle	0	35	2	1	Person	1	0	37	1	Other	0	2	2	8
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	0	2	0																										
Vehicle	0	35	2	1																										
Person	1	0	37	1																										
Other	0	2	2	8																										
9,500	11,500	0.0026	0.00015	89.52%	<table border="1"> <thead> <tr> <th></th> <th>Bkgd</th> <th>Vehicle</th> <th>Person</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Bkgd</td> <td>18</td> <td>1</td> <td>1</td> <td>2</td> </tr> <tr> <td>Vehicle</td> <td>1</td> <td>35</td> <td>0</td> <td>1</td> </tr> <tr> <td>Person</td> <td>0</td> <td>0</td> <td>35</td> <td>4</td> </tr> <tr> <td>Other</td> <td>0</td> <td>0</td> <td>1</td> <td>6</td> </tr> </tbody> </table> <p>Accuracy: 89.524% (incorrect=11, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	1	1	2	Vehicle	1	35	0	1	Person	0	0	35	4	Other	0	0	1	6
	Bkgd	Vehicle	Person	Other																										
Bkgd	18	1	1	2																										
Vehicle	1	35	0	1																										
Person	0	0	35	4																										
Other	0	0	1	6																										

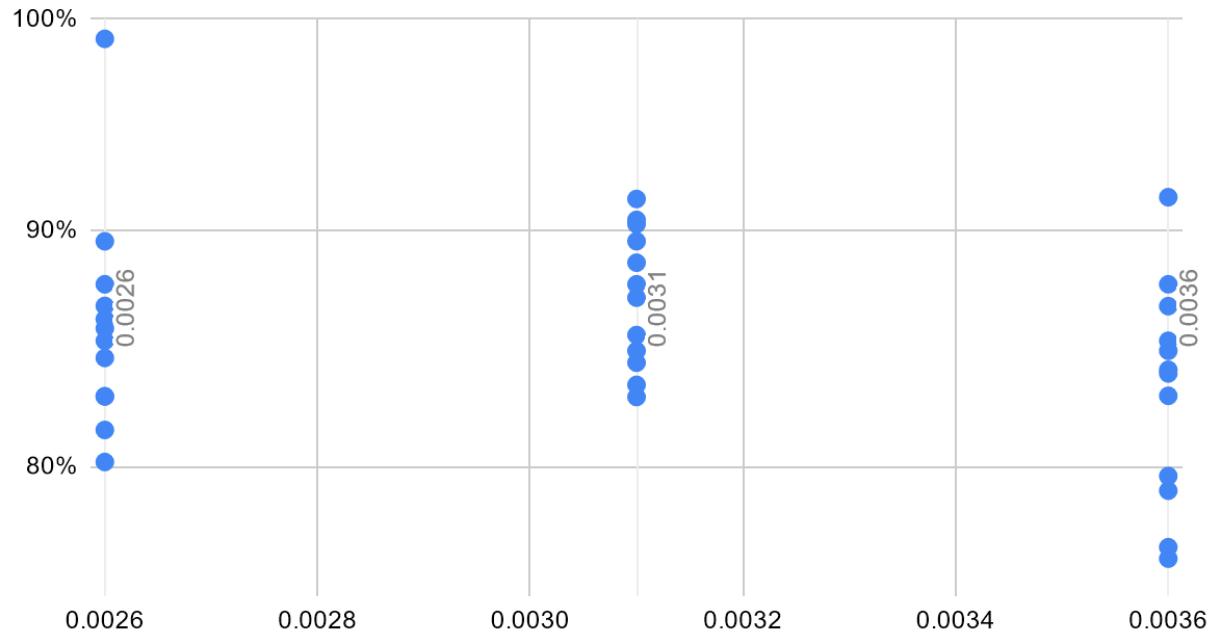
q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix																														
9,000	11,000	0.0031	0.0001	88.57%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>0</td><td>0</td><td>3</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>44</td><td>1</td><td>1</td><td></td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>28</td><td>2</td><td></td></tr> <tr> <td>Other</td><td>0</td><td>2</td><td>3</td><td>9</td><td></td></tr> </tbody> </table> <p>Accuracy: 88.571% (incorrect=12, total=105)</p>		Bkgd	Vehicle	Person	Other		Bkgd	12	0	0	3		Vehicle	0	44	1	1		Person	0	0	28	2		Other	0	2	3	9	
	Bkgd	Vehicle	Person	Other																															
Bkgd	12	0	0	3																															
Vehicle	0	44	1	1																															
Person	0	0	28	2																															
Other	0	2	3	9																															
9,500	11,500	0.0026	0.0001	87.62%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>1</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>41</td><td>0</td><td>2</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>28</td><td>4</td><td></td></tr> <tr> <td>Other</td><td>0</td><td>0</td><td>2</td><td>12</td><td></td></tr> </tbody> </table> <p>Accuracy: 87.619% (incorrect=13, total=105)</p>		Bkgd	Vehicle	Person	Other		Bkgd	11	0	1	2		Vehicle	1	41	0	2		Person	1	0	28	4		Other	0	0	2	12	
	Bkgd	Vehicle	Person	Other																															
Bkgd	11	0	1	2																															
Vehicle	1	41	0	2																															
Person	1	0	28	4																															
Other	0	0	2	12																															
9,500	11,500	0.0036	0.0001	87.62%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>1</td><td>1</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>38</td><td>2</td><td>2</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>28</td><td>3</td><td></td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>0</td><td>10</td><td></td></tr> </tbody> </table> <p>Accuracy: 87.619% (incorrect=13, total=105)</p>		Bkgd	Vehicle	Person	Other		Bkgd	16	0	1	1		Vehicle	0	38	2	2		Person	2	0	28	3		Other	1	1	0	10	
	Bkgd	Vehicle	Person	Other																															
Bkgd	16	0	1	1																															
Vehicle	0	38	2	2																															
Person	2	0	28	3																															
Other	1	1	0	10																															
9,000	11,500	0.0031	0.0002	87.62%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>24</td><td>0</td><td>3</td><td>0</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>38</td><td>0</td><td>2</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>23</td><td>3</td><td></td></tr> <tr> <td>Other</td><td>1</td><td>0</td><td>1</td><td>7</td><td></td></tr> </tbody> </table> <p>Accuracy: 87.619% (incorrect=13, total=105)</p>		Bkgd	Vehicle	Person	Other		Bkgd	24	0	3	0		Vehicle	0	38	0	2		Person	2	1	23	3		Other	1	0	1	7	
	Bkgd	Vehicle	Person	Other																															
Bkgd	24	0	3	0																															
Vehicle	0	38	0	2																															
Person	2	1	23	3																															
Other	1	0	1	7																															
9,500	11,000	0.0031	0.0001	87.04%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>1</td><td>1</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>32</td><td>0</td><td>2</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>40</td><td>3</td><td></td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>2</td><td>11</td><td></td></tr> </tbody> </table> <p>Accuracy: 87.037% (incorrect=14, total=108)</p>		Bkgd	Vehicle	Person	Other		Bkgd	11	0	1	1		Vehicle	0	32	0	2		Person	1	0	40	3		Other	3	1	2	11	
	Bkgd	Vehicle	Person	Other																															
Bkgd	11	0	1	1																															
Vehicle	0	32	0	2																															
Person	1	0	40	3																															
Other	3	1	2	11																															
9,500	11,500	0.0026	0.0002	86.68%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>1</td><td>1</td><td>1</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>38</td><td>1</td><td>1</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>30</td><td>2</td><td></td></tr> <tr> <td>Other</td><td>3</td><td>0</td><td>3</td><td>12</td><td></td></tr> </tbody> </table> <p>Accuracy: 86.667% (incorrect=14, total=105)</p>		Bkgd	Vehicle	Person	Other		Bkgd	11	1	1	1		Vehicle	0	38	1	1		Person	1	0	30	2		Other	3	0	3	12	
	Bkgd	Vehicle	Person	Other																															
Bkgd	11	1	1	1																															
Vehicle	0	38	1	1																															
Person	1	0	30	2																															
Other	3	0	3	12																															
9,500	11,500	0.0036	0.0002	86.67%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>9</td><td>0</td><td>0</td><td>3</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>41</td><td>2</td><td>0</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>38</td><td>4</td><td></td></tr> <tr> <td>Other</td><td>0</td><td>2</td><td>1</td><td>3</td><td></td></tr> </tbody> </table> <p>Accuracy: 86.667% (incorrect=14, total=105)</p>		Bkgd	Vehicle	Person	Other		Bkgd	9	0	0	3		Vehicle	0	41	2	0		Person	2	0	38	4		Other	0	2	1	3	
	Bkgd	Vehicle	Person	Other																															
Bkgd	9	0	0	3																															
Vehicle	0	41	2	0																															
Person	2	0	38	4																															
Other	0	2	1	3																															

q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix																									
9,500	11,000	0.0026	0.0002	86.11%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>2</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>39</td><td>0</td><td>0</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>34</td><td>1</td></tr> <tr> <td>Other</td><td>3</td><td>2</td><td>1</td><td>4</td></tr> </tbody> </table> <p>Accuracy: 86.11% (incorrect=15, total=108)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	2	2	3	Vehicle	0	39	0	0	Person	1	0	34	1	Other	3	2	1	4
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	2	2	3																										
Vehicle	0	39	0	0																										
Person	1	0	34	1																										
Other	3	2	1	4																										
9,000	11,500	0.0026	0.0001	85.71%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>1</td><td>0</td><td>4</td></tr> <tr> <td>Vehicle</td><td>0</td><td>38</td><td>0</td><td>4</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>27</td><td>1</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>1</td><td>7</td></tr> </tbody> </table> <p>Accuracy: 85.71% (incorrect=15, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	1	0	4	Vehicle	0	38	0	4	Person	0	1	27	1	Other	2	1	1	7
	Bkgd	Vehicle	Person	Other																										
Bkgd	18	1	0	4																										
Vehicle	0	38	0	4																										
Person	0	1	27	1																										
Other	2	1	1	7																										
9,000	11,000	0.0031	0.0002	85.43%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>0</td><td>1</td><td>5</td></tr> <tr> <td>Vehicle</td><td>1</td><td>36</td><td>2</td><td>0</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>25</td><td>2</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>1</td><td>9</td></tr> </tbody> </table> <p>Accuracy: 85.43% (incorrect=15, total=103)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	0	1	5	Vehicle	1	36	2	0	Person	1	0	25	2	Other	1	1	1	9
	Bkgd	Vehicle	Person	Other																										
Bkgd	18	0	1	5																										
Vehicle	1	36	2	0																										
Person	1	0	25	2																										
Other	1	1	1	9																										
9,500	11,000	0.0026	0.0001	85.19%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>0</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>38</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>29</td><td>4</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>2</td><td>6</td></tr> </tbody> </table> <p>Accuracy: 85.185% (incorrect=16, total=108)</p>		Bkgd	Vehicle	Person	Other	Bkgd	19	0	1	3	Vehicle	0	38	0	1	Person	3	0	29	4	Other	1	1	2	6
	Bkgd	Vehicle	Person	Other																										
Bkgd	19	0	1	3																										
Vehicle	0	38	0	1																										
Person	3	0	29	4																										
Other	1	1	2	6																										
9,500	11,000	0.0036	0.0002	85.19%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>0</td><td>0</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>35</td><td>0</td><td>2</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>30</td><td>4</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>2</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 85.185% (incorrect=16, total=108)</p>		Bkgd	Vehicle	Person	Other	Bkgd	15	0	0	2	Vehicle	0	35	0	2	Person	2	1	30	4	Other	2	1	2	12
	Bkgd	Vehicle	Person	Other																										
Bkgd	15	0	0	2																										
Vehicle	0	35	0	2																										
Person	2	1	30	4																										
Other	2	1	2	12																										
9,000	11,500	0.0036	0.0001	84.76%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>38</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>2</td><td>27</td><td>2</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>1</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 84.762% (incorrect=16, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	1	2	Vehicle	0	38	0	3	Person	2	2	27	2	Other	2	1	1	10
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	0	1	2																										
Vehicle	0	38	0	3																										
Person	2	2	27	2																										
Other	2	1	1	10																										
9,500	11,500	0.0031	0.00015	84.76%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>3</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>33</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>0</td><td>2</td><td>27</td><td>0</td></tr> <tr> <td>Other</td><td>3</td><td>2</td><td>1</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 84.762% (incorrect=16, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	3	3	Vehicle	1	33	0	1	Person	0	2	27	0	Other	3	2	1	13
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	0	3	3																										
Vehicle	1	33	0	1																										
Person	0	2	27	0																										
Other	3	2	1	13																										

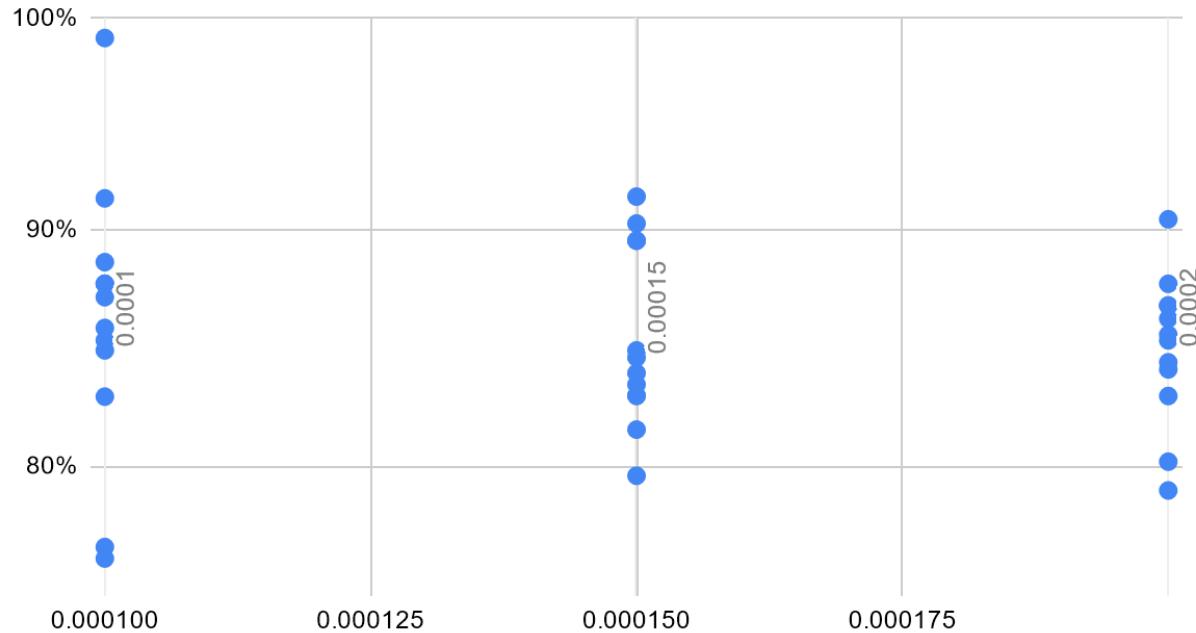
					matrix																				
q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy																					
9,000	11,000	0.0026	0.00015	84.46%	<table> <tr><td>Bkgd</td><td>17</td><td>0</td><td>2</td><td>0</td></tr> <tr><td>Vehicle</td><td>2</td><td>32</td><td>1</td><td>1</td></tr> <tr><td>Person</td><td>2</td><td>1</td><td>30</td><td>3</td></tr> <tr><td>Other</td><td>0</td><td>1</td><td>3</td><td>8</td></tr> </table> <p>Accuracy: 84.466% (incorrect=16, total=103)</p>	Bkgd	17	0	2	0	Vehicle	2	32	1	1	Person	2	1	30	3	Other	0	1	3	8
Bkgd	17	0	2	0																					
Vehicle	2	32	1	1																					
Person	2	1	30	3																					
Other	0	1	3	8																					
9,500	11,000	0.0031	0.0002	84.26%	<table> <tr><td>Bkgd</td><td>12</td><td>0</td><td>3</td><td>1</td></tr> <tr><td>Vehicle</td><td>0</td><td>41</td><td>1</td><td>1</td></tr> <tr><td>Person</td><td>2</td><td>0</td><td>34</td><td>5</td></tr> <tr><td>Other</td><td>1</td><td>1</td><td>2</td><td>4</td></tr> </table> <p>Accuracy: 84.259% (incorrect=17, total=108)</p>	Bkgd	12	0	3	1	Vehicle	0	41	1	1	Person	2	0	34	5	Other	1	1	2	4
Bkgd	12	0	3	1																					
Vehicle	0	41	1	1																					
Person	2	0	34	5																					
Other	1	1	2	4																					
9,000	11,000	0.0036	0.0002	83.96%	<table> <tr><td>Bkgd</td><td>16</td><td>1</td><td>1</td><td>3</td></tr> <tr><td>Vehicle</td><td>1</td><td>30</td><td>1</td><td>1</td></tr> <tr><td>Person</td><td>0</td><td>0</td><td>37</td><td>2</td></tr> <tr><td>Other</td><td>2</td><td>2</td><td>3</td><td>6</td></tr> </table> <p>Accuracy: 83.962% (incorrect=17, total=106)</p>	Bkgd	16	1	1	3	Vehicle	1	30	1	1	Person	0	0	37	2	Other	2	2	3	6
Bkgd	16	1	1	3																					
Vehicle	1	30	1	1																					
Person	0	0	37	2																					
Other	2	2	3	6																					
9,000	11,500	0.0036	0.00015	83.81%	<table> <tr><td>Bkgd</td><td>13</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>Vehicle</td><td>1</td><td>36</td><td>1</td><td>2</td></tr> <tr><td>Person</td><td>1</td><td>0</td><td>34</td><td>4</td></tr> <tr><td>Other</td><td>1</td><td>0</td><td>4</td><td>5</td></tr> </table> <p>Accuracy: 83.810% (incorrect=17, total=105)</p>	Bkgd	13	0	1	2	Vehicle	1	36	1	2	Person	1	0	34	4	Other	1	0	4	5
Bkgd	13	0	1	2																					
Vehicle	1	36	1	2																					
Person	1	0	34	4																					
Other	1	0	4	5																					
9,500	11,000	0.0031	0.00015	83.33%	<table> <tr><td>Bkgd</td><td>13</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>Vehicle</td><td>0</td><td>32</td><td>0</td><td>5</td></tr> <tr><td>Person</td><td>0</td><td>0</td><td>32</td><td>4</td></tr> <tr><td>Other</td><td>3</td><td>1</td><td>2</td><td>13</td></tr> </table> <p>Accuracy: 83.333% (incorrect=18, total=108)</p>	Bkgd	13	0	1	2	Vehicle	0	32	0	5	Person	0	0	32	4	Other	3	1	2	13
Bkgd	13	0	1	2																					
Vehicle	0	32	0	5																					
Person	0	0	32	4																					
Other	3	1	2	13																					
9,500	11,500	0.0036	0.00015	82.88%	<table> <tr><td>Bkgd</td><td>16</td><td>2</td><td>1</td><td>1</td></tr> <tr><td>Vehicle</td><td>1</td><td>40</td><td>1</td><td>3</td></tr> <tr><td>Person</td><td>3</td><td>1</td><td>22</td><td>3</td></tr> <tr><td>Other</td><td>0</td><td>1</td><td>1</td><td>9</td></tr> </table> <p>Accuracy: 82.857% (incorrect=18, total=105)</p>	Bkgd	16	2	1	1	Vehicle	1	40	1	3	Person	3	1	22	3	Other	0	1	1	9
Bkgd	16	2	1	1																					
Vehicle	1	40	1	3																					
Person	3	1	22	3																					
Other	0	1	1	9																					
9,000	11,500	0.0026	0.00015	82.86%	<table> <tr><td>Bkgd</td><td>12</td><td>1</td><td>4</td><td>2</td></tr> <tr><td>Vehicle</td><td>0</td><td>50</td><td>2</td><td>4</td></tr> <tr><td>Person</td><td>2</td><td>0</td><td>21</td><td>3</td></tr> <tr><td>Other</td><td>0</td><td>0</td><td>0</td><td>4</td></tr> </table> <p>Accuracy: 82.857% (incorrect=18, total=105)</p>	Bkgd	12	1	4	2	Vehicle	0	50	2	4	Person	2	0	21	3	Other	0	0	0	4
Bkgd	12	1	4	2																					
Vehicle	0	50	2	4																					
Person	2	0	21	3																					
Other	0	0	0	4																					

q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix																									
9,000	11,500	0.0026	0.0002	82.86%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>0</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>36</td><td>2</td><td>1</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>26</td><td>3</td></tr> <tr> <td>Other</td><td>1</td><td>3</td><td>2</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 82.857% (incorrect=18, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	0	1	1	Vehicle	1	36	2	1	Person	3	0	26	3	Other	1	3	2	8
	Bkgd	Vehicle	Person	Other																										
Bkgd	17	0	1	1																										
Vehicle	1	36	2	1																										
Person	3	0	26	3																										
Other	1	3	2	8																										
9,500	11,500	0.0031	0.0001	82.83%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>2</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>32</td><td>2</td><td>4</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>30</td><td>3</td></tr> <tr> <td>Other</td><td>1</td><td>0</td><td>2</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 82.857% (incorrect=18, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	2	2	Vehicle	0	32	2	4	Person	1	1	30	3	Other	1	0	2	11
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	0	2	2																										
Vehicle	0	32	2	4																										
Person	1	1	30	3																										
Other	1	0	2	11																										
9,500	11,000	0.0026	0.00015	81.48%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>1</td><td>2</td><td>4</td></tr> <tr> <td>Vehicle</td><td>0</td><td>44</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>19</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>0</td><td>4</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 81.481% (incorrect=20, total=108)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	1	2	4	Vehicle	0	44	0	1	Person	0	0	19	4	Other	4	0	4	12
	Bkgd	Vehicle	Person	Other																										
Bkgd	13	1	2	4																										
Vehicle	0	44	0	1																										
Person	0	0	19	4																										
Other	4	0	4	12																										
9,000	11,000	0.0026	0.0002	80.19%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>21</td><td>0</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>30</td><td>0</td><td>2</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>28</td><td>6</td></tr> <tr> <td>Other</td><td>2</td><td>3</td><td>3</td><td>6</td></tr> </tbody> </table> <p>Accuracy: 80.189% (incorrect=21, total=106)</p>		Bkgd	Vehicle	Person	Other	Bkgd	21	0	1	3	Vehicle	0	30	0	2	Person	0	1	28	6	Other	2	3	3	6
	Bkgd	Vehicle	Person	Other																										
Bkgd	21	0	1	3																										
Vehicle	0	30	0	2																										
Person	0	1	28	6																										
Other	2	3	3	6																										
9,500	11,000	0.0036	0.00015	79.63%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>1</td><td>2</td><td>4</td></tr> <tr> <td>Vehicle</td><td>0</td><td>36</td><td>1</td><td>0</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>25</td><td>3</td></tr> <tr> <td>Other</td><td>4</td><td>2</td><td>4</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 79.630% (incorrect=22, total=108)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	1	2	4	Vehicle	0	36	1	0	Person	1	0	25	3	Other	4	2	4	11
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	1	2	4																										
Vehicle	0	36	1	0																										
Person	1	0	25	3																										
Other	4	2	4	11																										
9,000	11,500	0.0036	0.0002	79.05%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>35</td><td>0</td><td>4</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>30</td><td>4</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>4</td><td>7</td></tr> </tbody> </table> <p>Accuracy: 79.048% (incorrect=22, total=105)</p>		Bkgd	Vehicle	Person	Other	Bkgd	11	0	1	2	Vehicle	1	35	0	4	Person	1	1	30	4	Other	3	1	4	7
	Bkgd	Vehicle	Person	Other																										
Bkgd	11	0	1	2																										
Vehicle	1	35	0	4																										
Person	1	1	30	4																										
Other	3	1	4	7																										
9,500	11,000	0.0036	0.0001	76.85%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>3</td><td>7</td></tr> <tr> <td>Vehicle</td><td>1</td><td>28</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>29</td><td>6</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>3</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 76.852% (incorrect=25, total=108)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	3	7	Vehicle	1	28	0	1	Person	0	1	29	6	Other	2	1	3	10
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	0	3	7																										
Vehicle	1	28	0	1																										
Person	0	1	29	6																										
Other	2	1	3	10																										
9,000	11,000	0.0036	0.0001	76.42%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>0</td><td>3</td><td>5</td></tr> <tr> <td>Vehicle</td><td>0</td><td>32</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>26</td><td>4</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>5</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 76.415% (incorrect=25, total=106)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	0	3	5	Vehicle	0	32	1	2	Person	1	1	26	4	Other	2	1	5	11
	Bkgd	Vehicle	Person	Other																										
Bkgd	12	0	3	5																										
Vehicle	0	32	1	2																										
Person	1	1	26	4																										
Other	2	1	5	11																										

### q\_s Learning Rate vs Accuracy



### q\_s\_lr1 Learning Rate vs Accuracy



**Observations:** There was an incredibly high accuracy test result at 99.03%, which resulted from a base max\_iter value of 9000, layer 1 max\_iter of 11,000 with a base learning rate of 0.0026 and layer 1 learning rate of 0.0001. This is an interesting result, as it was reproduced twice with the exact same settings. Generally, however, accuracies of around 90% were

achieved with a base max\_iter of 9,000 and a layer 1 max\_iter of 11,000-11,5000, while the base learning rate switched between 0.0026 and 0.0031 with a layer 1 learning rate varying anywhere between 0.0001 to 0.0002.

## Test 5 - New datasets

**Objective:** Running Test after adding the new data set to see if it's accurate.

**NOTE:** After not getting the accuracy we hoped so decided to add more data sets for each class which included vehicle, people, other and background to see if the lack of dataset was the issue we were facing. After adding this new data set we ran the tests twice for each setting to see what accuracy we got.

**Settings:** We used top performing learning rate and max iterations settings from previous tests. Other settings were left at default.

### Test Phase 1

q_s max_itr	q_s_lr1 max_itr	q_s base_lr	q_s_lr1 base_lr	Accy	New Accy	matrix				
						Bkgd	Vehicle	Person	Other	
9,000	11,000	0.0026	0.0001	99.03%	83.33%	Bkgd Vehicle Person Other	16 0 0 2	0 37 1 0	2 2 28 4	1 2 4 9
						Accuracy: 83.33% (incorrect=18, total=108)				
9,000	11,000	0.0036	0.00015	91.51%	88.89%	Bkgd Vehicle Person Other	22 0 1 3	0 29 0 1	0 2 33 1	0 2 2 12
						Accuracy: 88.89% (incorrect=12, total=108)				
9,000	11,500	0.0031	0.0001	91.43%	80.56%	Bkgd Vehicle Person Other	17 1 4 2	0 39 0 2	0 1 25 4	4 1 2 6
						Accuracy: 80.556% (incorrect=21, total=108)				
9,500	11,500	0.0031	0.0002	90.48%	85.19%	Bkgd Vehicle Person Other	11 1 3 1	0 41 0 0	2 0 27 6	1 0 2 13
						Accuracy: 85.185% (incorrect=16, total=108)				
9,000	11,000	0.0031	0.00015	90.29%	85.19%	Bkgd Vehicle Person Other	18 1 2 0	2 39 0 4	0 0 27 3	1 0 1 8
						Accuracy: 85.185% (incorrect=16, total=108)				
9,000	11,500	0.0031	0.00015	89.52%	82.88%	Bkgd Vehicle Person Other	15 1 2 3	0 55 0 2	3 0 37 4	2 5 3 14
						Accuracy: 82.877% (incorrect=25, total=146)				
9,500	11,500	0.0026	0.00015	89.52%	86.30%	Bkgd Vehicle Person Other	18 1 1 2	0 63 0 2	2 0 40 2	0 2 8 5
						Accuracy: 86.301% (incorrect=20, total=146)				

## Test Phase 2

q_s_max_itr	q_s_lr1_max_itr	q_s_base_lr	q_s_lr1_base_lr	Newer Accy	newer matrix				
9,000	11,000	0.0026	0.0001	85.91%	Bkgd	13	1	0	2
					Vehicle	1	52	0	2
					Person	1	0	48	5
					Other	5	2	2	15
					Accuracy: 85.906% (incorrect=21, total=149)				
9,000	11,000	0.0036	0.00015	89.26%	Bkgd	19	5	0	2
					Vehicle	0	65	0	1
					Person	2	0	37	2
					Other	2	1	1	12
					Accuracy: 89.262% (incorrect=16, total=149)				
9,000	11,500	0.0031	0.0001	81.88%	Bkgd	15	0	1	3
					Vehicle	1	61	0	3
					Person	2	0	35	5
					Other	4	4	4	11
					Accuracy: 81.879% (incorrect=27, total=149)				
9,500	11,500	0.0031	0.0002	83.89%	Bkgd	18	1	3	6
					Vehicle	1	60	0	0
					Person	0	2	37	4
					Other	3	1	3	10
					Accuracy: 83.893% (incorrect=24, total=149)				
9,000	11,000	0.0031	0.00015	79.87%	Bkgd	16	0	1	5
					Vehicle	1	48	1	3
					Person	1	0	45	4
					Other	5	2	7	10
					Accuracy: 79.866% (incorrect=30, total=149)				
9,000	11,500	0.0031	0.00015	81.21%	Bkgd	15	2	4	2
					Vehicle	0	41	1	3
					Person	2	0	49	5
					Other	7	1	1	16
					Accuracy: 81.208% (incorrect=28, total=149)				
9,500	11,500	0.0026	0.00015	83.89%	Bkgd	16	1	1	4
					Vehicle	0	53	0	1
					Person	2	1	49	10
					Other	3	0	1	7
					Accuracy: 83.893% (incorrect=24, total=149)				

**Observation:** On the first try (green row) we were able to get 99 % accuracy. In the secondary and tertiary tests the highest accuracy we got was 85.91% which is way lower than what we got on the first try. This is likely because we were overfitting with the first dataset and the later datasets had a little more variety.

## Test 6

**Objectives:** Find momentum value pairs giving highest accuracy with best 8 epoch and learning rate settings.

**Settings:** Momentum values range from 0.5 to 0.99. 11 variations of Momentum value pairs were tested with the first phase momentum value greater than or equal to the second phase momentum value. These 11 variations were tested with best 8 epoch and learning rate settings. Results with the default momentum settings (.9 and .9) were included in the table and are indicated by not having a confusion matrix included.

q_s_max_itr	q_s_lr1_max_itr	q_s_base_lr	q_s_lr1_base_lr	q_s_mom.	q_s_lr1_mom.	Accy	matrix																									
9,000	11,000	0.0026	0.0001	0.5	0.5	80.14%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>9</td><td>0</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>57</td><td>1</td><td>5</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>41</td><td>6</td></tr> <tr> <td>Other</td><td>3</td><td>2</td><td>4</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 80.137% (incorrect=29, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	9	0	1	3	Vehicle	1	57	1	5	Person	3	0	41	6	Other	3	2	4	10
	Bkgd	Vehicle	Person	Other																												
Bkgd	9	0	1	3																												
Vehicle	1	57	1	5																												
Person	3	0	41	6																												
Other	3	2	4	10																												
9,000	11,000	0.0026	0.0001	0.7	0.5	81.51%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>20</td><td>1</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>56</td><td>0</td><td>7</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>31</td><td>8</td></tr> <tr> <td>Other</td><td>0</td><td>2</td><td>2</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 81.507% (incorrect=27, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	20	1	1	2	Vehicle	1	56	0	7	Person	2	1	31	8	Other	0	2	2	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	20	1	1	2																												
Vehicle	1	56	0	7																												
Person	2	1	31	8																												
Other	0	2	2	12																												
9,000	11,000	0.0026	0.0001	0.7	0.7	85.62%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>1</td><td>4</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>54</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>40</td><td>4</td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>4</td><td>14</td></tr> </tbody> </table> <p>Accuracy: 85.616% (incorrect=21, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	1	4	1	Vehicle	0	54	0	1	Person	1	1	40	4	Other	2	2	4	14
	Bkgd	Vehicle	Person	Other																												
Bkgd	17	1	4	1																												
Vehicle	0	54	0	1																												
Person	1	1	40	4																												
Other	2	2	4	14																												
9,000	11,000	0.0026	0.0001	0.9	0.5	85.62%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>10</td><td>2</td><td>3</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>51</td><td>2</td><td>2</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>52</td><td>4</td></tr> <tr> <td>Other</td><td>3</td><td>0</td><td>1</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 85.616% (incorrect=21, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	10	2	3	2	Vehicle	0	51	2	2	Person	2	0	52	4	Other	3	0	1	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	10	2	3	2																												
Vehicle	0	51	2	2																												
Person	2	0	52	4																												
Other	3	0	1	12																												
9,000	11,000	0.0026	0.0001	0.9	0.7	80.82%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>2</td><td>0</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>51</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>39</td><td>6</td></tr> <tr> <td>Other</td><td>4</td><td>3</td><td>7</td><td>14</td></tr> </tbody> </table> <p>Accuracy: 80.822% (incorrect=28, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	2	0	1	Vehicle	1	51	1	3	Person	0	0	39	6	Other	4	3	7	14
	Bkgd	Vehicle	Person	Other																												
Bkgd	14	2	0	1																												
Vehicle	1	51	1	3																												
Person	0	0	39	6																												
Other	4	3	7	14																												
9,000	11,000	0.0026	0.0001	0.9	0.9	83.33%																										
9,000	11,000	0.0026	0.0001	0.9	0.99	78.77%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>4</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>53</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>4</td><td>0</td><td>38</td><td>7</td></tr> <tr> <td>Other</td><td>3</td><td>4</td><td>3</td><td>6</td></tr> </tbody> </table> <p>Accuracy: 78.767% (incorrect=31, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	4	1	3	Vehicle	1	53	0	1	Person	4	0	38	7	Other	3	4	3	6
	Bkgd	Vehicle	Person	Other																												
Bkgd	18	4	1	3																												
Vehicle	1	53	0	1																												
Person	4	0	38	7																												
Other	3	4	3	6																												
9,000	11,000	0.0026	0.0001	0.99	0.5	83.56%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>4</td><td>57</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>3</td><td>1</td><td>37</td><td>5</td></tr> <tr> <td>Other</td><td>0</td><td>1</td><td>3</td><td>14</td></tr> </tbody> </table> <p>Accuracy: 83.562% (incorrect=24, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	1	2	Vehicle	4	57	1	3	Person	3	1	37	5	Other	0	1	3	14
	Bkgd	Vehicle	Person	Other																												
Bkgd	14	0	1	2																												
Vehicle	4	57	1	3																												
Person	3	1	37	5																												
Other	0	1	3	14																												
9,000	11,000	0.0026	0.0001	0.99	0.7	79.45%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>2</td><td>4</td></tr> <tr> <td>Vehicle</td><td>1</td><td>49</td><td>1</td><td>1</td></tr> <tr> <td>Person</td><td>5</td><td>2</td><td>41</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>3</td><td>3</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 79.452% (incorrect=30, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	2	4	Vehicle	1	49	1	1	Person	5	2	41	4	Other	4	3	3	10
	Bkgd	Vehicle	Person	Other																												
Bkgd	16	0	2	4																												
Vehicle	1	49	1	1																												
Person	5	2	41	4																												
Other	4	3	3	10																												
9,000	11,000	0.0026	0.0001	0.99	0.9	82.19%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>1</td><td>5</td></tr> <tr> <td>Vehicle</td><td>2</td><td>60</td><td>0</td><td>5</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>38</td><td>5</td></tr> <tr> <td>Other</td><td>0</td><td>1</td><td>4</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 82.192% (incorrect=26, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	1	5	Vehicle	2	60	0	5	Person	2	1	38	5	Other	0	1	4	8
	Bkgd	Vehicle	Person	Other																												
Bkgd	14	0	1	5																												
Vehicle	2	60	0	5																												
Person	2	1	38	5																												
Other	0	1	4	8																												
9,000	11,000	0.0026	0.0001	0.99	0.99	79.73%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>10</td><td>1</td><td>3</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>54</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>4</td><td>1</td><td>43</td><td>6</td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>8</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 79.730% (incorrect=30, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	10	1	3	1	Vehicle	1	54	0	1	Person	4	1	43	6	Other	2	0	8	11
	Bkgd	Vehicle	Person	Other																												
Bkgd	10	1	3	1																												
Vehicle	1	54	0	1																												
Person	4	1	43	6																												
Other	2	0	8	11																												
9,000	11,000	0.0036	0.00015	0.5	0.5	85.81%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>1</td><td>0</td><td>4</td></tr> <tr> <td>Vehicle</td><td>1</td><td>44</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>54</td><td>2</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>4</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 85.811% (incorrect=21, total=148)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	1	0	4	Vehicle	1	44	0	3	Person	3	0	54	2	Other	1	2	4	11
	Bkgd	Vehicle	Person	Other																												
Bkgd	18	1	0	4																												
Vehicle	1	44	0	3																												
Person	3	0	54	2																												
Other	1	2	4	11																												

q_s_max_itr	q_s_lr1_max_itr	q_s_base_lr	q_s_lr1_base_lr	q_s_mom.	q_s_lr1_mom.	Accy	matrix				
							Bkgd	Vehicle	Person	Other	
9,000	11,000	0.0036	0.00015	0.7	0.5	78.77%	Bkgd	10	1	3	4
							Vehicle	4	55	1	5
							Person	1	0	35	2
							Other	2	0	8	15
							Accuracy: 78.76% (incorrect=31, total=146)				
9,000	11,000	0.0036	0.00015	0.7	0.7	83.56%	Bkgd	15	1	1	1
							Vehicle	3	51	0	3
							Person	1	0	46	4
							Other	3	4	3	10
							Accuracy: 83.562% (incorrect=24, total=146)				
9,000	11,000	0.0036	0.00015	0.9	0.5	87.83%	Bkgd	16	2	0	2
							Vehicle	0	49	0	2
							Person	2	1	42	2
							Other	2	1	4	23
							Accuracy: 87.838% (incorrect=18, total=148)				
9,000	11,000	0.0036	0.00015	0.9	0.7	86.99%	Bkgd	23	2	0	3
							Vehicle	1	49	2	3
							Person	0	0	47	3
							Other	1	2	2	8
							Accuracy: 86.986% (incorrect=19, total=146)				
9,000	11,000	0.0036	0.00015	0.9	0.9	88.89%					
9,000	11,000	0.0036	0.00015	0.9	0.99	82.43%	Bkgd	15	3	4	1
							Vehicle	1	48	0	2
							Person	1	0	42	9
							Other	2	0	3	17
							Accuracy: 82.432% (incorrect=26, total=148)				
9,000	11,000	0.0036	0.00015	0.99	0.5	83.11%	Bkgd	22	0	0	5
							Vehicle	1	56	1	4
							Person	1	1	37	6
							Other	3	1	2	8
							Accuracy: 83.108% (incorrect=25, total=148)				
9,000	11,000	0.0036	0.00015	0.99	0.7	78.77%	Bkgd	10	3	1	3
							Vehicle	1	53	2	2
							Person	2	0	42	5
							Other	5	0	7	10
							Accuracy: 78.767% (incorrect=31, total=146)				
9,000	11,000	0.0036	0.00015	0.99	0.9	84.93%	Bkgd	23	1	2	2
							Vehicle	2	48	0	2
							Person	3	0	43	3
							Other	3	2	2	10
							Accuracy: 84.932% (incorrect=22, total=146)				
9,000	11,000	0.0036	0.00015	0.99	0.99	78.08%	Bkgd	20	0	6	4
							Vehicle	0	33	2	3
							Person	3	0	48	7
							Other	1	2	4	13
							Accuracy: 78.082% (incorrect=32, total=146)				
9,000	11,500	0.0031	0.0001	0.5	0.5	84.93%	Bkgd	20	0	1	2
							Vehicle	1	57	0	5
							Person	2	1	43	4
							Other	0	3	3	4
							Accuracy: 84.932% (incorrect=22, total=146)				
9,000	11,500	0.0031	0.0001	0.7	0.5	85.62%	Bkgd	22	2	2	2
							Vehicle	1	44	1	4
							Person	1	1	51	5
							Other	0	1	1	8
							Accuracy: 85.616% (incorrect=21, total=146)				

							matrix											
								Bkgd	Vehicle	Person	Other							
9,000	11,500	0.0031	0.0001	0.7	0.7	80.12%	Bkgd	23	3	0	4							
							Vehicle	0	46	1	4							
							Person	1	1	35	4							
							Other	6	3	2	13							
							Accuracy: 80.137% (incorrect=29, total=146)											
9,000	11,500	0.0031	0.0001	0.9	0.5	83.56%	Bkgd	22	1	0	3							
							Vehicle	0	41	0	1							
							Person	3	2	51	8							
							Other	4	1	1	8							
							Accuracy: 83.562% (incorrect=24, total=146)											
9,000	11,500	0.0031	0.0001	0.9	0.7	82.88%	Bkgd	18	2	2	2							
							Vehicle	0	53	3	3							
							Person	1	0	41	8							
							Other	1	0	3	9							
							Accuracy: 82.877% (incorrect=25, total=146)											
9,000	11,500	0.0031	0.0001	0.9	0.9	80.56%												
9,000	11,500	0.0031	0.0001	0.9	0.99	84.25%	Bkgd	17	1	1	6							
							Vehicle	0	50	0	3							
							Person	1	0	43	4							
							Other	1	1	5	13							
							Accuracy: 84.247% (incorrect=23, total=146)											
9,000	11,500	0.0031	0.0001	0.99	0.5	78.08%	Bkgd	23	1	4	5							
							Vehicle	2	47	3	3							
							Person	3	1	37	4							
							Other	0	2	4	7							
							Accuracy: 78.082% (incorrect=32, total=146)											
9,000	11,500	0.0031	0.0001	0.99	0.7	82.88%	Bkgd	17	1	1	4							
							Vehicle	0	55	1	3							
							Person	1	2	40	5							
							Other	5	0	2	9							
							Accuracy: 82.877% (incorrect=25, total=146)											
9,000	11,500	0.0031	0.0001	0.99	0.9	80.14%	Bkgd	18	3	1	4							
							Vehicle	1	47	1	2							
							Person	2	0	36	8							
							Other	4	1	2	16							
							Accuracy: 80.137% (incorrect=29, total=146)											
9,000	11,500	0.0031	0.0001	0.99	0.99	80.14%	Bkgd	10	3	1	2							
							Vehicle	2	47	2	4							
							Person	0	1	49	5							
							Other	2	3	3	11							
							Accuracy: 80.137% (incorrect=29, total=146)											
9,500	11,500	0.0031	0.0002	0.5	0.5	86.30%	Bkgd	17	1	1	3							
							Vehicle	5	49	0	2							
							Person	0	0	48	3							
							Other	3	0	2	12							
							Accuracy: 86.301% (incorrect=20, total=146)											
9,500	11,500	0.0031	0.0002	0.7	0.5	86.30%	Bkgd	14	1	2	2							
							Vehicle	0	45	0	3							
							Person	2	0	54	2							
							Other	0	4	4	13							
							Accuracy: 86.301% (incorrect=20, total=146)											
9,500	11,500	0.0031	0.0002	0.7	0.7	86.30%	Bkgd	22	0	0	0							
							Vehicle	0	54	0	6							
							Person	4	1	42	6							
							Other	2	0	1	8							
							Accuracy: 86.301% (incorrect=20, total=146)											

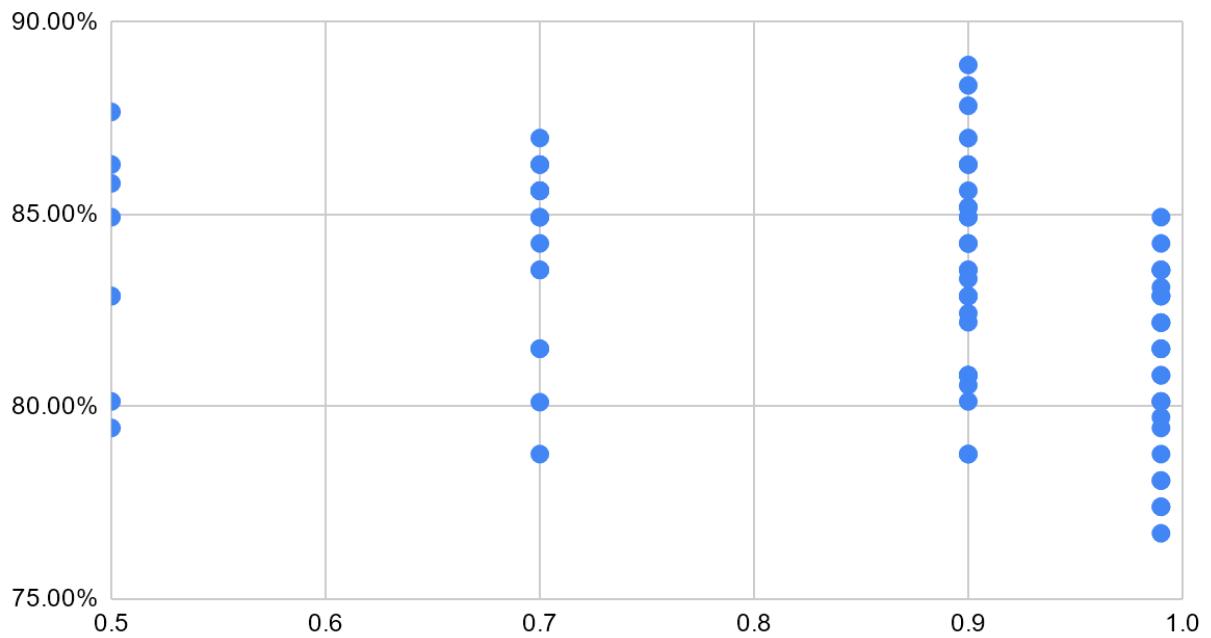
q_s_max_itr	q_s_lr1_max_itr	q_s_base_lr	q_s_lr1_base_lr	q_s_mom.	q_s_lr1_mom.	Accy	matrix																									
9,500	11,500	0.0031	0.0002	0.9	0.5	80.82%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>1</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>4</td><td>45</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>4</td><td>0</td><td>47</td><td>4</td></tr> <tr> <td>Other</td><td>5</td><td>2</td><td>2</td><td>9</td></tr> </tbody> </table> <p>Accuracy: 80.822% (incorrect=28, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	1	2	3	Vehicle	4	45	0	1	Person	4	0	47	4	Other	5	2	2	9
	Bkgd	Vehicle	Person	Other																												
Bkgd	17	1	2	3																												
Vehicle	4	45	0	1																												
Person	4	0	47	4																												
Other	5	2	2	9																												
9,500	11,500	0.0031	0.0002	0.9	0.7	83.56%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>2</td><td>1</td><td>4</td></tr> <tr> <td>Vehicle</td><td>1</td><td>58</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>3</td><td>1</td><td>39</td><td>5</td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>2</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 83.562% (incorrect=24, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	2	1	4	Vehicle	1	58	0	3	Person	3	1	39	5	Other	2	0	2	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	13	2	1	4																												
Vehicle	1	58	0	3																												
Person	3	1	39	5																												
Other	2	0	2	12																												
9,500	11,500	0.0031	0.0002	0.9	0.9	85.19%																										
9,500	11,500	0.0031	0.0002	0.9	0.99	86.30%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>2</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>56</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>0</td><td>2</td><td>44</td><td>5</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>2</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 86.301% (incorrect=20, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	2	1	1	Vehicle	1	56	0	3	Person	0	2	44	5	Other	1	2	2	10
	Bkgd	Vehicle	Person	Other																												
Bkgd	16	2	1	1																												
Vehicle	1	56	0	3																												
Person	0	2	44	5																												
Other	1	2	2	10																												
9,500	11,500	0.0031	0.0002	0.99	0.5	77.40%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>1</td><td>4</td><td>4</td></tr> <tr> <td>Vehicle</td><td>2</td><td>43</td><td>0</td><td>4</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>47</td><td>9</td></tr> <tr> <td>Other</td><td>2</td><td>3</td><td>2</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 77.397% (incorrect=33, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	15	1	4	4	Vehicle	2	43	0	4	Person	2	0	47	9	Other	2	3	2	8
	Bkgd	Vehicle	Person	Other																												
Bkgd	15	1	4	4																												
Vehicle	2	43	0	4																												
Person	2	0	47	9																												
Other	2	3	2	8																												
9,500	11,500	0.0031	0.0002	0.99	0.7	80.82%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>3</td><td>2</td><td>2</td></tr> <tr> <td>Vehicle</td><td>2</td><td>51</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>41</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>0</td><td>5</td><td>9</td></tr> </tbody> </table> <p>Accuracy: 80.822% (incorrect=28, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	3	2	2	Vehicle	2	51	0	3	Person	2	1	41	4	Other	4	0	5	9
	Bkgd	Vehicle	Person	Other																												
Bkgd	17	3	2	2																												
Vehicle	2	51	0	3																												
Person	2	1	41	4																												
Other	4	0	5	9																												
9,500	11,500	0.0031	0.0002	0.99	0.9	82.88%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>52</td><td>2</td><td>4</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>42</td><td>4</td></tr> <tr> <td>Other</td><td>1</td><td>4</td><td>4</td><td>16</td></tr> </tbody> </table> <p>Accuracy: 82.877% (incorrect=25, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	11	0	1	3	Vehicle	1	52	2	4	Person	0	1	42	4	Other	1	4	4	16
	Bkgd	Vehicle	Person	Other																												
Bkgd	11	0	1	3																												
Vehicle	1	52	2	4																												
Person	0	1	42	4																												
Other	1	4	4	16																												
9,500	11,500	0.0031	0.0002	0.99	0.99	81.51%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>2</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>4</td><td>60</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>31</td><td>4</td></tr> <tr> <td>Other</td><td>5</td><td>1</td><td>1</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 81.507% (incorrect=27, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	2	1	2	Vehicle	4	60	1	3	Person	3	0	31	4	Other	5	1	1	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	16	2	1	2																												
Vehicle	4	60	1	3																												
Person	3	0	31	4																												
Other	5	1	1	12																												
9,000	11,000	0.0031	0.00015	0.5	0.5	79.45%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>1</td><td>2</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>47</td><td>4</td><td>6</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>43</td><td>4</td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>6</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 79.452% (incorrect=30, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	1	2	2	Vehicle	0	47	4	6	Person	3	0	43	4	Other	2	0	6	13
	Bkgd	Vehicle	Person	Other																												
Bkgd	13	1	2	2																												
Vehicle	0	47	4	6																												
Person	3	0	43	4																												
Other	2	0	6	13																												
9,000	11,000	0.0031	0.00015	0.7	0.5	83.56%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>20</td><td>0</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>2</td><td>53</td><td>3</td><td>3</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>41</td><td>3</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>3</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 83.562% (incorrect=24, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	20	0	1	3	Vehicle	2	53	3	3	Person	3	0	41	3	Other	1	2	3	8
	Bkgd	Vehicle	Person	Other																												
Bkgd	20	0	1	3																												
Vehicle	2	53	3	3																												
Person	3	0	41	3																												
Other	1	2	3	8																												
9,000	11,000	0.0031	0.00015	0.7	0.7	81.51%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>2</td><td>2</td><td>4</td></tr> <tr> <td>Vehicle</td><td>0</td><td>55</td><td>0</td><td>4</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>41</td><td>6</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>3</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 81.507% (incorrect=27, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	2	2	4	Vehicle	0	55	0	4	Person	2	0	41	6	Other	3	1	3	11
	Bkgd	Vehicle	Person	Other																												
Bkgd	12	2	2	4																												
Vehicle	0	55	0	4																												
Person	2	0	41	6																												
Other	3	1	3	11																												
9,000	11,000	0.0031	0.00015	0.9	0.5	80.82%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>3</td><td>2</td><td>0</td></tr> <tr> <td>Vehicle</td><td>0</td><td>55</td><td>2</td><td>2</td></tr> <tr> <td>Person</td><td>5</td><td>0</td><td>32</td><td>7</td></tr> <tr> <td>Other</td><td>1</td><td>0</td><td>6</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 80.822% (incorrect=28, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	19	3	2	0	Vehicle	0	55	2	2	Person	5	0	32	7	Other	1	0	6	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	19	3	2	0																												
Vehicle	0	55	2	2																												
Person	5	0	32	7																												
Other	1	0	6	12																												

q_s_max_itr	q_s_lr1_max_itr	q_s_base_lr	q_s_lr1_base_lr	q_s_mom.	q_s_lr1_mom.	Accy	matrix																									
9,000	11,000	0.0031	0.00015	0.9	0.7	82.20%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>21</td><td>5</td><td>0</td><td>3</td></tr> <tr> <td>Vehicle</td><td>2</td><td>39</td><td>0</td><td>4</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>49</td><td>3</td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>3</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 82.192% (incorrect=26, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	21	5	0	3	Vehicle	2	39	0	4	Person	2	0	49	3	Other	2	2	3	11
	Bkgd	Vehicle	Person	Other																												
Bkgd	21	5	0	3																												
Vehicle	2	39	0	4																												
Person	2	0	49	3																												
Other	2	2	3	11																												
9,000	11,000	0.0031	0.00015	0.9	0.9	85.19%																										
9,000	11,000	0.0031	0.00015	0.9	0.99	80.82%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>2</td><td>3</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>55</td><td>2</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>38</td><td>6</td></tr> <tr> <td>Other</td><td>3</td><td>3</td><td>3</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 80.822% (incorrect=28, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	2	3	1	Vehicle	0	55	2	3	Person	2	0	38	6	Other	3	3	3	8
	Bkgd	Vehicle	Person	Other																												
Bkgd	17	2	3	1																												
Vehicle	0	55	2	3																												
Person	2	0	38	6																												
Other	3	3	3	8																												
9,000	11,000	0.0031	0.00015	0.99	0.5	83.56%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>1</td><td>2</td><td>5</td></tr> <tr> <td>Vehicle</td><td>0</td><td>53</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>42</td><td>5</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>4</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 83.562% (incorrect=24, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	19	1	2	5	Vehicle	0	53	0	1	Person	3	0	42	5	Other	1	2	4	8
	Bkgd	Vehicle	Person	Other																												
Bkgd	19	1	2	5																												
Vehicle	0	53	0	1																												
Person	3	0	42	5																												
Other	1	2	4	8																												
9,000	11,000	0.0031	0.00015	0.99	0.7	82.19%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>1</td><td>3</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>56</td><td>1</td><td>4</td></tr> <tr> <td>Person</td><td>0</td><td>3</td><td>37</td><td>6</td></tr> <tr> <td>Other</td><td>0</td><td>3</td><td>1</td><td>14</td></tr> </tbody> </table> <p>Accuracy: 82.192% (incorrect=26, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	1	3	3	Vehicle	1	56	1	4	Person	0	3	37	6	Other	0	3	1	14
	Bkgd	Vehicle	Person	Other																												
Bkgd	13	1	3	3																												
Vehicle	1	56	1	4																												
Person	0	3	37	6																												
Other	0	3	1	14																												
9,000	11,000	0.0031	0.00015	0.99	0.9	80.14%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>0</td><td>2</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>46</td><td>2</td><td>4</td></tr> <tr> <td>Person</td><td>2</td><td>2</td><td>43</td><td>8</td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>5</td><td>9</td></tr> </tbody> </table> <p>Accuracy: 80.137% (incorrect=29, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	19	0	2	1	Vehicle	1	46	2	4	Person	2	2	43	8	Other	2	0	5	9
	Bkgd	Vehicle	Person	Other																												
Bkgd	19	0	2	1																												
Vehicle	1	46	2	4																												
Person	2	2	43	8																												
Other	2	0	5	9																												
9,000	11,000	0.0031	0.00015	0.99	0.99	80.82%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>2</td><td>5</td></tr> <tr> <td>Vehicle</td><td>0</td><td>53</td><td>0</td><td>2</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>41</td><td>8</td></tr> <tr> <td>Other</td><td>1</td><td>4</td><td>6</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 80.822% (incorrect=28, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	2	5	Vehicle	0	53	0	2	Person	0	0	41	8	Other	1	4	6	10
	Bkgd	Vehicle	Person	Other																												
Bkgd	14	0	2	5																												
Vehicle	0	53	0	2																												
Person	0	0	41	8																												
Other	1	4	6	10																												
9,000	11,500	0.0031	0.00015	0.5	0.5	82.88%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>4</td><td>1</td><td>5</td></tr> <tr> <td>Vehicle</td><td>0</td><td>49</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>5</td><td>0</td><td>45</td><td>2</td></tr> <tr> <td>Other</td><td>1</td><td>4</td><td>2</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 82.877% (incorrect=25, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	15	4	1	5	Vehicle	0	49	0	1	Person	5	0	45	2	Other	1	4	2	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	15	4	1	5																												
Vehicle	0	49	0	1																												
Person	5	0	45	2																												
Other	1	4	2	12																												
9,000	11,500	0.0031	0.00015	0.7	0.5	84.25%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>21</td><td>1</td><td>0</td><td>4</td></tr> <tr> <td>Vehicle</td><td>0</td><td>52</td><td>2</td><td>2</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>43</td><td>2</td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>5</td><td>7</td></tr> </tbody> </table> <p>Accuracy: 84.247% (incorrect=23, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	21	1	0	4	Vehicle	0	52	2	2	Person	2	1	43	2	Other	2	2	5	7
	Bkgd	Vehicle	Person	Other																												
Bkgd	21	1	0	4																												
Vehicle	0	52	2	2																												
Person	2	1	43	2																												
Other	2	2	5	7																												
9,000	11,500	0.0031	0.00015	0.7	0.7	85.62%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>23</td><td>3</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>56</td><td>1</td><td>5</td></tr> <tr> <td>Person</td><td>4</td><td>0</td><td>34</td><td>5</td></tr> <tr> <td>Other</td><td>0</td><td>0</td><td>1</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 85.616% (incorrect=21, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	23	3	1	1	Vehicle	0	56	1	5	Person	4	0	34	5	Other	0	0	1	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	23	3	1	1																												
Vehicle	0	56	1	5																												
Person	4	0	34	5																												
Other	0	0	1	12																												
9,000	11,500	0.0031	0.00015	0.9	0.5	82.88%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>2</td><td>0</td><td>4</td></tr> <tr> <td>Vehicle</td><td>0</td><td>46</td><td>0</td><td>6</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>39</td><td>3</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>5</td><td>21</td></tr> </tbody> </table> <p>Accuracy: 82.877% (incorrect=25, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	15	2	0	4	Vehicle	0	46	0	6	Person	0	1	39	3	Other	3	1	5	21
	Bkgd	Vehicle	Person	Other																												
Bkgd	15	2	0	4																												
Vehicle	0	46	0	6																												
Person	0	1	39	3																												
Other	3	1	5	21																												
9,000	11,500	0.0031	0.00015	0.9	0.7	80.14%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>1</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>48</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>47</td><td>7</td></tr> <tr> <td>Other</td><td>3</td><td>2</td><td>3</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 80.137% (incorrect=29, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	1	2	3	Vehicle	1	48	1	3	Person	2	1	47	7	Other	3	2	3	8
	Bkgd	Vehicle	Person	Other																												
Bkgd	14	1	2	3																												
Vehicle	1	48	1	3																												
Person	2	1	47	7																												
Other	3	2	3	8																												

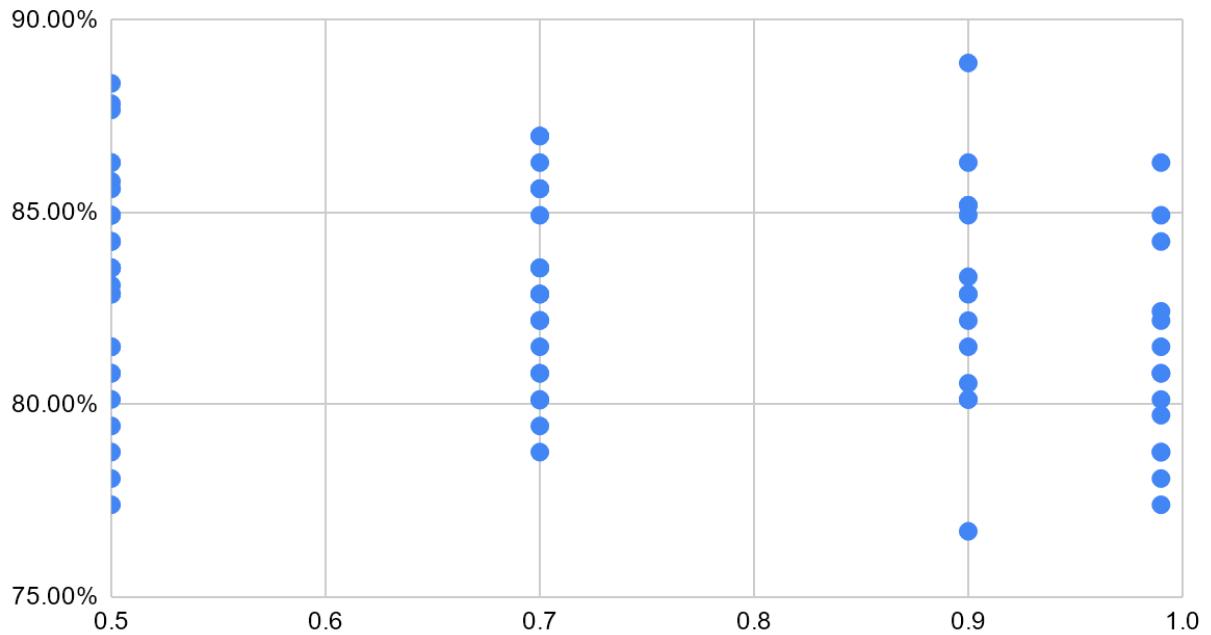
q_s_max_itr	q_s_lr1_max_itr	q_s_base_lr	q_s_lr1_base_lr	q_s_mom.	q_s_lr1_mom.	Accy	matrix																									
9,000	11,500	0.0031	0.00015	0.9	0.9	82.88%																										
9,000	11,500	0.0031	0.00015	0.9	0.99	78.77%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>1</td><td>0</td><td>3</td></tr> <tr> <td>Vehicle</td><td>2</td><td>42</td><td>3</td><td>2</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>47</td><td>2</td></tr> <tr> <td>Other</td><td>4</td><td>5</td><td>6</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 78.767% (incorrect=31, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	1	0	3	Vehicle	2	42	3	2	Person	3	0	47	2	Other	4	5	6	13
	Bkgd	Vehicle	Person	Other																												
Bkgd	13	1	0	3																												
Vehicle	2	42	3	2																												
Person	3	0	47	2																												
Other	4	5	6	13																												
9,000	11,500	0.0031	0.00015	0.99	0.5	81.51%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>1</td><td>4</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>46</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>5</td><td>0</td><td>50</td><td>2</td></tr> <tr> <td>Other</td><td>6</td><td>0</td><td>5</td><td>7</td></tr> </tbody> </table> <p>Accuracy: 81.507% (incorrect=27, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	1	4	1	Vehicle	0	46	0	3	Person	5	0	50	2	Other	6	0	5	7
	Bkgd	Vehicle	Person	Other																												
Bkgd	16	1	4	1																												
Vehicle	0	46	0	3																												
Person	5	0	50	2																												
Other	6	0	5	7																												
9,000	11,500	0.0031	0.00015	0.99	0.7	82.88%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>1</td><td>1</td><td>5</td></tr> <tr> <td>Vehicle</td><td>1</td><td>57</td><td>2</td><td>4</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>40</td><td>1</td></tr> <tr> <td>Other</td><td>4</td><td>0</td><td>4</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 82.877% (incorrect=25, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	1	1	5	Vehicle	1	57	2	4	Person	1	1	40	1	Other	4	0	4	8
	Bkgd	Vehicle	Person	Other																												
Bkgd	16	1	1	5																												
Vehicle	1	57	2	4																												
Person	1	1	40	1																												
Other	4	0	4	8																												
9,000	11,500	0.0031	0.00015	0.99	0.9	76.71%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>20</td><td>0</td><td>4</td><td>7</td></tr> <tr> <td>Vehicle</td><td>2</td><td>39</td><td>3</td><td>2</td></tr> <tr> <td>Person</td><td>0</td><td>2</td><td>40</td><td>6</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>5</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 76.712% (incorrect=34, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	20	0	4	7	Vehicle	2	39	3	2	Person	0	2	40	6	Other	1	2	5	13
	Bkgd	Vehicle	Person	Other																												
Bkgd	20	0	4	7																												
Vehicle	2	39	3	2																												
Person	0	2	40	6																												
Other	1	2	5	13																												
9,000	11,500	0.0031	0.00015	0.99	0.99	77.40%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>1</td><td>0</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>45</td><td>2</td><td>6</td></tr> <tr> <td>Person</td><td>4</td><td>2</td><td>44</td><td>7</td></tr> <tr> <td>Other</td><td>4</td><td>0</td><td>4</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 77.397% (incorrect=33, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	1	0	2	Vehicle	1	45	2	6	Person	4	2	44	7	Other	4	0	4	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	12	1	0	2																												
Vehicle	1	45	2	6																												
Person	4	2	44	7																												
Other	4	0	4	12																												
9,000	11,500	0.0026	0.00015	0.5	0.5	87.67%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>1</td><td>0</td><td>0</td></tr> <tr> <td>Vehicle</td><td>1</td><td>44</td><td>0</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>48</td><td>3</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>5</td><td>19</td></tr> </tbody> </table> <p>Accuracy: 87.671% (incorrect=18, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	1	0	0	Vehicle	1	44	0	2	Person	1	1	48	3	Other	3	1	5	19
	Bkgd	Vehicle	Person	Other																												
Bkgd	17	1	0	0																												
Vehicle	1	44	0	2																												
Person	1	1	48	3																												
Other	3	1	5	19																												
9,000	11,500	0.0026	0.00015	0.7	0.5	84.93%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>1</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>56</td><td>1</td><td>4</td></tr> <tr> <td>Person</td><td>4</td><td>0</td><td>44</td><td>2</td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>3</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 84.932% (incorrect=22, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	1	1	2	Vehicle	0	56	1	4	Person	4	0	44	2	Other	2	2	3	11
	Bkgd	Vehicle	Person	Other																												
Bkgd	13	1	1	2																												
Vehicle	0	56	1	4																												
Person	4	0	44	2																												
Other	2	2	3	11																												
9,000	11,500	0.0026	0.00015	0.7	0.7	85.62%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>2</td><td>2</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>50</td><td>2</td><td>1</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>49</td><td>6</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>2</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 85.616% (incorrect=21, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	2	2	2	Vehicle	1	50	2	1	Person	0	1	49	6	Other	1	1	2	13
	Bkgd	Vehicle	Person	Other																												
Bkgd	13	2	2	2																												
Vehicle	1	50	2	1																												
Person	0	1	49	6																												
Other	1	1	2	13																												
9,000	11,500	0.0026	0.00015	0.9	0.5	88.36%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>1</td><td>0</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>62</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>37</td><td>3</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>4</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 88.356% (incorrect=17, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	1	0	2	Vehicle	0	62	0	3	Person	1	0	37	3	Other	1	2	4	13
	Bkgd	Vehicle	Person	Other																												
Bkgd	17	1	0	2																												
Vehicle	0	62	0	3																												
Person	1	0	37	3																												
Other	1	2	4	13																												
9,500	11,500	0.0026	0.00015	0.5	0.5	82.88%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>2</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>50</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>41</td><td>7</td></tr> <tr> <td>Other</td><td>3</td><td>3</td><td>2</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 82.877% (incorrect=25, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	2	1	3	Vehicle	0	50	0	1	Person	2	1	41	7	Other	3	3	2	12
	Bkgd	Vehicle	Person	Other																												
Bkgd	18	2	1	3																												
Vehicle	0	50	0	1																												
Person	2	1	41	7																												
Other	3	3	2	12																												
9,500	11,500	0.0026	0.00015	0.7	0.5	84.93%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>3</td><td>0</td><td>0</td></tr> <tr> <td>Vehicle</td><td>1</td><td>47</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>52</td><td>5</td></tr> <tr> <td>Other</td><td>3</td><td>4</td><td>1</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 84.932% (incorrect=22, total=146)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	3	0	0	Vehicle	1	47	1	2	Person	1	1	52	5	Other	3	4	1	13
	Bkgd	Vehicle	Person	Other																												
Bkgd	12	3	0	0																												
Vehicle	1	47	1	2																												
Person	1	1	52	5																												
Other	3	4	1	13																												

							matrix				
								Bkgd	Vehicle	Person	Other
9,500	11,500	0.0026	0.00015	0.7	0.7	86.99%	Bkgd	20	0	0	4
							Vehicle	3	49	1	1
							Person	4	0	45	3
							Other	1	1	1	13
							Accuracy: 86.986% (incorrect=19, total=146)				
9,500	11,500	0.0026	0.00015	0.9	0.5	84.25%	Bkgd	18	2	2	6
							Vehicle	0	49	1	1
							Person	1	1	47	4
							Other	0	1	4	9
							Accuracy: 84.247% (incorrect=23, total=146)				
9,500	11,500	0.0026	0.00015	0.9	0.7	84.93%	Bkgd	14	0	4	1
							Vehicle	2	62	0	2
							Person	2	0	36	5
							Other	2	1	3	12
							Accuracy: 84.932% (incorrect=22, total=146)				
9,500	11,500	0.0026	0.00015	0.9	0.9	86.30%	Bkgd	15	0	0	1
							Vehicle	0	57	2	5
							Person	3	0	42	1
							Other	2	4	4	10
							Accuracy: 84.932% (incorrect=22, total=146)				
9,500	11,500	0.0026	0.00015	0.99	0.99	84.25%	Bkgd	16	0	2	4
							Vehicle	1	58	2	3
							Person	1	0	41	0
							Other	4	2	4	8
							Accuracy: 84.247% (incorrect=23, total=146)				
9,500	11,500	0.0026	0.00015	0.99	0.7	83.56%	Bkgd	24	0	2	3
							Vehicle	1	51	1	3
							Person	3	0	35	4
							Other	2	1	4	12
							Accuracy: 83.562% (incorrect=24, total=146)				
9,500	11,500	0.0026	0.00015	0.99	0.9	81.51%	Bkgd	10	2	1	2
							Vehicle	0	49	1	2
							Person	2	2	51	4
							Other	3	1	7	9
							Accuracy: 81.507% (incorrect=27, total=146)				
9,500	11,500	0.0026	0.00015	0.99	0.99	82.19%	Bkgd	17	0	0	3
							Vehicle	1	53	2	2
							Person	0	2	39	4
							Other	4	3	5	11
							Accuracy: 82.192% (incorrect=26, total=146)				

q\_s Momentum



q\_s\_lr1 Momentum



**Observations:** None of the momentum value pairs gave the results we were looking for with the best 8 epoch and learning rate settings. Highest accuracy reached was 88.36%. This was most likely due to expanding the dataset after the epochs and learning rate tests.

## Test 7

**Objectives:** Find best epoch settings for new dataset.

**Settings:** 6000 - 10000 epochs for the first phase and 8000 - 12000 epochs for the second phase. The rest of the settings were set to default settings.

q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
8500	10500	89.58%	Bkgd	11	2	3	1
			Vehicle	0	51	1	4
			Person	1	0	48	1
			Other	0	0	2	19
			Accuracy: 89.583% (incorrect=15, total=144)				
7000	10500	89.04%	Bkgd	20	0	2	3
			Vehicle	1	45	2	3
			Person	0	0	54	2
			Other	1	2	0	11
			Accuracy: 89.041% (incorrect=16, total=146)				
7000	11500	89.04%	Bkgd	19	0	0	1
			Vehicle	0	55	1	4
			Person	1	0	50	4
			Other	1	1	3	6
			Accuracy: 89.041% (incorrect=16, total=146)				
6500	12000	88.59%	Bkgd	18	0	1	0
			Vehicle	0	61	1	3
			Person	1	0	38	5
			Other	0	2	4	15
			Accuracy: 88.591% (incorrect=17, total=149)				
8000	10500	87.67%	Bkgd	16	0	3	2
			Vehicle	0	54	0	4
			Person	1	0	52	4
			Other	1	1	2	6
			Accuracy: 87.671% (incorrect=18, total=146)				
8500	11000	87.50%	Bkgd	20	0	1	1
			Vehicle	2	52	0	4
			Person	1	0	43	4
			Other	3	1	1	11
			Accuracy: 87.500% (incorrect=18, total=144)				
8500	11500	87.50%	Bkgd	12	0	2	2
			Vehicle	1	56	0	3
			Person	1	0	45	4
			Other	1	3	1	13
			Accuracy: 87.500% (incorrect=18, total=144)				

q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
			Bkgd	Vehicle	Person	Other	
9000	11000	87.50%	Bkgd	15	1	1	3
			Vehicle	2	58	1	1
			Person	2	0	39	3
			Other	2	0	2	14
			Accuracy: 87.500% (incorrect=18, total=144)				
7000	8500	86.99%	Bkgd	13	2	1	2
			Vehicle	0	56	0	1
			Person	1	0	50	5
			Other	1	1	5	8
			Accuracy: 86.986% (incorrect=19, total=146)				
7500	10500	86.99%	Bkgd	20	1	1	2
			Vehicle	2	49	0	4
			Person	0	0	49	2
			Other	3	1	3	9
			Accuracy: 86.986% (incorrect=19, total=146)				
9000	10500	86.11%	Bkgd	21	1	1	3
			Vehicle	3	55	2	3
			Person	2	0	37	2
			Other	2	0	1	11
			Accuracy: 86.111% (incorrect=20, total=144)				
7000	11000	84.93%	Bkgd	14	0	0	4
			Vehicle	0	58	1	3
			Person	2	0	47	3
			Other	2	4	3	5
			Accuracy: 84.932% (incorrect=22, total=146)				
7500	11000	84.93%	Bkgd	16	1	0	2
			Vehicle	1	52	0	2
			Person	3	0	43	5
			Other	5	0	3	13
			Accuracy: 84.932% (incorrect=22, total=146)				
9500	11500	84.72%	Bkgd	15	0	0	5
			Vehicle	0	57	1	2
			Person	2	0	44	6
			Other	1	2	3	6
			Accuracy: 84.722% (incorrect=22, total=144)				

q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
			Bkgd	Vehicle	Person	Other	
7500	11500	84.25%	Bkgd	15	1	2	1
			Vehicle	1	52	0	2
			Person	3	0	45	3
			Other	6	2	2	11
			Accuracy: 84.247% (incorrect=23, total=146)				
8000	9000	84.25%	Bkgd	18	1	2	2
			Vehicle	1	51	2	2
			Person	2	0	44	4
			Other	3	1	3	10
			Accuracy: 84.247% (incorrect=23, total=146)				
8500	9500	84.03%	Bkgd	14	0	1	3
			Vehicle	0	45	0	5
			Person	1	0	49	7
			Other	2	2	2	13
			Accuracy: 84.028% (incorrect=23, total=144)				
9500	10500	84.03%	Bkgd	16	1	1	7
			Vehicle	2	53	1	0
			Person	1	0	41	2
			Other	5	1	2	11
			Accuracy: 84.028% (incorrect=23, total=144)				
8000	11500	83.89%	Bkgd	24	3	1	2
			Vehicle	0	54	0	3
			Person	2	1	41	2
			Other	5	0	5	6
			Accuracy: 83.893% (incorrect=24, total=149)				
7000	9500	83.56%	Bkgd	11	1	4	2
			Vehicle	0	60	1	3
			Person	2	0	40	4
			Other	3	2	2	11
			Accuracy: 83.562% (incorrect=24, total=146)				
7000	10000	83.56%	Bkgd	12	1	1	2
			Vehicle	0	56	2	3
			Person	2	1	40	5
			Other	3	1	3	14
			Accuracy: 83.562% (incorrect=24, total=146)				

q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
			Bkgd	Vehicle	Person	Other	
8000	9500	83.56%	Bkgd	16	0	4	1
			Vehicle	1	64	0	7
			Person	1	0	29	1
			Other	3	0	6	13
			Accuracy: 83.562% (incorrect=24, total=146)				
9500	11000	83.33%	Bkgd	14	4	1	4
			Vehicle	0	48	0	2
			Person	2	0	48	5
			Other	1	0	5	10
			Accuracy: 83.333% (incorrect=24, total=144)				
6500	8500	83.22%	Bkgd	20	1	1	6
			Vehicle	1	55	1	3
			Person	2	0	43	3
			Other	5	1	1	6
			Accuracy: 83.221% (incorrect=25, total=149)				
6500	10500	83.22%	Bkgd	12	0	3	1
			Vehicle	2	60	0	3
			Person	1	0	38	5
			Other	3	2	5	14
			Accuracy: 83.221% (incorrect=25, total=149)				
7000	9000	82.88%	Bkgd	17	0	2	3
			Vehicle	1	46	1	3
			Person	4	0	47	6
			Other	0	1	4	11
			Accuracy: 82.877% (incorrect=25, total=146)				
7500	8500	82.88%	Bkgd	19	0	2	2
			Vehicle	2	54	1	6
			Person	0	0	40	8
			Other	0	1	3	8
			Accuracy: 82.877% (incorrect=25, total=146)				
8500	10000	82.64%	Bkgd	12	1	0	2
			Vehicle	1	51	0	3
			Person	1	0	41	8
			Other	3	2	4	15
			Accuracy: 82.639% (incorrect=25, total=144)				

q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
			Bkgd	Vehicle	Person	Other	
8500	12000	82.64%	Bkgd	19	0	2	1
			Vehicle	0	44	1	1
			Person	7	1	44	6
			Other	4	1	1	12
			Accuracy: 82.639% (incorrect=25, total=144)				
9500	12000	82.64%	Bkgd	18	2	1	2
			Vehicle	1	51	0	3
			Person	3	0	38	5
			Other	3	2	3	12
			Accuracy: 82.639% (incorrect=25, total=144)				
6000	11000	82.55%	Bkgd	16	1	4	2
			Vehicle	0	55	0	3
			Person	4	1	41	2
			Other	4	1	4	11
			Accuracy: 82.550% (incorrect=26, total=149)				
6500	11000	82.55%	Bkgd	20	3	0	2
			Vehicle	1	45	0	1
			Person	2	0	53	5
			Other	6	2	4	5
			Accuracy: 82.550% (incorrect=26, total=149)				
7000	12000	82.19%	Bkgd	16	4	0	0
			Vehicle	1	48	2	2
			Person	2	1	48	7
			Other	3	0	4	8
			Accuracy: 82.192% (incorrect=26, total=146)				
9000	10000	81.94%	Bkgd	11	1	0	4
			Vehicle	0	59	0	3
			Person	1	0	32	9
			Other	6	0	2	16
			Accuracy: 81.944% (incorrect=26, total=144)				
9000	12000	81.94%	Bkgd	13	1	2	2
			Vehicle	1	44	1	4
			Person	3	0	53	5
			Other	2	3	2	8
			Accuracy: 81.944% (incorrect=26, total=144)				

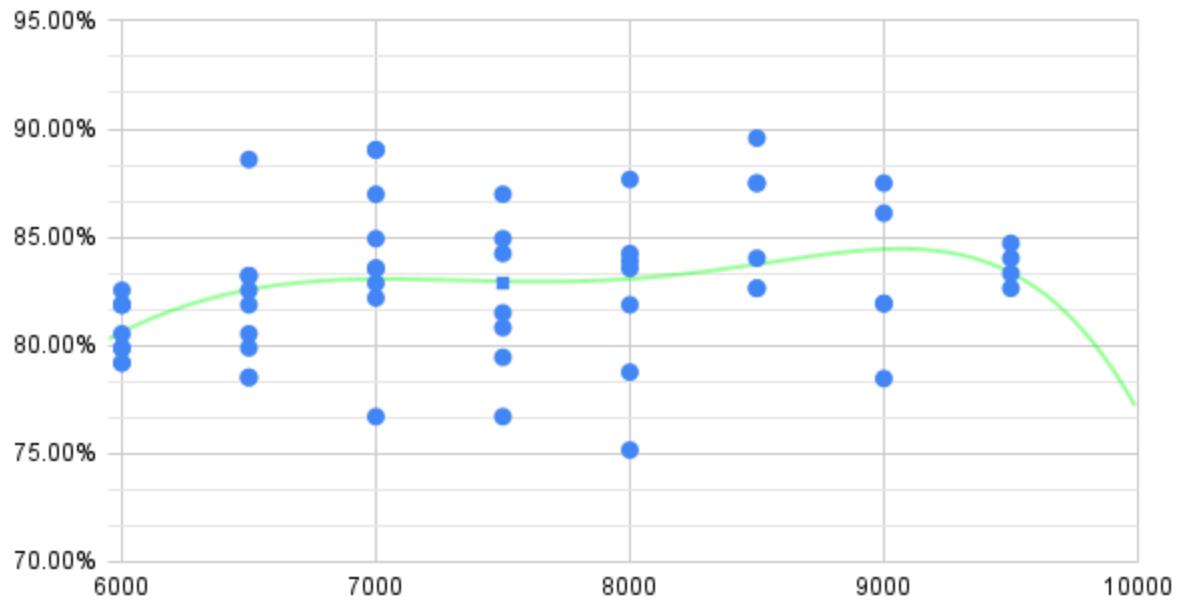
q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
6000	8000	81.88%	Bkgd	14	0	3	5
			Vehicle	1	52	3	3
			Person	4	0	44	3
			Other	1	0	4	12
			Accuracy: 81.879% (incorrect=27, total=149)				
6000	9000	81.88%	Bkgd	11	2	2	4
			Vehicle	0	57	1	2
			Person	0	0	36	6
			Other	5	2	3	18
			Accuracy: 81.879% (incorrect=27, total=149)				
6000	10000	81.88%	Bkgd	19	0	0	5
			Vehicle	1	54	0	4
			Person	2	0	40	6
			Other	2	4	3	9
			Accuracy: 81.879% (incorrect=27, total=149)				
6500	8000	81.88%	Bkgd	20	0	2	5
			Vehicle	0	46	1	2
			Person	5	1	41	2
			Other	6	0	3	15
			Accuracy: 81.879% (incorrect=27, total=149)				
8000	12000	81.88%	Bkgd	15	2	3	1
			Vehicle	2	51	1	2
			Person	3	1	48	2
			Other	4	2	4	8
			Accuracy: 81.879% (incorrect=27, total=149)				
7500	9500	81.51%	Bkgd	15	1	0	2
			Vehicle	1	52	1	6
			Person	0	0	38	6
			Other	5	1	4	14
			Accuracy: 81.507% (incorrect=27, total=146)				
7500	9000	80.82%	Bkgd	18	0	3	1
			Vehicle	1	42	1	5
			Person	1	1	40	3
			Other	5	2	5	18
			Accuracy: 80.822% (incorrect=28, total=146)				

q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
			Bkgd	Vehicle	Person	Other	
6000	9500	80.54%	Bkgd	13	0	2	3
			Vehicle	1	64	1	4
			Person	3	0	35	7
			Other	2	2	4	8
			Accuracy: 80.53% (incorrect=29, total=149)				
6500	10000	80.54%	Bkgd	14	0	2	3
			Vehicle	2	47	0	1
			Person	1	0	56	3
			Other	7	4	6	3
			Accuracy: 80.53% (incorrect=29, total=149)				
6000	12000	79.89%	Bkgd	19	2	5	1
			Vehicle	2	50	2	2
			Person	6	1	40	3
			Other	2	1	3	10
			Accuracy: 79.86% (incorrect=30, total=149)				
6500	11500	79.89%	Bkgd	12	0	1	3
			Vehicle	2	54	0	6
			Person	2	2	43	5
			Other	2	1	6	10
			Accuracy: 79.86% (incorrect=30, total=149)				
6000	11500	79.87%	Bkgd	12	0	1	5
			Vehicle	1	53	2	5
			Person	1	1	44	1
			Other	6	2	5	10
			Accuracy: 79.86% (incorrect=30, total=149)				
7500	12000	79.45%	Bkgd	20	4	3	5
			Vehicle	1	53	0	2
			Person	2	1	34	4
			Other	2	0	6	9
			Accuracy: 79.45% (incorrect=30, total=146)				
6000	8500	79.20%	Bkgd	9	0	0	4
			Vehicle	1	59	0	2
			Person	1	0	36	7
			Other	8	2	6	14
			Accuracy: 79.19% (incorrect=31, total=149)				

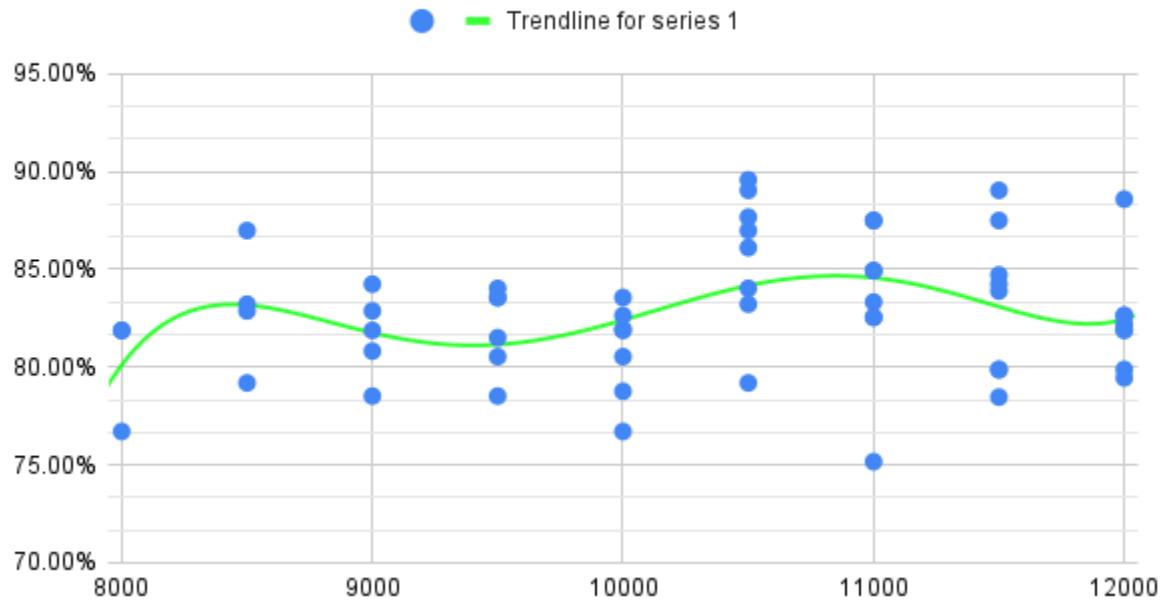
q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
			Bkgd	Vehicle	Person	Other	
6000	10500	79.20%	Bkgd	11	1	1	3
			Vehicle	1	54	3	5
			Person	0	0	38	6
			Other	7	0	4	15
			Accuracy: 79.195% (incorrect=31, total=149)				
8000	10000	78.77%	Bkgd	13	2	2	6
			Vehicle	0	51	0	5
			Person	0	0	35	7
			Other	1	2	6	16
			Accuracy: 78.767% (incorrect=31, total=146)				
6500	9000	78.52%	Bkgd	18	1	0	7
			Vehicle	1	47	2	3
			Person	4	2	42	5
			Other	3	0	4	10
			Accuracy: 78.523% (incorrect=32, total=149)				
6500	9500	78.52%	Bkgd	17	3	2	6
			Vehicle	2	41	1	1
			Person	2	1	45	9
			Other	3	0	2	14
			Accuracy: 78.523% (incorrect=32, total=149)				
9000	11500	78.47%	Bkgd	13	2	3	2
			Vehicle	0	44	2	2
			Person	2	0	44	5
			Other	5	3	5	12
			Accuracy: 78.472% (incorrect=31, total=144)				
7000	8000	76.71%	Bkgd	11	1	2	4
			Vehicle	3	53	0	6
			Person	3	0	40	6
			Other	4	2	3	8
			Accuracy: 76.712% (incorrect=34, total=146)				
7500	10000	76.71%	Bkgd	10	1	1	3
			Vehicle	0	53	3	5
			Person	4	0	45	9
			Other	2	2	4	4
			Accuracy: 76.712% (incorrect=34, total=146)				

q_s_max_iter	q_s_lr1_max_iter	Accy	Matrix				
			Bkgd	Vehicle	Person	Other	
8000	11000	75.17%	Bkgd	15	0	4	6
			Vehicle	3	45	1	5
			Person	2	0	39	5
			Other	5	1	5	13
			Accuracy: 75.168% (incorrect=37, total=149)				

**max\_iter**



**lr1 max\_iter**



**Observations:** For the first phase, highest accuracy was achieved with epochs 6500, 7000 and 8500. For the second phase, the highest accuracy was achieved with epochs 10500, 11500, and 12000. The 4 epoch pairs with the highest accuracy were: 7000 and 10500; 7000 and 11500; 8500 and 10500; and 6500 and 12000.

## Test 8

**Objectives:** Getting more tests done by changing the Learning Rate to see if we get any higher Accuracy. For this Phase, we did additional 100 tests done by changing a lot of base learning rate and iteration value

**Settings:** The first-phase learning rates were 0.003, 0.004, 0.005, 0.006 and 0.009. The second-phase learning rates were 0.0001, 0.00015, 0.0002, 0.0003 and 0.0004. The epoch pairs were 7000 and 10500; 7000 and 11500; 8500 and 10500; and 6500 and 12000.

matrix																														
q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy																										
6500	12000	0.004	0.0002	88.89%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>1</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>59</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>39</td><td>4</td></tr> <tr> <td>Other</td><td>3</td><td>2</td><td>1</td><td>16</td></tr> </tbody> </table> <p>Accuracy: 88.89% (incorrect=16, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	1	1	1	Vehicle	1	59	0	1	Person	1	0	39	4	Other	3	2	1	16
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	1	1	1																										
Vehicle	1	59	0	1																										
Person	1	0	39	4																										
Other	3	2	1	16																										
7000	10500	0.009	0.0004	88.19%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>2</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>55</td><td>2</td><td>4</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>47</td><td>4</td></tr> <tr> <td>Other</td><td>1</td><td>0</td><td>2</td><td>9</td></tr> </tbody> </table> <p>Accuracy: 88.194% (incorrect=17, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	2	1	Vehicle	0	55	2	4	Person	0	1	47	4	Other	1	0	2	9
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	0	2	1																										
Vehicle	0	55	2	4																										
Person	0	1	47	4																										
Other	1	0	2	9																										
6500	12000	0.004	0.00015	88.19%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>23</td><td>0</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>45</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>51</td><td>4</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>3</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 88.194% (incorrect=17, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	23	0	1	1	Vehicle	0	45	0	3	Person	3	0	51	4	Other	1	1	3	8
	Bkgd	Vehicle	Person	Other																										
Bkgd	23	0	1	1																										
Vehicle	0	45	0	3																										
Person	3	0	51	4																										
Other	1	1	3	8																										
7000	10500	0.005	0.0002	87.50%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>1</td><td>2</td><td>5</td></tr> <tr> <td>Vehicle</td><td>0</td><td>59</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>48</td><td>0</td></tr> <tr> <td>Other</td><td>1</td><td>0</td><td>5</td><td>7</td></tr> </tbody> </table> <p>Accuracy: 87.500% (incorrect=18, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	1	2	5	Vehicle	0	59	1	3	Person	0	0	48	0	Other	1	0	5	7
	Bkgd	Vehicle	Person	Other																										
Bkgd	12	1	2	5																										
Vehicle	0	59	1	3																										
Person	0	0	48	0																										
Other	1	0	5	7																										
7000	10500	0.006	0.0001	87.50%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>0</td><td>2</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>53</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>52</td><td>3</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>6</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 87.500% (incorrect=18, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	0	2	2	Vehicle	0	53	1	2	Person	0	0	52	3	Other	1	1	6	8
	Bkgd	Vehicle	Person	Other																										
Bkgd	13	0	2	2																										
Vehicle	0	53	1	2																										
Person	0	0	52	3																										
Other	1	1	6	8																										
6500	12000	0.005	0.0001	87.50%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>1</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>2</td><td>57</td><td>0</td><td>4</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>45</td><td>5</td></tr> <tr> <td>Other</td><td>1</td><td>0</td><td>2</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 87.500% (incorrect=18, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	1	1	1	Vehicle	2	57	0	4	Person	1	0	45	5	Other	1	0	2	10
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	1	1	1																										
Vehicle	2	57	0	4																										
Person	1	0	45	5																										
Other	1	0	2	10																										
6500	12000	0.009	0.0001	87.50%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>3</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>65</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>41</td><td>5</td></tr> <tr> <td>Other</td><td>0</td><td>0</td><td>2</td><td>6</td></tr> </tbody> </table> <p>Accuracy: 87.500% (incorrect=18, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	3	1	Vehicle	1	65	0	3	Person	2	1	41	5	Other	0	0	2	6
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	0	3	1																										
Vehicle	1	65	0	3																										
Person	2	1	41	5																										
Other	0	0	2	6																										
7000	11500	0.003	0.0003	86.81%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>0</td><td>0</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>53</td><td>1</td><td>1</td></tr> <tr> <td>Person</td><td>0</td><td>2</td><td>44</td><td>3</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>6</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 86.806% (incorrect=19, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	15	0	0	3	Vehicle	0	53	1	1	Person	0	2	44	3	Other	2	1	6	13
	Bkgd	Vehicle	Person	Other																										
Bkgd	15	0	0	3																										
Vehicle	0	53	1	1																										
Person	0	2	44	3																										
Other	2	1	6	13																										
7000	11500	0.004	0.0001	86.81%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>22</td><td>0</td><td>2</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>48</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>46</td><td>4</td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>2</td><td>9</td></tr> </tbody> </table> <p>Accuracy: 86.806% (incorrect=19, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	22	0	2	2	Vehicle	0	48	1	2	Person	1	1	46	4	Other	2	2	2	9
	Bkgd	Vehicle	Person	Other																										
Bkgd	22	0	2	2																										
Vehicle	0	48	1	2																										
Person	1	1	46	4																										
Other	2	2	2	9																										
7000	10500	0.004	0.0004	86.11%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>1</td><td>1</td><td>5</td></tr> <tr> <td>Vehicle</td><td>1</td><td>56</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>41</td><td>3</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>2</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 86.111% (incorrect=20, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	19	1	1	5	Vehicle	1	56	1	2	Person	0	1	41	3	Other	2	1	2	8
	Bkgd	Vehicle	Person	Other																										
Bkgd	19	1	1	5																										
Vehicle	1	56	1	2																										
Person	0	1	41	3																										
Other	2	1	2	8																										
7000	11500	0.004	0.0004	86.11%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>21</td><td>2</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>47</td><td>0</td><td>2</td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>46</td><td>3</td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>2</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 86.111% (incorrect=20, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	21	2	2	3	Vehicle	1	47	0	2	Person	3	0	46	3	Other	2	0	2	10
	Bkgd	Vehicle	Person	Other																										
Bkgd	21	2	2	3																										
Vehicle	1	47	0	2																										
Person	3	0	46	3																										
Other	2	0	2	10																										
7000	11500	0.005	0.0001	86.11%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>4</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>52</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>45</td><td>5</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>2</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 86.111% (incorrect=20, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	4	1	Vehicle	0	52	0	3	Person	0	1	45	5	Other	3	1	2	13
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	0	4	1																										
Vehicle	0	52	0	3																										
Person	0	1	45	5																										
Other	3	1	2	13																										

					matrix
q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	
					Bkgd                    Vehicle                    Person                    Other Bkgd                    17                    0                    2                    3 Vehicle                1                    52                    0                    0 Person                 2                    2                    46                    5 Other                  2                    1                    2                    9 Accuracy: 86.111% (incorrect=20, total=144)
7000	11500	0.006	0.00015	86.11%	Bkgd                    Vehicle                    Person                    Other Bkgd                    23                    1                    3                    3 Vehicle                0                    44                    1                    1 Person                 4                    0                    47                    3 Other                  2                    0                    2                    10 Accuracy: 86.111% (incorrect=20, total=144)
					Bkgd                    Vehicle                    Person                    Other Bkgd                    13                    1                    2                    3 Vehicle                0                    58                    0                    1 Person                 2                    0                    40                    3 Other                  2                    2                    4                    13 Accuracy: 86.111% (incorrect=20, total=144)
6500	12000	0.003	0.0004	86.11%	Bkgd                    Vehicle                    Person                    Other Bkgd                    12                    2                    1                    2 Vehicle                1                    57                    1                    4 Person                 1                    0                    44                    3 Other                  0                    3                    2                    11 Accuracy: 86.111% (incorrect=20, total=144)
					Bkgd                    Vehicle                    Person                    Other Bkgd                    12                    0                    1                    2 Vehicle                1                    59                    1                    5 Person                 2                    1                    40                    3 Other                  1                    1                    2                    13 Accuracy: 86.111% (incorrect=20, total=144)
6500	12000	0.009	0.00015	86.11%	Bkgd                    Vehicle                    Person                    Other Bkgd                    15                    2                    1                    4 Vehicle                0                    60                    0                    2 Person                 2                    0                    46                    5 Other                  2                    1                    2                    7 Accuracy: 85.906% (incorrect=21, total=149)
					Bkgd                    Vehicle                    Person                    Other Bkgd                    11                    0                    1                    2 Vehicle                1                    55                    1                    2 Person                 1                    0                    46                    6 Other                  1                    4                    2                    16 Accuracy: 85.906% (incorrect=21, total=149)
8500	10500	0.004	0.00015	85.91%	Bkgd                    Vehicle                    Person                    Other Bkgd                    19                    1                    1                    6 Vehicle                0                    56                    2                    1 Person                 0                    1                    37                    2 Other                  4                    0                    3                    16 Accuracy: 85.906% (incorrect=21, total=149)
					Bkgd                    Vehicle                    Person                    Other Bkgd                    18                    0                    0                    3 Vehicle                1                    57                    0                    4 Person                 1                    0                    39                    1 Other                  5                    4                    2                    9 Accuracy: 85.417% (incorrect=21, total=144)
7000	10500	0.005	0.0001	85.42%	Bkgd                    Vehicle                    Person                    Other Bkgd                    15                    1                    1                    2 Vehicle                1                    45                    1                    3 Person                 1                    0                    51                    4 Other                  3                    1                    3                    12 Accuracy: 85.417% (incorrect=21, total=144)
					Bkgd                    Vehicle                    Person                    Other Bkgd                    15                    1                    1                    1 Vehicle                0                    49                    1                    2 Person                 2                    1                    44                    4 Other                  3                    0                    5                    15 Accuracy: 85.417% (incorrect=21, total=144)
7000	10500	0.006	0.0002	85.42%	Bkgd                    Vehicle                    Person                    Other Bkgd                    15                    1                    1                    1 Vehicle                0                    49                    1                    2 Person                 2                    1                    44                    4 Other                  3                    0                    5                    15 Accuracy: 85.417% (incorrect=21, total=144)
					Bkgd                    Vehicle                    Person                    Other Bkgd                    15                    1                    1                    1 Vehicle                0                    49                    1                    2 Person                 2                    1                    44                    4 Other                  3                    0                    5                    15 Accuracy: 85.417% (incorrect=21, total=144)
7000	11500	0.006	0.0001	85.42%	Bkgd                    Vehicle                    Person                    Other Bkgd                    15                    1                    1                    1 Vehicle                0                    49                    1                    2 Person                 2                    1                    44                    4 Other                  3                    0                    5                    15 Accuracy: 85.417% (incorrect=21, total=144)

q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix																									
8500	10500	0.006	0.00015	85.24%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>1</td><td>2</td><td>6</td></tr> <tr> <td>Vehicle</td><td>0</td><td>53</td><td>1</td><td>1</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>42</td><td>6</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>1</td><td>15</td></tr> </tbody> </table> <p>Accuracy: 85.235% (incorrect=22, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	17	1	2	6	Vehicle	0	53	1	1	Person	1	0	42	6	Other	2	1	1	15
	Bkgd	Vehicle	Person	Other																										
Bkgd	17	1	2	6																										
Vehicle	0	53	1	1																										
Person	1	0	42	6																										
Other	2	1	1	15																										
8500	10500	0.005	0.0002	85.24%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>57</td><td>2</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>2</td><td>50</td><td>5</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>2</td><td>6</td></tr> </tbody> </table> <p>Accuracy: 85.235% (incorrect=22, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	1	3	Vehicle	0	57	2	2	Person	1	2	50	5	Other	3	1	2	6
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	0	1	3																										
Vehicle	0	57	2	2																										
Person	1	2	50	5																										
Other	3	1	2	6																										
8500	10500	0.003	0.0004	85.24%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>1</td><td>0</td><td>4</td></tr> <tr> <td>Vehicle</td><td>1</td><td>50</td><td>1</td><td>4</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>44</td><td>2</td></tr> <tr> <td>Other</td><td>4</td><td>2</td><td>2</td><td>14</td></tr> </tbody> </table> <p>Accuracy: 85.235% (incorrect=22, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	19	1	0	4	Vehicle	1	50	1	4	Person	0	1	44	2	Other	4	2	2	14
	Bkgd	Vehicle	Person	Other																										
Bkgd	19	1	0	4																										
Vehicle	1	50	1	4																										
Person	0	1	44	2																										
Other	4	2	2	14																										
8500	10500	0.004	0.0003	85.24%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>2</td><td>0</td><td>2</td></tr> <tr> <td>Vehicle</td><td>2</td><td>52</td><td>1</td><td>1</td></tr> <tr> <td>Person</td><td>3</td><td>1</td><td>51</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>1</td><td>1</td><td>8</td></tr> </tbody> </table> <p>Accuracy: 85.235% (incorrect=22, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	2	0	2	Vehicle	2	52	1	1	Person	3	1	51	4	Other	4	1	1	8
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	2	0	2																										
Vehicle	2	52	1	1																										
Person	3	1	51	4																										
Other	4	1	1	8																										
7000	10500	0.004	0.0003	84.72%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>1</td><td>0</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>61</td><td>2</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>36</td><td>5</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>3</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 84.722% (incorrect=22, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	1	0	3	Vehicle	0	61	2	3	Person	2	0	36	5	Other	1	2	3	13
	Bkgd	Vehicle	Person	Other																										
Bkgd	12	1	0	3																										
Vehicle	0	61	2	3																										
Person	2	0	36	5																										
Other	1	2	3	13																										
7000	10500	0.009	0.0001	84.72%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>1</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>50</td><td>1</td><td>4</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>44</td><td>6</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>3</td><td>10</td></tr> </tbody> </table> <p>Accuracy: 84.722% (incorrect=22, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	1	1	2	Vehicle	1	50	1	4	Person	1	0	44	6	Other	1	1	3	10
	Bkgd	Vehicle	Person	Other																										
Bkgd	18	1	1	2																										
Vehicle	1	50	1	4																										
Person	1	0	44	6																										
Other	1	1	3	10																										
7000	11500	0.003	0.0004	84.72%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>10</td><td>1</td><td>2</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>51</td><td>2</td><td>6</td></tr> <tr> <td>Person</td><td>1</td><td>2</td><td>44</td><td>3</td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>1</td><td>17</td></tr> </tbody> </table> <p>Accuracy: 84.722% (incorrect=22, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	10	1	2	1	Vehicle	1	51	2	6	Person	1	2	44	3	Other	2	0	1	17
	Bkgd	Vehicle	Person	Other																										
Bkgd	10	1	2	1																										
Vehicle	1	51	2	6																										
Person	1	2	44	3																										
Other	2	0	1	17																										
7000	10500	0.003	0.0004	84.56%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>1</td><td>3</td><td>2</td></tr> <tr> <td>Vehicle</td><td>2</td><td>52</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>42</td><td>3</td></tr> <tr> <td>Other</td><td>5</td><td>1</td><td>3</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 84.564% (incorrect=23, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	19	1	3	2	Vehicle	2	52	0	3	Person	0	0	42	3	Other	5	1	3	13
	Bkgd	Vehicle	Person	Other																										
Bkgd	19	1	3	2																										
Vehicle	2	52	0	3																										
Person	0	0	42	3																										
Other	5	1	3	13																										
7000	10500	0.003	0.0001	84.56%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>0</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>2</td><td>53</td><td>1</td><td>2</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>43</td><td>6</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>2</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 84.564% (incorrect=23, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	19	0	1	3	Vehicle	2	53	1	2	Person	2	0	43	6	Other	3	1	2	11
	Bkgd	Vehicle	Person	Other																										
Bkgd	19	0	1	3																										
Vehicle	2	53	1	2																										
Person	2	0	43	6																										
Other	3	1	2	11																										
8500	10500	0.009	0.0002	84.56%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>4</td><td>1</td><td>5</td></tr> <tr> <td>Vehicle</td><td>1</td><td>53</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>41</td><td>3</td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>1</td><td>14</td></tr> </tbody> </table> <p>Accuracy: 84.564% (incorrect=23, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	4	1	5	Vehicle	1	53	0	3	Person	1	0	41	3	Other	2	2	1	14
	Bkgd	Vehicle	Person	Other																										
Bkgd	18	4	1	5																										
Vehicle	1	53	0	3																										
Person	1	0	41	3																										
Other	2	2	1	14																										
7000	10500	0.004	0.00015	84.03%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>0</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>59</td><td>3</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>36</td><td>3</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>6</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 84.028% (incorrect=23, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	0	2	3	Vehicle	1	59	3	2	Person	1	0	36	3	Other	1	1	6	13
	Bkgd	Vehicle	Person	Other																										
Bkgd	13	0	2	3																										
Vehicle	1	59	3	2																										
Person	1	0	36	3																										
Other	1	1	6	13																										
7000	10500	0.006	0.0003	84.03%	<table> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>0</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>1</td><td>59</td><td>3</td><td>2</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>36</td><td>3</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>6</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 84.028% (incorrect=23, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	0	2	3	Vehicle	1	59	3	2	Person	1	0	36	3	Other	1	1	6	13
	Bkgd	Vehicle	Person	Other																										
Bkgd	13	0	2	3																										
Vehicle	1	59	3	2																										
Person	1	0	36	3																										
Other	1	1	6	13																										

q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix
					Bkgd                      Vehicle                      Person                      Other Bkgd                      12                      0                      2                      2 Vehicle                    1                      57                      3                      3 Person                    2                      0                      39                      5 Other                    3                      1                      1                      13 Accuracy: 84.028% (incorrect=23, total=144)
7000	10500	0.009	0.00015	84.03%	Bkgd                      Vehicle                      Person                      Other Bkgd                      11                      0                      3                      3 Vehicle                    1                      61                      0                      3 Person                    2                      0                      37                      6 Other                    3                      0                      2                      12 Accuracy: 84.028% (incorrect=23, total=144)
					Bkgd                      Vehicle                      Person                      Other Bkgd                      15                      0                      2                      2 Vehicle                    0                      56                      0                      2 Person                    2                      0                      33                      7 Other                    3                      0                      5                      17 Accuracy: 84.028% (incorrect=23, total=144)
6500	12000	0.004	0.0001	84.03%	Bkgd                      Vehicle                      Person                      Other Bkgd                      16                      1                      5                      2 Vehicle                    0                      50                      1                      6 Person                    1                      0                      41                      2 Other                    2                      0                      3                      14 Accuracy: 84.028% (incorrect=23, total=144)
					Bkgd                      Vehicle                      Person                      Other Bkgd                      19                      2                      4                      2 Vehicle                    0                      46                      1                      3 Person                    2                      0                      46                      2 Other                    2                      1                      5                      14 Accuracy: 84.028% (incorrect=23, total=144)
8500	10500	0.005	0.0001	83.89%	Bkgd                      Vehicle                      Person                      Other Bkgd                      23                      1                      2                      2 Vehicle                    1                      41                      0                      1 Person                    2                      0                      50                      4 Other                    4                      3                      4                      11 Accuracy: 83.893% (incorrect=24, total=149)
					Bkgd                      Vehicle                      Person                      Other Bkgd                      16                      0                      2                      0 Vehicle                    1                      56                      0                      2 Person                    2                      2                      46                      5 Other                    4                      3                      3                      7 Accuracy: 83.893% (incorrect=24, total=149)
8500	10500	0.004	0.0001	83.89%	Bkgd                      Vehicle                      Person                      Other Bkgd                      16                      0                      2                      0 Vehicle                    1                      56                      0                      2 Person                    2                      2                      46                      5 Other                    4                      3                      3                      7 Accuracy: 83.893% (incorrect=24, total=149)
					Bkgd                      Vehicle                      Person                      Other Bkgd                      13                      1                      4                      1 Vehicle                    1                      56                      1                      2 Person                    1                      0                      38                      8 Other                    2                      1                      2                      13 Accuracy: 83.333% (incorrect=24, total=144)
7000	10500	0.009	0.0003	83.33%	Bkgd                      Vehicle                      Person                      Other Bkgd                      14                      0                      2                      4 Vehicle                    2                      51                      2                      3 Person                    1                      0                      45                      4 Other                    4                      0                      2                      10 Accuracy: 83.333% (incorrect=24, total=144)
					Bkgd                      Vehicle                      Person                      Other Bkgd                      23                      0                      2                      2 Vehicle                    1                      52                      1                      2 Person                    4                      0                      34                      5 Other                    2                      2                      3                      11 Accuracy: 83.333% (incorrect=24, total=144)
7000	11500	0.005	0.0002	83.33%	Bkgd                      Vehicle                      Person                      Other Bkgd                      11                      0                      1                      2 Vehicle                    1                      44                      1                      4 Person                    2                      1                      48                      3 Other                    5                      1                      3                      17 Accuracy: 83.333% (incorrect=24, total=144)
					Bkgd                      Vehicle                      Person                      Other Bkgd                      16                      1                      2                      1 Vehicle                    0                      46                      1                      3 Person                    4                      0                      48                      3 Other                    2                      2                      5                      10 Accuracy: 83.333% (incorrect=24, total=144)
7000	11500	0.005	0.0003	83.33%	
7000	11500	0.009	0.0001	83.33%	

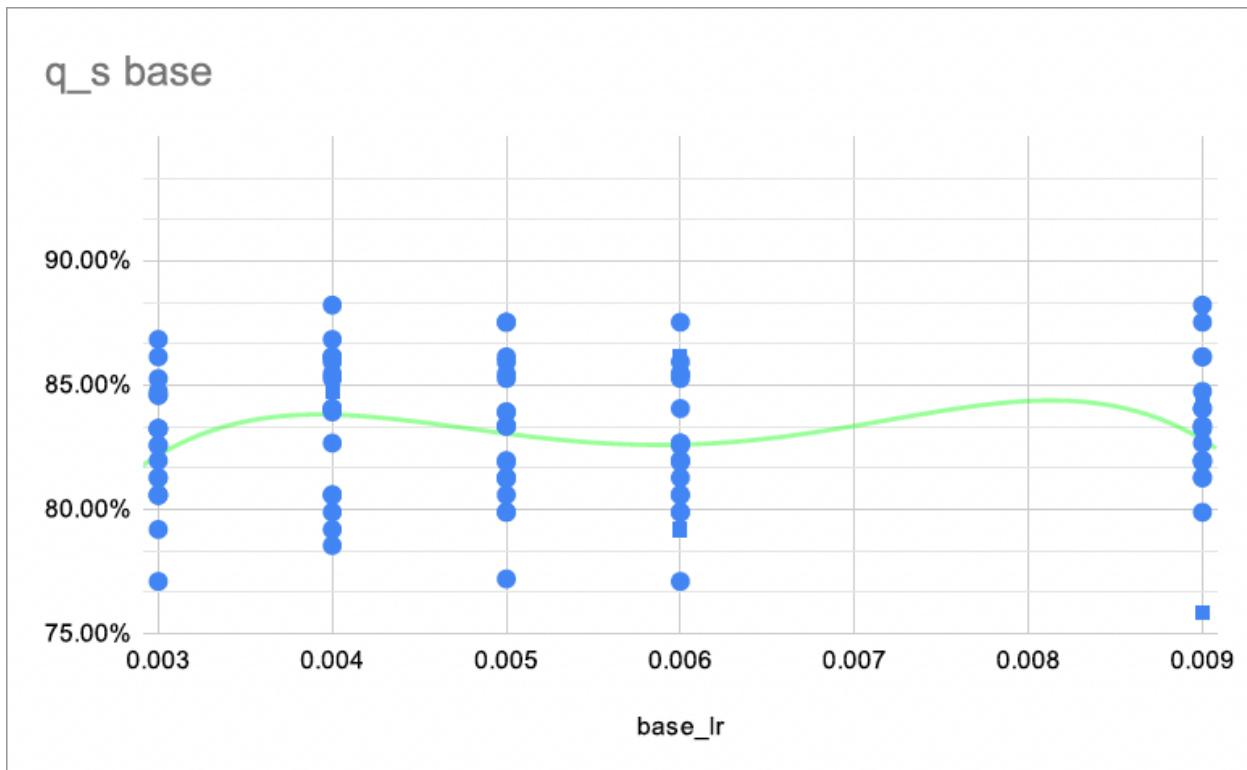
q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix																									
8500	10500	0.003	0.00015	83.22%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>2</td><td>3</td></tr> <tr> <td>Vehicle</td><td>2</td><td>57</td><td>0</td><td>1</td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>36</td><td>9</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>4</td><td>20</td></tr> </tbody> </table> <p>Accuracy: 83.221% (incorrect=25, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	11	0	2	3	Vehicle	2	57	0	1	Person	0	0	36	9	Other	3	1	4	20
	Bkgd	Vehicle	Person	Other																										
Bkgd	11	0	2	3																										
Vehicle	2	57	0	1																										
Person	0	0	36	9																										
Other	3	1	4	20																										
7000	10500	0.003	0.0002	83.22%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>1</td><td>3</td><td>2</td></tr> <tr> <td>Vehicle</td><td>2</td><td>49</td><td>3</td><td>1</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>50</td><td>2</td></tr> <tr> <td>Other</td><td>6</td><td>2</td><td>2</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 83.221% (incorrect=25, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	13	1	3	2	Vehicle	2	49	3	1	Person	1	0	50	2	Other	6	2	2	12
	Bkgd	Vehicle	Person	Other																										
Bkgd	13	1	3	2																										
Vehicle	2	49	3	1																										
Person	1	0	50	2																										
Other	6	2	2	12																										
8500	10500	0.009	0.0003	83.22%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>1</td><td>4</td></tr> <tr> <td>Vehicle</td><td>1</td><td>58</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>35</td><td>6</td></tr> <tr> <td>Other</td><td>2</td><td>3</td><td>3</td><td>17</td></tr> </tbody> </table> <p>Accuracy: 83.221% (incorrect=25, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	0	1	4	Vehicle	1	58	1	3	Person	1	0	35	6	Other	2	3	3	17
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	0	1	4																										
Vehicle	1	58	1	3																										
Person	1	0	35	6																										
Other	2	3	3	17																										
8500	10500	0.003	0.0002	83.22%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>1</td><td>1</td><td>5</td></tr> <tr> <td>Vehicle</td><td>0</td><td>58</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>32</td><td>9</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>1</td><td>16</td></tr> </tbody> </table> <p>Accuracy: 83.221% (incorrect=25, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	1	1	5	Vehicle	0	58	1	3	Person	1	1	32	9	Other	1	1	1	16
	Bkgd	Vehicle	Person	Other																										
Bkgd	18	1	1	5																										
Vehicle	0	58	1	3																										
Person	1	1	32	9																										
Other	1	1	1	16																										
7000	11500	0.006	0.0003	82.64%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>1</td><td>0</td><td>1</td></tr> <tr> <td>Vehicle</td><td>1</td><td>51</td><td>0</td><td>4</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>40</td><td>6</td></tr> <tr> <td>Other</td><td>1</td><td>2</td><td>8</td><td>13</td></tr> </tbody> </table> <p>Accuracy: 82.639% (incorrect=25, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	15	1	0	1	Vehicle	1	51	0	4	Person	0	1	40	6	Other	1	2	8	13
	Bkgd	Vehicle	Person	Other																										
Bkgd	15	1	0	1																										
Vehicle	1	51	0	4																										
Person	0	1	40	6																										
Other	1	2	8	13																										
6500	12000	0.004	0.0004	82.64%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>12</td><td>0</td><td>1</td><td>0</td></tr> <tr> <td>Vehicle</td><td>1</td><td>60</td><td>1</td><td>5</td></tr> <tr> <td>Person</td><td>2</td><td>1</td><td>40</td><td>4</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>6</td><td>7</td></tr> </tbody> </table> <p>Accuracy: 82.639% (incorrect=25, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	12	0	1	0	Vehicle	1	60	1	5	Person	2	1	40	4	Other	3	1	6	7
	Bkgd	Vehicle	Person	Other																										
Bkgd	12	0	1	0																										
Vehicle	1	60	1	5																										
Person	2	1	40	4																										
Other	3	1	6	7																										
6500	12000	0.006	0.0001	82.64%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>1</td><td>0</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>46</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>4</td><td>1</td><td>46</td><td>5</td></tr> <tr> <td>Other</td><td>0</td><td>3</td><td>7</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 82.639% (incorrect=25, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	15	1	0	1	Vehicle	0	46	0	3	Person	4	1	46	5	Other	0	3	7	12
	Bkgd	Vehicle	Person	Other																										
Bkgd	15	1	0	1																										
Vehicle	0	46	0	3																										
Person	4	1	46	5																										
Other	0	3	7	12																										
6500	12000	0.009	0.0003	82.64%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>0</td><td>2</td><td>1</td></tr> <tr> <td>Vehicle</td><td>0</td><td>63</td><td>1</td><td>4</td></tr> <tr> <td>Person</td><td>3</td><td>1</td><td>31</td><td>5</td></tr> <tr> <td>Other</td><td>2</td><td>3</td><td>3</td><td>9</td></tr> </tbody> </table> <p>Accuracy: 82.639% (incorrect=25, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	0	2	1	Vehicle	0	63	1	4	Person	3	1	31	5	Other	2	3	3	9
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	0	2	1																										
Vehicle	0	63	1	4																										
Person	3	1	31	5																										
Other	2	3	3	9																										
7000	10500	0.003	0.00015	82.55%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>2</td><td>0</td><td>4</td></tr> <tr> <td>Vehicle</td><td>4</td><td>61</td><td>2</td><td>0</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>37</td><td>2</td></tr> <tr> <td>Other</td><td>4</td><td>1</td><td>5</td><td>11</td></tr> </tbody> </table> <p>Accuracy: 82.550% (incorrect=26, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	14	2	0	4	Vehicle	4	61	2	0	Person	2	0	37	2	Other	4	1	5	11
	Bkgd	Vehicle	Person	Other																										
Bkgd	14	2	0	4																										
Vehicle	4	61	2	0																										
Person	2	0	37	2																										
Other	4	1	5	11																										
8500	10500	0.006	0.0004	82.55%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>1</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>47</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>54</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>1</td><td>6</td><td>6</td></tr> </tbody> </table> <p>Accuracy: 82.550% (incorrect=26, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	16	1	1	3	Vehicle	0	47	1	3	Person	2	0	54	4	Other	4	1	6	6
	Bkgd	Vehicle	Person	Other																										
Bkgd	16	1	1	3																										
Vehicle	0	47	1	3																										
Person	2	0	54	4																										
Other	4	1	6	6																										
8500	10500	0.003	0.0001	82.55%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>2</td><td>0</td><td>2</td></tr> <tr> <td>Vehicle</td><td>0</td><td>60</td><td>0</td><td>3</td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>33</td><td>7</td></tr> <tr> <td>Other</td><td>7</td><td>0</td><td>2</td><td>12</td></tr> </tbody> </table> <p>Accuracy: 82.550% (incorrect=26, total=149)</p>		Bkgd	Vehicle	Person	Other	Bkgd	18	2	0	2	Vehicle	0	60	0	3	Person	0	1	33	7	Other	7	0	2	12
	Bkgd	Vehicle	Person	Other																										
Bkgd	18	2	0	2																										
Vehicle	0	60	0	3																										
Person	0	1	33	7																										
Other	7	0	2	12																										
7000	11500	0.006	0.0004	81.94%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>0</td><td>1</td><td>3</td></tr> <tr> <td>Vehicle</td><td>0</td><td>58</td><td>1</td><td>5</td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>34</td><td>8</td></tr> <tr> <td>Other</td><td>4</td><td>1</td><td>2</td><td>15</td></tr> </tbody> </table> <p>Accuracy: 81.944% (incorrect=26, total=144)</p>		Bkgd	Vehicle	Person	Other	Bkgd	11	0	1	3	Vehicle	0	58	1	5	Person	1	0	34	8	Other	4	1	2	15
	Bkgd	Vehicle	Person	Other																										
Bkgd	11	0	1	3																										
Vehicle	0	58	1	5																										
Person	1	0	34	8																										
Other	4	1	2	15																										

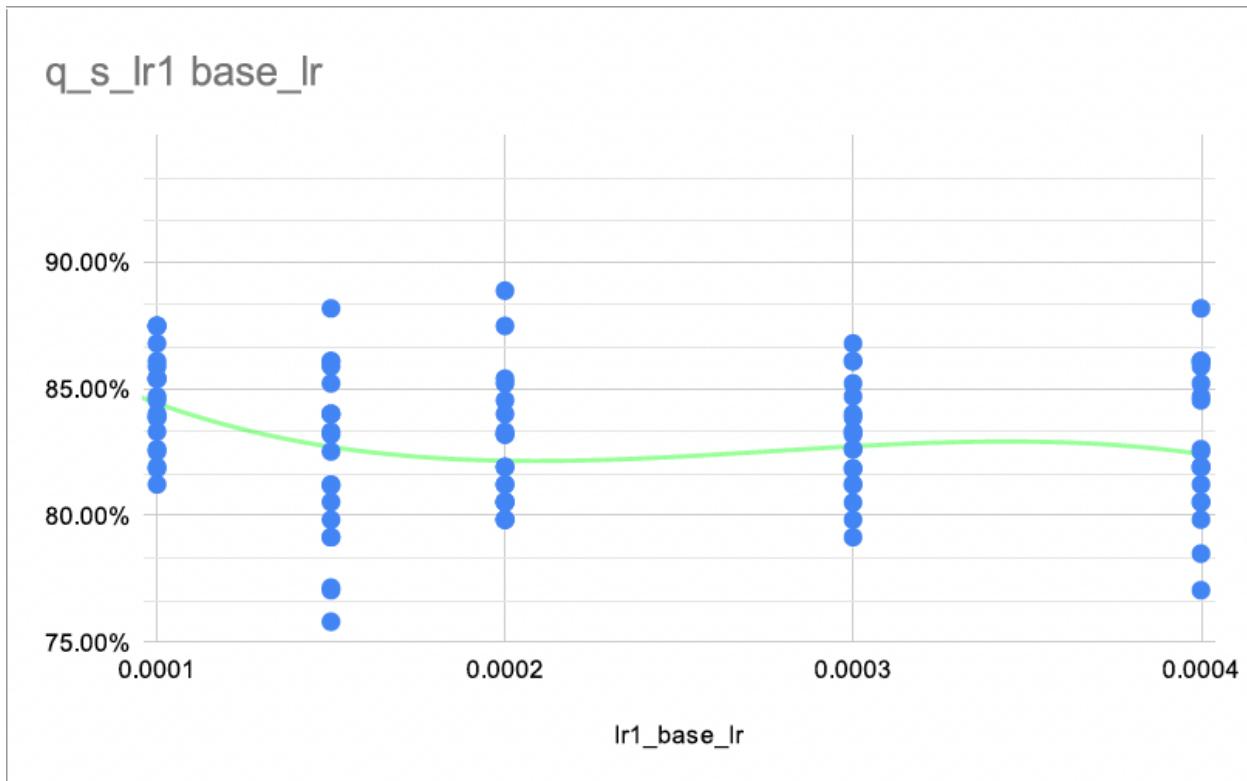
matrix																																			
q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy																															
7000	11500	0.009	0.0004	81.94%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>1</td><td>1</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>2</td><td>46</td><td>0</td><td>3</td><td></td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>47</td><td>4</td><td></td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>6</td><td>10</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.944% (incorrect=26, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	15	1	1	2		Vehicle	2	46	0	3		Person	3	0	47	4		Other	2	2	6	10	
	Bkgd	Vehicle	Person	Other																															
Bkgd	15	1	1	2																															
Vehicle	2	46	0	3																															
Person	3	0	47	4																															
Other	2	2	6	10																															
6500	12000	0.003	0.0001	81.94%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>3</td><td>6</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>45</td><td>1</td><td>6</td><td></td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>45</td><td>4</td><td></td></tr> <tr> <td>Other</td><td>0</td><td>0</td><td>3</td><td>11</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.944% (incorrect=26, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	17	3	6	2		Vehicle	1	45	1	6		Person	0	0	45	4		Other	0	0	3	11	
	Bkgd	Vehicle	Person	Other																															
Bkgd	17	3	6	2																															
Vehicle	1	45	1	6																															
Person	0	0	45	4																															
Other	0	0	3	11																															
6500	12000	0.005	0.0002	81.94%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>10</td><td>0</td><td>2</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>2</td><td>51</td><td>1</td><td>4</td><td></td></tr> <tr> <td>Person</td><td>3</td><td>2</td><td>46</td><td>3</td><td></td></tr> <tr> <td>Other</td><td>3</td><td>0</td><td>4</td><td>11</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.944% (incorrect=26, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	10	0	2	2		Vehicle	2	51	1	4		Person	3	2	46	3		Other	3	0	4	11	
	Bkgd	Vehicle	Person	Other																															
Bkgd	10	0	2	2																															
Vehicle	2	51	1	4																															
Person	3	2	46	3																															
Other	3	0	4	11																															
6500	12000	0.006	0.0002	81.94%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>0</td><td>0</td><td>1</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>51</td><td>5</td><td>3</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>39</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>0</td><td>1</td><td>8</td><td>13</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.944% (incorrect=26, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	15	0	0	1		Vehicle	1	51	5	3		Person	2	0	39	5		Other	0	1	8	13	
	Bkgd	Vehicle	Person	Other																															
Bkgd	15	0	0	1																															
Vehicle	1	51	5	3																															
Person	2	0	39	5																															
Other	0	1	8	13																															
6500	12000	0.009	0.0004	81.94%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>0</td><td>1</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>2</td><td>57</td><td>1</td><td>2</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>37</td><td>8</td><td></td></tr> <tr> <td>Other</td><td>3</td><td>4</td><td>1</td><td>10</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.944% (incorrect=26, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	14	0	1	2		Vehicle	2	57	1	2		Person	2	0	37	8		Other	3	4	1	10	
	Bkgd	Vehicle	Person	Other																															
Bkgd	14	0	1	2																															
Vehicle	2	57	1	2																															
Person	2	0	37	8																															
Other	3	4	1	10																															
8500	10500	0.006	0.0003	81.88%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>2</td><td>2</td><td>6</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>52</td><td>3</td><td>2</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>43</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>2</td><td>13</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.879% (incorrect=27, total=149)</p>		Bkgd	Vehicle	Person	Other		Bkgd	14	2	2	6		Vehicle	1	52	3	2		Person	1	1	43	5		Other	2	0	2	13	
	Bkgd	Vehicle	Person	Other																															
Bkgd	14	2	2	6																															
Vehicle	1	52	3	2																															
Person	1	1	43	5																															
Other	2	0	2	13																															
7000	10500	0.005	0.0003	81.88%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>22</td><td>2</td><td>0</td><td>3</td><td></td></tr> <tr> <td>Vehicle</td><td>2</td><td>51</td><td>2</td><td>7</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>41</td><td>6</td><td></td></tr> <tr> <td>Other</td><td>0</td><td>2</td><td>2</td><td>8</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.879% (incorrect=27, total=149)</p>		Bkgd	Vehicle	Person	Other		Bkgd	22	2	0	3		Vehicle	2	51	2	7		Person	1	0	41	6		Other	0	2	2	8	
	Bkgd	Vehicle	Person	Other																															
Bkgd	22	2	0	3																															
Vehicle	2	51	2	7																															
Person	1	0	41	6																															
Other	0	2	2	8																															
8500	10500	0.009	0.0001	81.88%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>11</td><td>1</td><td>3</td><td>1</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>63</td><td>0</td><td>1</td><td></td></tr> <tr> <td>Person</td><td>4</td><td>1</td><td>37</td><td>8</td><td></td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>6</td><td>11</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.879% (incorrect=27, total=149)</p>		Bkgd	Vehicle	Person	Other		Bkgd	11	1	3	1		Vehicle	0	63	0	1		Person	4	1	37	8		Other	1	1	6	11	
	Bkgd	Vehicle	Person	Other																															
Bkgd	11	1	3	1																															
Vehicle	0	63	0	1																															
Person	4	1	37	8																															
Other	1	1	6	11																															
7000	10500	0.009	0.0002	81.25%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>16</td><td>1</td><td>2</td><td>3</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>46</td><td>1</td><td>5</td><td></td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>46</td><td>6</td><td></td></tr> <tr> <td>Other</td><td>4</td><td>2</td><td>2</td><td>9</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.250% (incorrect=27, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	16	1	2	3		Vehicle	0	46	1	5		Person	0	1	46	6		Other	4	2	2	9	
	Bkgd	Vehicle	Person	Other																															
Bkgd	16	1	2	3																															
Vehicle	0	46	1	5																															
Person	0	1	46	6																															
Other	4	2	2	9																															
7000	11500	0.003	0.0001	81.25%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>23</td><td>2</td><td>0</td><td>5</td><td></td></tr> <tr> <td>Vehicle</td><td>3</td><td>48</td><td>3</td><td>3</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>37</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>1</td><td>0</td><td>3</td><td>9</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.250% (incorrect=27, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	23	2	0	5		Vehicle	3	48	3	3		Person	2	0	37	5		Other	1	0	3	9	
	Bkgd	Vehicle	Person	Other																															
Bkgd	23	2	0	5																															
Vehicle	3	48	3	3																															
Person	2	0	37	5																															
Other	1	0	3	9																															
7000	11500	0.009	0.0002	81.25%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>1</td><td>2</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>3</td><td>73</td><td>1</td><td>4</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>19</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>4</td><td>2</td><td>1</td><td>12</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.250% (incorrect=27, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	13	1	2	2		Vehicle	3	73	1	4		Person	2	0	19	5		Other	4	2	1	12	
	Bkgd	Vehicle	Person	Other																															
Bkgd	13	1	2	2																															
Vehicle	3	73	1	4																															
Person	2	0	19	5																															
Other	4	2	1	12																															
6500	12000	0.003	0.0003	81.25%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>0</td><td>4</td><td>0</td><td></td></tr> <tr> <td>Vehicle</td><td>2</td><td>52</td><td>3</td><td>5</td><td></td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>39</td><td>7</td><td></td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>4</td><td>7</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.250% (incorrect=27, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	19	0	4	0		Vehicle	2	52	3	5		Person	0	0	39	7		Other	1	1	4	7	
	Bkgd	Vehicle	Person	Other																															
Bkgd	19	0	4	0																															
Vehicle	2	52	3	5																															
Person	0	0	39	7																															
Other	1	1	4	7																															

matrix																																				
q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy																																
6500	12000	0.005	0.00015	81.25%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>3</td><td>2</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>45</td><td>1</td><td>4</td><td></td></tr> <tr> <td>Person</td><td>0</td><td>1</td><td>45</td><td>4</td><td></td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>5</td><td>12</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.250% (incorrect=27, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	15	3	2	2		Vehicle	1	45	1	4		Person	0	1	45	4		Other	2	2	5	12	
	Bkgd	Vehicle	Person	Other																																
Bkgd	15	3	2	2																																
Vehicle	1	45	1	4																																
Person	0	1	45	4																																
Other	2	2	5	12																																
6500	12000	0.005	0.0004	81.25%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>1</td><td>1</td><td>3</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>50</td><td>0</td><td>4</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>43</td><td>4</td><td></td></tr> <tr> <td>Other</td><td>3</td><td>4</td><td>4</td><td>6</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.250% (incorrect=27, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	18	1	1	3		Vehicle	1	50	0	4		Person	2	0	43	4		Other	3	4	4	6	
	Bkgd	Vehicle	Person	Other																																
Bkgd	18	1	1	3																																
Vehicle	1	50	0	4																																
Person	2	0	43	4																																
Other	3	4	4	6																																
6500	12000	0.006	0.0003	81.25%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>21</td><td>2</td><td>3</td><td>3</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>36</td><td>1</td><td>4</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>1</td><td>46</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>5</td><td>0</td><td>1</td><td>14</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.250% (incorrect=27, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	21	2	3	3		Vehicle	1	36	1	4		Person	1	1	46	5		Other	5	0	1	14	
	Bkgd	Vehicle	Person	Other																																
Bkgd	21	2	3	3																																
Vehicle	1	36	1	4																																
Person	1	1	46	5																																
Other	5	0	1	14																																
8500	10500	0.005	0.00015	81.21%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>28</td><td>0</td><td>4</td><td>1</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>43</td><td>1</td><td>4</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>40</td><td>6</td><td></td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>6</td><td>10</td><td></td></tr> </tbody> </table> <p>Accuracy: 81.208% (incorrect=28, total=149)</p>		Bkgd	Vehicle	Person	Other		Bkgd	28	0	4	1		Vehicle	1	43	1	4		Person	1	0	40	6		Other	2	2	6	10	
	Bkgd	Vehicle	Person	Other																																
Bkgd	28	0	4	1																																
Vehicle	1	43	1	4																																
Person	1	0	40	6																																
Other	2	2	6	10																																
7000	10500	0.004	0.0002	80.56%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>3</td><td>1</td><td>1</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>48</td><td>2</td><td>4</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>43</td><td>8</td><td></td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>5</td><td>6</td><td></td></tr> </tbody> </table> <p>Accuracy: 80.556% (incorrect=28, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	19	3	1	1		Vehicle	1	48	2	4		Person	1	0	43	8		Other	1	1	5	6	
	Bkgd	Vehicle	Person	Other																																
Bkgd	19	3	1	1																																
Vehicle	1	48	2	4																																
Person	1	0	43	8																																
Other	1	1	5	6																																
7000	10500	0.006	0.0004	80.56%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>15</td><td>0</td><td>3</td><td>4</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>53</td><td>3</td><td>4</td><td></td></tr> <tr> <td>Person</td><td>3</td><td>1</td><td>39</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>2</td><td>0</td><td>3</td><td>9</td><td></td></tr> </tbody> </table> <p>Accuracy: 80.556% (incorrect=28, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	15	0	3	4		Vehicle	0	53	3	4		Person	3	1	39	5		Other	2	0	3	9	
	Bkgd	Vehicle	Person	Other																																
Bkgd	15	0	3	4																																
Vehicle	0	53	3	4																																
Person	3	1	39	5																																
Other	2	0	3	9																																
7000	11500	0.003	0.0002	80.56%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>14</td><td>1</td><td>0</td><td>4</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>53</td><td>3</td><td>5</td><td></td></tr> <tr> <td>Person</td><td>0</td><td>0</td><td>39</td><td>4</td><td></td></tr> <tr> <td>Other</td><td>4</td><td>0</td><td>6</td><td>10</td><td></td></tr> </tbody> </table> <p>Accuracy: 80.556% (incorrect=28, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	14	1	0	4		Vehicle	1	53	3	5		Person	0	0	39	4		Other	4	0	6	10	
	Bkgd	Vehicle	Person	Other																																
Bkgd	14	1	0	4																																
Vehicle	1	53	3	5																																
Person	0	0	39	4																																
Other	4	0	6	10																																
7000	11500	0.004	0.0002	80.56%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>13</td><td>1</td><td>4</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>50</td><td>3</td><td>2</td><td></td></tr> <tr> <td>Person</td><td>3</td><td>0</td><td>46</td><td>3</td><td></td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>6</td><td>7</td><td></td></tr> </tbody> </table> <p>Accuracy: 80.556% (incorrect=28, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	13	1	4	2		Vehicle	0	50	3	2		Person	3	0	46	3		Other	2	2	6	7	
	Bkgd	Vehicle	Person	Other																																
Bkgd	13	1	4	2																																
Vehicle	0	50	3	2																																
Person	3	0	46	3																																
Other	2	2	6	7																																
7000	11500	0.005	0.0004	80.56%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>19</td><td>0</td><td>2</td><td>2</td><td></td></tr> <tr> <td>Vehicle</td><td>1</td><td>47</td><td>0</td><td>6</td><td></td></tr> <tr> <td>Person</td><td>4</td><td>0</td><td>37</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>6</td><td>13</td><td></td></tr> </tbody> </table> <p>Accuracy: 80.556% (incorrect=28, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	19	0	2	2		Vehicle	1	47	0	6		Person	4	0	37	5		Other	1	1	6	13	
	Bkgd	Vehicle	Person	Other																																
Bkgd	19	0	2	2																																
Vehicle	1	47	0	6																																
Person	4	0	37	5																																
Other	1	1	6	13																																
6500	12000	0.003	0.0002	80.56%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>18</td><td>0</td><td>5</td><td>1</td><td></td></tr> <tr> <td>Vehicle</td><td>2</td><td>50</td><td>0</td><td>1</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>2</td><td>41</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>4</td><td>3</td><td>4</td><td>7</td><td></td></tr> </tbody> </table> <p>Accuracy: 80.556% (incorrect=28, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	18	0	5	1		Vehicle	2	50	0	1		Person	1	2	41	5		Other	4	3	4	7	
	Bkgd	Vehicle	Person	Other																																
Bkgd	18	0	5	1																																
Vehicle	2	50	0	1																																
Person	1	2	41	5																																
Other	4	3	4	7																																
6500	12000	0.006	0.00015	80.56%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>17</td><td>5</td><td>4</td><td>3</td><td></td></tr> <tr> <td>Vehicle</td><td>2</td><td>50</td><td>0</td><td>1</td><td></td></tr> <tr> <td>Person</td><td>2</td><td>0</td><td>41</td><td>5</td><td></td></tr> <tr> <td>Other</td><td>2</td><td>2</td><td>2</td><td>8</td><td></td></tr> </tbody> </table> <p>Accuracy: 80.556% (incorrect=28, total=144)</p>		Bkgd	Vehicle	Person	Other		Bkgd	17	5	4	3		Vehicle	2	50	0	1		Person	2	0	41	5		Other	2	2	2	8	
	Bkgd	Vehicle	Person	Other																																
Bkgd	17	5	4	3																																
Vehicle	2	50	0	1																																
Person	2	0	41	5																																
Other	2	2	2	8																																
8500	10500	0.003	0.0003	80.54%		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th><th></th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>23</td><td>0</td><td>5</td><td>5</td><td></td></tr> <tr> <td>Vehicle</td><td>0</td><td>49</td><td>0</td><td>2</td><td></td></tr> <tr> <td>Person</td><td>1</td><td>0</td><td>41</td><td>3</td><td></td></tr> <tr> <td>Other</td><td>4</td><td>4</td><td>5</td><td>7</td><td></td></tr> </tbody> </table> <p>Accuracy: 80.537% (incorrect=29, total=149)</p>		Bkgd	Vehicle	Person	Other		Bkgd	23	0	5	5		Vehicle	0	49	0	2		Person	1	0	41	3		Other	4	4	5	7	
	Bkgd	Vehicle	Person	Other																																
Bkgd	23	0	5	5																																
Vehicle	0	49	0	2																																
Person	1	0	41	3																																
Other	4	4	5	7																																

q_s_max_itr	q_s_lr1_max_itr	q_s_base	q_s_lr1_base_lr	Accy	matrix
					Bkgd                      Vehicle                      Person                      Other 16                            1                            3                            6 Vehicle                     2                            53                          1                            3 Person                      1                            0                            45                          6 Other                        3                            0                            4                            5 Accuracy: 79.866% (incorrect=30, total=149)
7000	10500	0.005	0.0004	79.87%	Bkgd                      Vehicle                      Person                      Other 20                            1                            2                            4 Vehicle                     0                            47                          1                            2 Person                      3                            1                            42                          9 Other                        3                            0                            4                            10 Accuracy: 79.866% (incorrect=30, total=149)
					Bkgd                      Vehicle                      Person                      Other 20                            1                            1                            1                            1 Vehicle                     1                            48                          0                            4 Person                      2                            1                            42                          4 Other                        6                            3                            6                            9 Accuracy: 79.866% (incorrect=30, total=149)
8500	10500	0.004	0.0002	79.87%	Bkgd                      Vehicle                      Person                      Other 15                            1                            1                            1                            2 Vehicle                     2                            52                          3                            1 Person                      3                            0                            39                          3 Other                        5                            1                            7                            9 Accuracy: 79.861% (incorrect=29, total=144)
					Bkgd                      Vehicle                      Person                      Other 22                            0                            2                            4                            4 Vehicle                     0                            47                          1                            1 Person                      1                            1                            37                          11 Other                        4                            2                            2                            9 Accuracy: 79.861% (incorrect=29, total=144)
7000	11500	0.006	0.0002	79.86%	Bkgd                      Vehicle                      Person                      Other 20                            1                            2                            4                            4 Vehicle                     0                            44                          3                            4 Person                      3                            1                            39                          3 Other                        1                            2                            5                            12 Accuracy: 79.861% (incorrect=29, total=144)
					Bkgd                      Vehicle                      Person                      Other 11                            0                            4                            2                            2 Vehicle                     1                            42                          0                            3 Person                      0                            0                            49                          6 Other                        6                            0                            8                            12 Accuracy: 79.167% (incorrect=30, total=144)
6500	12000	0.005	0.0003	79.86%	Bkgd                      Vehicle                      Person                      Other 15                            0                            1                            2                            2 Vehicle                     2                            50                          0                            5 Person                      0                            3                            41                          5 Other                        3                            3                            6                            8 Accuracy: 79.167% (incorrect=30, total=144)
					Bkgd                      Vehicle                      Person                      Other 18                            3                            1                            5                            5 Vehicle                     0                            42                          0                            4 Person                      0                            0                            48                          8 Other                        2                            0                            7                            6 Accuracy: 79.167% (incorrect=30, total=144)
7000	10500	0.006	0.00015	79.17%	Bkgd                      Vehicle                      Person                      Other 15                            1                            2                            5                            5 Vehicle                     1                            45                          0                            2 Person                      1                            2                            47                          5 Other                        5                            2                            6                            10 Accuracy: 78.523% (incorrect=32, total=149)
					Bkgd                      Vehicle                      Person                      Other 7                            0                            4                            6                            6 Vehicle                     1                            43                          0                            6 Person                      2                            0                            54                          7 Other                        4                            2                            2                            11 Accuracy: 77.181% (incorrect=34, total=149)
8500	10500	0.004	0.0004	78.52%	Bkgd                      Vehicle                      Person                      Other 13                            0                            3                            4                            4 Vehicle                     2                            55                          0                            4 Person                      7                            2                            33                          1 Other                        2                            2                            6                            10 Accuracy: 77.083% (incorrect=33, total=144)
					Bkgd                      Vehicle                      Person                      Other 11500                     0.003                    0.00015                    77.08%
7000	11500	0.003	0.00015	77.18%	

					matrix
					Bkgd      Vehicle      Person      Other
6500	12000	0.006	0.0004	77.08%	Bkgd      Vehicle      Person      Other Bkgd      17      1      3      2 Vehicle      2      44      1      3 Person      4      2      38      4 Other      5      2      4      12 Accuracy: 77.083% (incorrect=33, total=144)
8500	10500	0.009	0.00015	75.84%	Bkgd      Vehicle      Person      Other Bkgd      18      0      0      7 Vehicle      3      47      2      3 Person      4      0      39      7 Other      3      3      4      9 Accuracy: 75.839% (incorrect=36, total=149)
7000	10500	0.003	0.0003	73.83%	Bkgd      Vehicle      Person      Other Bkgd      14      0      2      8 Vehicle      2      47      2      1 Person      3      0      39      9 Other      5      1      6      10 Accuracy: 73.826% (incorrect=39, total=149)
8500	10500	0.009	0.0004	73.83%	Bkgd      Vehicle      Person      Other Bkgd      17      3      2      5 Vehicle      1      45      2      2 Person      2      2      38      6 Other      3      3      8      10 Accuracy: 73.826% (incorrect=39, total=149)





**Observations:** Out of the 100 tests we ran, the highest accuracy was 88.89%. Not an improvement from highest accuracy of 89.58% from default learning rate settings. The graph shows the base learning rate changes that we made for both Learning rate 1 and Learning rate 2.

**NOTE:** After many countless tests we have done, we were still not getting the Accuracy that we wanted. We discussed in our meeting what could have been a problem and we all decided to add more dataset of Vehicle and human and background and run many more tests after. We have done 121 tests total after adding the new data set. The highest accuracy we got was 91.86% which is very close to the accuracy we wanted but not quite 95% or higher yet.

## Test 9

**Objectives:** Achieve the highest accuracy possible.

**Settings:** Two best performing setting combinations from previous experiments, listed below.

Max\_itr = 9000, lr1\_max\_itr = 11000, base\_lr = 0.004, lr1\_base\_lr = 0.0001

Max\_itr = 9000, lr1\_max\_itr = 11000, base\_lr = 0.005, lr1\_base\_lr = 0.00015

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix			
2				0.0001	0.9	0.9	91.921%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	49	2	0
								Vehicle	4	203	0
								Person	3	3	133
								Other	4	5	2
								Accuracy: 91.921% (incorrect=37, total=458)			
3				0.0001	0.9	0.9	91.703%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	57	1	4
								Vehicle	1	212	6
								Person	3	5	7
								Other	1	1	3
								Accuracy: 91.703% (incorrect=38, total=458)			
4				0.0001	0.9	0.9	89.301%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	56	1	3
								Vehicle	3	203	5
								Person	5	7	8
								Other	3	1	32
								Accuracy: 89.301% (incorrect=49, total=458)			
5				0.0001	0.9	0.9	91.921%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	47	1	5
								Vehicle	3	220	3
								Person	2	2	8
								Other	1	1	24
								Accuracy: 91.921% (incorrect=37, total=458)			
6				0.0001	0.9	0.9	93.013%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	61	4	3
								Vehicle	2	198	3
								Person	0	1	8
								Other	1	3	37
								Accuracy: 93.013% (incorrect=32, total=458)			
7				0.0001	0.9	0.9	92.795%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	60	2	6
								Vehicle	3	205	7
								Person	0	1	4
								Other	2	1	24
								Accuracy: 92.795% (incorrect=33, total=458)			
8				0.0001	0.9	0.9	91.048%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	55	4	3
								Vehicle	3	208	4
								Person	6	1	3
								Other	3	5	30
								Accuracy: 91.048% (incorrect=41, total=458)			
9				0.0001	0.9	0.9	93.231%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	50	2	5
								Vehicle	2	224	3
								Person	1	0	6
								Other	3	3	33
								Accuracy: 93.231% (incorrect=31, total=458)			
10				0.0001	0.9	0.9	90.393%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	58	0	5
								Vehicle	2	216	3
								Person	1	4	5
								Other	7	3	26
								Accuracy: 90.393% (incorrect=44, total=458)			
11				0.0001	0.9	0.9	90.611%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	42	4	2
								Vehicle	3	217	3
								Person	3	1	8
								Other	4	4	21
								Accuracy: 90.611% (incorrect=43, total=458)			
12				0.0001	0.9	0.9	91.266%	Bkgd	Vehicle	Person	Other
	9000	11000	0.004	0.0001				Bkgd	42	3	3
								Vehicle	0	235	2
								Person	1	3	6
								Other	6	1	30
								Accuracy: 91.266% (incorrect=40, total=458)			

1	q_s	q_s_ir1	q_s_base	q_s_ir1	q_s	q_s_ir1	Accy	matrix					
13	9000	11000	0.004	0.0001	0.9	0.9	92.576%	Bkgd	53	4	Person	3	Other
								Vehicle	198			5	
14	9000	11000	0.004	0.0001	0.9	0.9	94.541%	Bkgd	59	0	Person	0	Other
								Vehicle	228			1	
15	9000	11000	0.004	0.0001	0.9	0.9	93.668%	Bkgd	63	0	Person	0	Other
								Vehicle	213			2	
16	9000	11000	0.004	0.0001	0.9	0.9	90.611%	Bkgd	36	2	Person	4	Other
								Vehicle	203			4	
17	9000	11000	0.004	0.0001	0.9	0.9	92.795%	Bkgd	50	2	Person	3	Other
								Vehicle	212			4	
18	9000	11000	0.004	0.0001	0.9	0.9	91.048%	Bkgd	55	2	Person	4	Other
								Vehicle	222			4	
19	9000	11000	0.004	0.0001	0.9	0.9	93.013%	Bkgd	52	4	Person	1	Other
								Vehicle	208			0	
20	9000	11000	0.004	0.0001	0.9	0.9	90.611%	Bkgd	56	0	Person	1	Other
								Vehicle	207			6	
21	9000	11000	0.004	0.0001	0.9	0.9	91.048%	Bkgd	45	0	Person	5	Other
								Vehicle	221			4	
22	9000	11000	0.005	0.00015	0.9	0.9	90.393%	Bkgd	64	2	Person	5	Other
								Vehicle	190			1	
23	9000	11000	0.005	0.00015	0.9	0.9	90.175%	Bkgd	61	1	Person	2	Other
								Vehicle	184			5	

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix					
24	9000	11000	0.005	0.00015	0.9	0.9	90.393%	Bkgd	55	0	Person	2	Other
								Vehicle	5	214		7	4
25	9000	11000	0.005	0.00015	0.9	0.9	91.048%	Person	3	2		114	5
								Other	2	1		4	9
26	9000	11000	0.005	0.00015	0.9	0.9	91.703%	Bkgd	60	3	Person	5	Other
								Vehicle	3	225		4	4
27	9000	11000	0.005	0.00015	0.9	0.9	89.738%	Person	0	1		118	4
								Other	6	1		4	17
28	9000	11000	0.005	0.00015	0.9	0.9	91.266%	Bkgd	54	1	Person	7	Other
								Vehicle	7	211		3	6
29	9000	11000	0.005	0.00015	0.9	0.9	91.703%	Person	2	1		121	3
								Other	2	2		6	7
30	9000	11000	0.005	0.00015	0.9	0.9	93.231%	Bkgd	53	2	Person	3	Other
								Vehicle	6	204		5	0
31	9000	11000	0.005	0.00015	0.9	0.9	91.921%	Person	2	1		131	4
								Other	3	1		6	32
32	9000	11000	0.005	0.00015	0.9	0.9	91.048%	Bkgd	52	2	Person	1	Other
								Vehicle	1	235		3	5
33	9000	11000	0.005	0.00015	0.9	0.9	89.956%	Person	1	0		116	2
								Other	3	3		8	24
34	9000	11000	0.005	0.00015	0.9	0.9	90.393%	Bkgd	66	3	Person	0	Other
								Vehicle	2	195		3	4
								Person	5	2		117	5
								Other	4	2		6	9
								Bkgd	45	1	Person	4	Other
								Vehicle	3	219		3	4
								Person	4	0		121	6
								Other	4	3		6	29
								Bkgd	40	1	Person	4	Other
								Vehicle	3	219		3	4
								Person	4	0		121	6
								Other	4	3		6	29

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix						
35					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.005	0.00015			92.576%	Bkgd	54	1	1	3		
								Vehicle	5	213	3	4		
								Person	3	5	132	5		
								Other	1	1	2	25		
								Accuracy: 92.576% (incorrect=34, total=458)						
36					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.005	0.00015			92.576%	Bkgd	53	2	2	0		
								Vehicle	4	198	2	3		
								Person	3	4	149	8		
								Other	1	3	2	24		
								Accuracy: 92.576% (incorrect=34, total=458)						
37					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.005	0.00015			93.886%	Bkgd	50	0	0	0		
								Vehicle	1	211	2	2		
								Person	4	2	130	7		
								Other	3	4	3	39		
								Accuracy: 93.886% (incorrect=28, total=458)						
38					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.005	0.00015			90.830%	Bkgd	44	2	2	2		
								Vehicle	5	197	2	6		
								Person	5	3	143	9		
								Other	1	1	4	32		
								Accuracy: 90.830% (incorrect=42, total=458)						
39					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.005	0.00015			90.175%	Bkgd	50	1	2	3		
								Vehicle	4	202	6	4		
								Person	3	3	135	8		
								Other	3	4	4	26		
								Accuracy: 90.175% (incorrect=45, total=458)						
40					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.005	0.00015			89.301%	Bkgd	41	3	4	7		
								Vehicle	5	210	1	4		
								Person	4	4	126	7		
								Other	6	0	4	32		
								Accuracy: 89.301% (incorrect=49, total=458)						
41					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.005	0.00015			91.048%	Bkgd	49	3	3	2		
								Vehicle	6	218	1	2		
								Person	5	1	123	4		
								Other	6	2	6	27		
								Accuracy: 91.048% (incorrect=41, total=458)						
1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix						
42					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.004	0.00015			91.05%	Bkgd	47	1	4	2		
								Vehicle	0	216	2	1		
								Person	3	5	129	10		
								Other	4	4	5	25		
								Accuracy: 91.048% (incorrect=41, total=458)						
43					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.004	0.00015			90.18%	Bkgd	52	2	2	5		
								Vehicle	2	213	2	8		
								Person	3	1	121	5		
								Other	5	3	7	27		
								Accuracy: 90.175% (incorrect=45, total=458)						
44					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.004	0.00015			89.52%	Bkgd	42	2	3	6		
								Vehicle	5	219	1	4		
								Person	4	3	117	6		
								Other	5	2	7	32		
								Accuracy: 89.520% (incorrect=48, total=458)						
45					0.9	0.9		Bkgd	Vehicle	Person	Other			
	9000	11000	0.004	0.00015			92.36%	Bkgd	58	0	5	4		
								Vehicle	3	196	4	2		
								Person	2	1	132	3		
								Other	3	1	4	37		
								Accuracy: 92.358% (incorrect=35, total=458)						

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix																									
46					0.9	0.9		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>58</td><td>4</td><td>3</td><td>5</td></tr> <tr> <td>Vehicle</td><td>2</td><td>214</td><td>2</td><td>3</td></tr> <tr> <td>Person</td><td>3</td><td>8</td><td>107</td><td>9</td></tr> <tr> <td>Other</td><td>6</td><td>1</td><td>3</td><td>30</td></tr> </tbody> </table> <p>Accuracy: 89.301% (incorrect=49, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	58	4	3	5	Vehicle	2	214	2	3	Person	3	8	107	9	Other	6	1	3	30
	Bkgd	Vehicle	Person	Other																													
Bkgd	58	4	3	5																													
Vehicle	2	214	2	3																													
Person	3	8	107	9																													
Other	6	1	3	30																													
47	9000	11000	0.004	0.00015			89.30%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>55</td><td>1</td><td>1</td><td>2</td></tr> <tr> <td>Vehicle</td><td>1</td><td>202</td><td>1</td><td>4</td></tr> <tr> <td>Person</td><td>5</td><td>5</td><td>137</td><td>6</td></tr> <tr> <td>Other</td><td>4</td><td>1</td><td>3</td><td>30</td></tr> </tbody> </table> <p>Accuracy: 92.576% (incorrect=34, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	55	1	1	2	Vehicle	1	202	1	4	Person	5	5	137	6	Other	4	1	3	30
	Bkgd	Vehicle	Person	Other																													
Bkgd	55	1	1	2																													
Vehicle	1	202	1	4																													
Person	5	5	137	6																													
Other	4	1	3	30																													
48	9000	11000	0.004	0.00015			92.58%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>45</td><td>2</td><td>6</td><td>4</td></tr> <tr> <td>Vehicle</td><td>2</td><td>193</td><td>2</td><td>6</td></tr> <tr> <td>Person</td><td>3</td><td>2</td><td>155</td><td>7</td></tr> <tr> <td>Other</td><td>4</td><td>4</td><td>2</td><td>21</td></tr> </tbody> </table> <p>Accuracy: 90.393% (incorrect=44, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	45	2	6	4	Vehicle	2	193	2	6	Person	3	2	155	7	Other	4	4	2	21
	Bkgd	Vehicle	Person	Other																													
Bkgd	45	2	6	4																													
Vehicle	2	193	2	6																													
Person	3	2	155	7																													
Other	4	4	2	21																													
49	9000	11000	0.004	0.00015			90.39%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>56</td><td>1</td><td>5</td><td>6</td></tr> <tr> <td>Vehicle</td><td>5</td><td>196</td><td>1</td><td>3</td></tr> <tr> <td>Person</td><td>4</td><td>1</td><td>138</td><td>5</td></tr> <tr> <td>Other</td><td>1</td><td>1</td><td>5</td><td>30</td></tr> </tbody> </table> <p>Accuracy: 91.703% (incorrect=38, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	56	1	5	6	Vehicle	5	196	1	3	Person	4	1	138	5	Other	1	1	5	30
	Bkgd	Vehicle	Person	Other																													
Bkgd	56	1	5	6																													
Vehicle	5	196	1	3																													
Person	4	1	138	5																													
Other	1	1	5	30																													
50	9000	11000	0.004	0.00015			91.70%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>46</td><td>1</td><td>7</td><td>1</td></tr> <tr> <td>Vehicle</td><td>4</td><td>207</td><td>3</td><td>1</td></tr> <tr> <td>Person</td><td>4</td><td>4</td><td>138</td><td>8</td></tr> <tr> <td>Other</td><td>1</td><td>0</td><td>3</td><td>30</td></tr> </tbody> </table> <p>Accuracy: 91.921% (incorrect=37, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	46	1	7	1	Vehicle	4	207	3	1	Person	4	4	138	8	Other	1	0	3	30
	Bkgd	Vehicle	Person	Other																													
Bkgd	46	1	7	1																													
Vehicle	4	207	3	1																													
Person	4	4	138	8																													
Other	1	0	3	30																													
51	9000	11000	0.004	0.00015			91.92%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>45</td><td>4</td><td>2</td><td>2</td></tr> <tr> <td>Vehicle</td><td>4</td><td>207</td><td>0</td><td>6</td></tr> <tr> <td>Person</td><td>3</td><td>2</td><td>136</td><td>12</td></tr> <tr> <td>Other</td><td>1</td><td>4</td><td>6</td><td>24</td></tr> </tbody> </table> <p>Accuracy: 89.956% (incorrect=46, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	45	4	2	2	Vehicle	4	207	0	6	Person	3	2	136	12	Other	1	4	6	24
	Bkgd	Vehicle	Person	Other																													
Bkgd	45	4	2	2																													
Vehicle	4	207	0	6																													
Person	3	2	136	12																													
Other	1	4	6	24																													
52	9000	11000	0.0036	0.00015			89.96%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>54</td><td>1</td><td>3</td><td>5</td></tr> <tr> <td>Vehicle</td><td>5</td><td>202</td><td>2</td><td>3</td></tr> <tr> <td>Person</td><td>5</td><td>1</td><td>121</td><td>8</td></tr> <tr> <td>Other</td><td>1</td><td>5</td><td>9</td><td>33</td></tr> </tbody> </table> <p>Accuracy: 89.520% (incorrect=48, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	54	1	3	5	Vehicle	5	202	2	3	Person	5	1	121	8	Other	1	5	9	33
	Bkgd	Vehicle	Person	Other																													
Bkgd	54	1	3	5																													
Vehicle	5	202	2	3																													
Person	5	1	121	8																													
Other	1	5	9	33																													
1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix																									
53					0.9	0.5		<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>55</td><td>2</td><td>3</td><td>2</td></tr> <tr> <td>Vehicle</td><td>3</td><td>206</td><td>3</td><td>7</td></tr> <tr> <td>Person</td><td>2</td><td>3</td><td>127</td><td>4</td></tr> <tr> <td>Other</td><td>2</td><td>1</td><td>8</td><td>30</td></tr> </tbody> </table> <p>Accuracy: 91.266% (incorrect=40, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	55	2	3	2	Vehicle	3	206	3	7	Person	2	3	127	4	Other	2	1	8	30
	Bkgd	Vehicle	Person	Other																													
Bkgd	55	2	3	2																													
Vehicle	3	206	3	7																													
Person	2	3	127	4																													
Other	2	1	8	30																													
54	9000	11000	0.0036	0.00015			91.27%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>52</td><td>1</td><td>1</td><td>1</td></tr> <tr> <td>Vehicle</td><td>3</td><td>216</td><td>2</td><td>5</td></tr> <tr> <td>Person</td><td>5</td><td>2</td><td>118</td><td>4</td></tr> <tr> <td>Other</td><td>4</td><td>6</td><td>7</td><td>31</td></tr> </tbody> </table> <p>Accuracy: 91.048% (incorrect=41, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	52	1	1	1	Vehicle	3	216	2	5	Person	5	2	118	4	Other	4	6	7	31
	Bkgd	Vehicle	Person	Other																													
Bkgd	52	1	1	1																													
Vehicle	3	216	2	5																													
Person	5	2	118	4																													
Other	4	6	7	31																													
55	9000	11000	0.0036	0.00015			91.05%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>55</td><td>4</td><td>6</td><td>6</td></tr> <tr> <td>Vehicle</td><td>5</td><td>195</td><td>0</td><td>6</td></tr> <tr> <td>Person</td><td>3</td><td>2</td><td>131</td><td>10</td></tr> <tr> <td>Other</td><td>3</td><td>1</td><td>2</td><td>29</td></tr> </tbody> </table> <p>Accuracy: 89.520% (incorrect=48, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	55	4	6	6	Vehicle	5	195	0	6	Person	3	2	131	10	Other	3	1	2	29
	Bkgd	Vehicle	Person	Other																													
Bkgd	55	4	6	6																													
Vehicle	5	195	0	6																													
Person	3	2	131	10																													
Other	3	1	2	29																													
56	9000	11000	0.0036	0.00015			89.52%	<table border="1"> <thead> <tr> <th></th><th>Bkgd</th><th>Vehicle</th><th>Person</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Bkgd</td><td>50</td><td>3</td><td>2</td><td>0</td></tr> <tr> <td>Vehicle</td><td>1</td><td>191</td><td>5</td><td>3</td></tr> <tr> <td>Person</td><td>2</td><td>5</td><td>140</td><td>12</td></tr> <tr> <td>Other</td><td>4</td><td>1</td><td>4</td><td>35</td></tr> </tbody> </table> <p>Accuracy: 90.830% (incorrect=42, total=458)</p>		Bkgd	Vehicle	Person	Other	Bkgd	50	3	2	0	Vehicle	1	191	5	3	Person	2	5	140	12	Other	4	1	4	35
	Bkgd	Vehicle	Person	Other																													
Bkgd	50	3	2	0																													
Vehicle	1	191	5	3																													
Person	2	5	140	12																													
Other	4	1	4	35																													
	9000	11000	0.0036	0.00015			90.83%																										

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix																									
57					0.9	0.5		<table border="1"> <tr><td>Bkdg</td><td>52</td><td>2</td><td>5</td><td>3</td></tr> <tr><td>Vehicle</td><td>4</td><td>199</td><td>5</td><td>3</td></tr> <tr><td>Person</td><td>2</td><td>1</td><td>143</td><td>10</td></tr> <tr><td>Other</td><td>2</td><td>2</td><td>5</td><td>20</td></tr> <tr><td colspan="5">Accuracy: 90.393% (incorrect=44, total=458)</td></tr> </table>	Bkdg	52	2	5	3	Vehicle	4	199	5	3	Person	2	1	143	10	Other	2	2	5	20	Accuracy: 90.393% (incorrect=44, total=458)				
Bkdg	52	2	5	3																													
Vehicle	4	199	5	3																													
Person	2	1	143	10																													
Other	2	2	5	20																													
Accuracy: 90.393% (incorrect=44, total=458)																																	
	9000	11000	0.0036	0.00015			90.39%																										
58					0.9	0.5		<table border="1"> <tr><td>Bkdg</td><td>62</td><td>2</td><td>1</td><td>3</td></tr> <tr><td>Vehicle</td><td>1</td><td>214</td><td>1</td><td>3</td></tr> <tr><td>Person</td><td>0</td><td>6</td><td>116</td><td>7</td></tr> <tr><td>Other</td><td>1</td><td>3</td><td>4</td><td>34</td></tr> <tr><td colspan="5">Accuracy: 93.013% (incorrect=32, total=458)</td></tr> </table>	Bkdg	62	2	1	3	Vehicle	1	214	1	3	Person	0	6	116	7	Other	1	3	4	34	Accuracy: 93.013% (incorrect=32, total=458)				
Bkdg	62	2	1	3																													
Vehicle	1	214	1	3																													
Person	0	6	116	7																													
Other	1	3	4	34																													
Accuracy: 93.013% (incorrect=32, total=458)																																	
	9000	11000	0.0036	0.00015			93.01%																										
59					0.9	0.5		<table border="1"> <tr><td>Bkdg</td><td>59</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>Vehicle</td><td>0</td><td>217</td><td>2</td><td>4</td></tr> <tr><td>Person</td><td>2</td><td>0</td><td>120</td><td>5</td></tr> <tr><td>Other</td><td>5</td><td>2</td><td>6</td><td>33</td></tr> <tr><td colspan="5">Accuracy: 93.668% (incorrect=29, total=458)</td></tr> </table>	Bkdg	59	1	1	1	Vehicle	0	217	2	4	Person	2	0	120	5	Other	5	2	6	33	Accuracy: 93.668% (incorrect=29, total=458)				
Bkdg	59	1	1	1																													
Vehicle	0	217	2	4																													
Person	2	0	120	5																													
Other	5	2	6	33																													
Accuracy: 93.668% (incorrect=29, total=458)																																	
	9000	11000	0.0036	0.00015			93.67%																										
60					0.9	0.5		<table border="1"> <tr><td>Bkdg</td><td>47</td><td>1</td><td>2</td><td>1</td></tr> <tr><td>Vehicle</td><td>3</td><td>219</td><td>3</td><td>4</td></tr> <tr><td>Person</td><td>2</td><td>3</td><td>137</td><td>9</td></tr> <tr><td>Other</td><td>2</td><td>1</td><td>3</td><td>21</td></tr> <tr><td colspan="5">Accuracy: 92.576% (incorrect=34, total=458)</td></tr> </table>	Bkdg	47	1	2	1	Vehicle	3	219	3	4	Person	2	3	137	9	Other	2	1	3	21	Accuracy: 92.576% (incorrect=34, total=458)				
Bkdg	47	1	2	1																													
Vehicle	3	219	3	4																													
Person	2	3	137	9																													
Other	2	1	3	21																													
Accuracy: 92.576% (incorrect=34, total=458)																																	
	9000	11000	0.0036	0.00015			92.58%																										
61					0.9	0.5		<table border="1"> <tr><td>Bkdg</td><td>55</td><td>3</td><td>7</td><td>3</td></tr> <tr><td>Vehicle</td><td>2</td><td>189</td><td>0</td><td>7</td></tr> <tr><td>Person</td><td>1</td><td>4</td><td>133</td><td>14</td></tr> <tr><td>Other</td><td>6</td><td>0</td><td>6</td><td>28</td></tr> <tr><td colspan="5">Accuracy: 88.428% (incorrect=53, total=458)</td></tr> </table>	Bkdg	55	3	7	3	Vehicle	2	189	0	7	Person	1	4	133	14	Other	6	0	6	28	Accuracy: 88.428% (incorrect=53, total=458)				
Bkdg	55	3	7	3																													
Vehicle	2	189	0	7																													
Person	1	4	133	14																													
Other	6	0	6	28																													
Accuracy: 88.428% (incorrect=53, total=458)																																	
	9000	11000	0.0036	0.00015			88.43%																										
62					0.9	0.9		<table border="1"> <tr><td>Bkdg</td><td>43</td><td>1</td><td>5</td><td>3</td></tr> <tr><td>Vehicle</td><td>1</td><td>226</td><td>1</td><td>2</td></tr> <tr><td>Person</td><td>3</td><td>2</td><td>126</td><td>5</td></tr> <tr><td>Other</td><td>5</td><td>0</td><td>3</td><td>32</td></tr> <tr><td colspan="5">Accuracy: 93.231% (incorrect=31, total=458)</td></tr> </table>	Bkdg	43	1	5	3	Vehicle	1	226	1	2	Person	3	2	126	5	Other	5	0	3	32	Accuracy: 93.231% (incorrect=31, total=458)				
Bkdg	43	1	5	3																													
Vehicle	1	226	1	2																													
Person	3	2	126	5																													
Other	5	0	3	32																													
Accuracy: 93.231% (incorrect=31, total=458)																																	
	9000	11000	0.005	0.0001			93.23%																										
63					0.9	0.9		<table border="1"> <tr><td>Bkdg</td><td>56</td><td>5</td><td>2</td><td>5</td></tr> <tr><td>Vehicle</td><td>3</td><td>191</td><td>3</td><td>6</td></tr> <tr><td>Person</td><td>3</td><td>1</td><td>135</td><td>11</td></tr> <tr><td>Other</td><td>1</td><td>3</td><td>4</td><td>29</td></tr> <tr><td colspan="5">Accuracy: 89.738% (incorrect=47, total=458)</td></tr> </table>	Bkdg	56	5	2	5	Vehicle	3	191	3	6	Person	3	1	135	11	Other	1	3	4	29	Accuracy: 89.738% (incorrect=47, total=458)				
Bkdg	56	5	2	5																													
Vehicle	3	191	3	6																													
Person	3	1	135	11																													
Other	1	3	4	29																													
Accuracy: 89.738% (incorrect=47, total=458)																																	
	9000	11000	0.005	0.0001			89.74%																										
1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix																									
64					0.9	0.9		<table border="1"> <tr><td>Bkdg</td><td>58</td><td>1</td><td>3</td><td>4</td></tr> <tr><td>Vehicle</td><td>3</td><td>219</td><td>3</td><td>4</td></tr> <tr><td>Person</td><td>3</td><td>2</td><td>111</td><td>10</td></tr> <tr><td>Other</td><td>4</td><td>1</td><td>6</td><td>26</td></tr> <tr><td colspan="5">Accuracy: 90.393% (incorrect=44, total=458)</td></tr> </table>	Bkdg	58	1	3	4	Vehicle	3	219	3	4	Person	3	2	111	10	Other	4	1	6	26	Accuracy: 90.393% (incorrect=44, total=458)				
Bkdg	58	1	3	4																													
Vehicle	3	219	3	4																													
Person	3	2	111	10																													
Other	4	1	6	26																													
Accuracy: 90.393% (incorrect=44, total=458)																																	
	9000	11000	0.005	0.0001			90.94%																										
65					0.9	0.9		<table border="1"> <tr><td>Bkdg</td><td>45</td><td>6</td><td>4</td><td>6</td></tr> <tr><td>Vehicle</td><td>3</td><td>211</td><td>4</td><td>4</td></tr> <tr><td>Person</td><td>4</td><td>0</td><td>121</td><td>7</td></tr> <tr><td>Other</td><td>4</td><td>1</td><td>2</td><td>36</td></tr> <tr><td colspan="5">Accuracy: 90.175% (incorrect=45, total=458)</td></tr> </table>	Bkdg	45	6	4	6	Vehicle	3	211	4	4	Person	4	0	121	7	Other	4	1	2	36	Accuracy: 90.175% (incorrect=45, total=458)				
Bkdg	45	6	4	6																													
Vehicle	3	211	4	4																													
Person	4	0	121	7																													
Other	4	1	2	36																													
Accuracy: 90.175% (incorrect=45, total=458)																																	
	9000	11000	0.005	0.0001			90.18%																										
66					0.9	0.9		<table border="1"> <tr><td>Bkdg</td><td>62</td><td>1</td><td>0</td><td>3</td></tr> <tr><td>Vehicle</td><td>1</td><td>214</td><td>4</td><td>3</td></tr> <tr><td>Person</td><td>1</td><td>2</td><td>117</td><td>5</td></tr> <tr><td>Other</td><td>2</td><td>1</td><td>8</td><td>34</td></tr> <tr><td colspan="5">Accuracy: 93.231% (incorrect=31, total=458)</td></tr> </table>	Bkdg	62	1	0	3	Vehicle	1	214	4	3	Person	1	2	117	5	Other	2	1	8	34	Accuracy: 93.231% (incorrect=31, total=458)				
Bkdg	62	1	0	3																													
Vehicle	1	214	4	3																													
Person	1	2	117	5																													
Other	2	1	8	34																													
Accuracy: 93.231% (incorrect=31, total=458)																																	
	9000	11000	0.005	0.0001			93.23%																										
67					0.9	0.9		<table border="1"> <tr><td>Bkdg</td><td>53</td><td>3</td><td>5</td><td>2</td></tr> <tr><td>Vehicle</td><td>0</td><td>206</td><td>3</td><td>2</td></tr> <tr><td>Person</td><td>1</td><td>2</td><td>138</td><td>5</td></tr> <tr><td>Other</td><td>2</td><td>3</td><td>4</td><td>29</td></tr> <tr><td colspan="5">Accuracy: 93.013% (incorrect=32, total=458)</td></tr> </table>	Bkdg	53	3	5	2	Vehicle	0	206	3	2	Person	1	2	138	5	Other	2	3	4	29	Accuracy: 93.013% (incorrect=32, total=458)				
Bkdg	53	3	5	2																													
Vehicle	0	206	3	2																													
Person	1	2	138	5																													
Other	2	3	4	29																													
Accuracy: 93.013% (incorrect=32, total=458)																																	
	9000	11000	0.005	0.0001			93.01%																										

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix													
68	9000	11000	0.005	0.0001	0.9	0.9	91.70%	Bkgd	55	1	1	4									
								Vehicle	1	220	2	0									
69	9000	11000	0.005	0.0001	0.9	0.9	90.18%	Person	5	4	125	9									
								Other	2	4	5	20									
Accuracy: 91.70% (incorrect=38, total=458)																					
70	9000	11000	0.005	0.0001	0.9	0.9	89.74%	Bkgd	41	2	3	7									
								Vehicle	2	207	0	8									
71	9000	11000	0.005	0.0001	0.9	0.9	90.39%	Person	3	5	135	9									
								Other	3	0	3	30									
Accuracy: 90.175% (incorrect=45, total=458)																					
72	8500	10500	0.004	0.0001	0.9	0.9	89.74%	Bkgd	61	6	3	4									
								Vehicle	2	197	6	10									
73	8500	10500	0.004	0.0001	0.9	0.9	91.27%	Person	1	0	121	32									
								Other	5	2	5	32									
Accuracy: 89.738% (incorrect=47, total=458)																					
74	8500	10500	0.004	0.0001	0.9	0.9	90.61%	Bkgd	56	3	3	5									
								Vehicle	2	200	2	5									
75	8500	10500	0.004	0.0001	0.9	0.9	92.36%	Person	1	4	120	6									
								Other	3	2	4	32									
Accuracy: 91.266% (incorrect=40, total=458)																					
76	8500	10500	0.004	0.0001	0.9	0.9	90.61%	Bkgd	52	2	4	3									
								Vehicle	3	208	3	5									
77	8500	10500	0.004	0.0001	0.9	0.9	93.23%	Person	4	1	127	2									
								Other	4	1	4	35									
Accuracy: 90.611% (incorrect=43, total=458)																					
78	8500	10500	0.004	0.0001	0.9	0.9	90.39%	Bkgd	52	0	2	5									
								Vehicle	3	204	2	6									
79	8500	10500	0.004	0.0001	0.9	0.9	91.92%	Person	1	1	141	10									
								Other	4	2	3	19									
Accuracy: 90.393% (incorrect=44, total=458)																					
Accuracy: 91.921% (incorrect=37, total=458)																					

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix
80				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    52                    1                    5                    4 Person                    3                    216                    3                    4 Other                    1                    2                    122                    5 Accuracy: 91.26% (incorrect=40, total=458)
	8500	10500	0.004	0.0001			91.27%	Bkgd                    Vehicle                    Person                    Other Vehicle                    58                    3                    2                    1 Person                    3                    218                    3                    3 Other                    2                    1                    124                    5 Accuracy: 93.88% (incorrect=28, total=458)
81				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    63                    1                    2                    3 Person                    3                    182                    1                    3 Other                    4                    2                    142                    12 Accuracy: 91.703% (incorrect=38, total=458)
	8500	10500	0.004	0.00015			91.703%	Bkgd                    Vehicle                    Person                    Other Vehicle                    56                    2                    2                    5 Person                    1                    221                    1                    4 Other                    1                    1                    124                    7 Accuracy: 91.921% (incorrect=37, total=458)
82				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    65                    1                    0                    2 Person                    1                    210                    4                    7 Other                    1                    3                    129                    6 Accuracy: 93.231% (incorrect=31, total=458)
	8500	10500	0.004	0.00015			91.921%	Bkgd                    Vehicle                    Person                    Other Vehicle                    42                    5                    5                    4 Person                    3                    192                    1                    0 Other                    2                    0                    144                    9 Accuracy: 90.830% (incorrect=42, total=458)
83				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    51                    1                    3                    2 Person                    1                    215                    3                    2 Other                    1                    2                    131                    5 Accuracy: 93.231% (incorrect=31, total=458)
	8500	10500	0.004	0.00015			93.231%	Bkgd                    Vehicle                    Person                    Other Vehicle                    51                    1                    3                    2 Person                    1                    215                    3                    2 Other                    1                    2                    131                    5 Accuracy: 93.231% (incorrect=31, total=458)
84				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    48                    0                    5                    4 Person                    1                    228                    0                    6 Other                    1                    1                    129                    1 Accuracy: 92.795% (incorrect=33, total=458)
	8500	10500	0.004	0.00015			90.830%	Bkgd                    Vehicle                    Person                    Other Vehicle                    53                    0                    3                    2 Person                    3                    208                    0                    2 Other                    1                    4                    128                    5 Accuracy: 92.795% (incorrect=33, total=458)
85				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    53                    0                    3                    2 Person                    3                    208                    0                    2 Other                    1                    4                    128                    5 Accuracy: 92.795% (incorrect=33, total=458)
	8500	10500	0.004	0.00015			92.795%	Bkgd                    Vehicle                    Person                    Other Vehicle                    48                    0                    5                    4 Person                    1                    228                    0                    8 Other                    2                    2                    125                    4 Accuracy: 92.795% (incorrect=33, total=458)
86				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    53                    0                    3                    2 Person                    3                    208                    0                    2 Other                    1                    4                    128                    5 Accuracy: 92.795% (incorrect=33, total=458)
	8500	10500	0.004	0.00015			89.738%	Bkgd                    Vehicle                    Person                    Other Vehicle                    53                    0                    3                    2 Person                    3                    208                    0                    2 Other                    1                    4                    128                    5 Accuracy: 92.795% (incorrect=33, total=458)

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix
87				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    51                    1                    3                    2 Person                    1                    215                    3                    2 Other                    3                    0                    131                    5 Accuracy: 93.231% (incorrect=31, total=458)
	8500	10500	0.004	0.00015			93.231%	Bkgd                    Vehicle                    Person                    Other Vehicle                    60                    3                    2                    4 Person                    4                    209                    4                    2 Other                    3                    2                    129                    6 Accuracy: 91.703% (incorrect=38, total=458)
88				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    48                    0                    5                    4 Person                    1                    228                    0                    8 Other                    2                    2                    125                    4 Accuracy: 92.795% (incorrect=33, total=458)
	8500	10500	0.004	0.00015			91.703%	Bkgd                    Vehicle                    Person                    Other Vehicle                    53                    0                    3                    2 Person                    3                    208                    0                    2 Other                    1                    4                    128                    5 Accuracy: 92.795% (incorrect=33, total=458)
89				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    48                    0                    5                    4 Person                    1                    228                    0                    8 Other                    2                    2                    125                    4 Accuracy: 92.795% (incorrect=33, total=458)
	8500	10500	0.004	0.00015			92.795%	Bkgd                    Vehicle                    Person                    Other Vehicle                    53                    0                    3                    2 Person                    3                    208                    0                    2 Other                    1                    4                    128                    5 Accuracy: 92.795% (incorrect=33, total=458)
90				0.9	0.9			Bkgd                    Vehicle                    Person                    Other Vehicle                    53                    0                    3                    2 Person                    3                    208                    0                    2 Other                    1                    4                    128                    5 Accuracy: 92.795% (incorrect=33, total=458)
	8500	10500	0.004	0.00015			92.795%	Bkgd                    Vehicle                    Person                    Other Vehicle                    53                    0                    3                    2 Person                    3                    208                    0                    2 Other                    1                    4                    128                    5 Accuracy: 92.795% (incorrect=33, total=458)

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix				
91	8500	10500	0.004	0.00015	0.9	0.9	90.393%	Bkgd	48	4	6	5
								Vehicle	0	187	1	3
92	8500	10500	0.004	0.00015	0.9	0.9	93.013%	Bkgd	54	5	2	3
								Vehicle	1	216	1	2
93	8500	10500	0.004	0.00015	0.9	0.9	90.830%	Bkgd	54	2	1	8
								Vehicle	1	285	1	6
94	8500	10500	0.004	0.00015	0.9	0.9	90.175%	Bkgd	54	3	2	4
								Vehicle	1	198	3	4
95	8500	10500	0.004	0.00015	0.9	0.9	92.358%	Bkgd	47	2	3	4
								Vehicle	2	281	4	6
96	8500	10500	0.004	0.00015	0.9	0.9	89.738%	Bkgd	56	2	1	3
								Vehicle	4	191	0	5
97	8500	10500	0.004	0.00015	0.9	0.9	90.393%	Bkgd	41	0	5	3
								Vehicle	6	219	3	2

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix				
98	8500	10500	0.004	0.00015	0.9	0.9	91.485%	Bkgd	58	1	3	3
								Vehicle	4	201	3	7
99	8500	10500	0.004	0.00015	0.9	0.9	92.795%	Bkgd	62	0	1	5
								Vehicle	4	203	1	2
100	8500	10500	0.004	0.00015	0.9	0.9	91.703%	Bkgd	60	3	5	5
								Vehicle	2	203	1	7
101	8500	10500	0.004	0.00015	0.9	0.9	93.886%	Bkgd	61	2	3	1
								Vehicle	1	220	3	4

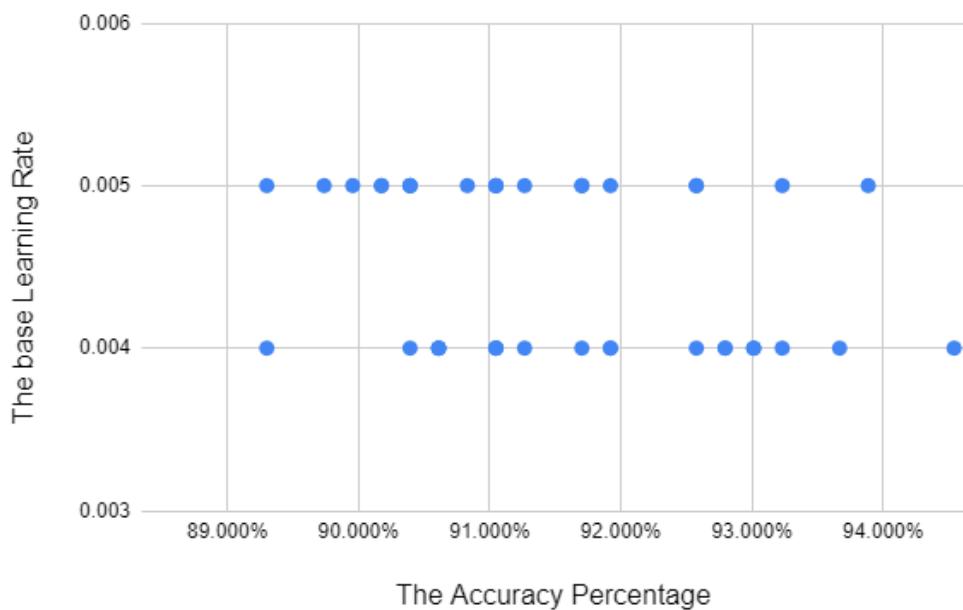
1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix					
102	8500	10500	0.005	0.00015	0.9	0.9	93.886%	Bkgd	56	3	Person	1	4
								Vehicle	3	228		4	2
103	8500	10500	0.005	0.00015	0.9	0.9	93.668%	Bkgd	59	3	Person	3	5
								Vehicle	3	210		3	3
104	8500	10500	0.005	0.00015	0.9	0.9	89.520%	Bkgd	49	1	Person	6	3
								Vehicle	1	209		5	3
105	8500	10500	0.005	0.00015	0.9	0.9	93.668%	Bkgd	55	1	Person	2	1
								Vehicle	3	206		1	2
106	8500	10500	0.005	0.00015	0.9	0.9	90.611%	Bkgd	52	1	Person	3	4
								Vehicle	1	219		4	4
107	8500	10500	0.005	0.00015	0.9	0.9	93.668%	Bkgd	50	1	Person	1	3
								Vehicle	1	213		2	2
108	8500	10500	0.005	0.00015	0.9	0.9	93.450%	Bkgd	53	3	Person	3	6
								Vehicle	2	223		7	1

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix					
109	8500	10500	0.005	0.00015	0.9	0.9	89.956%	Bkgd	56	6	Person	3	4
								Vehicle	4	190		1	3
110	8500	10500	0.005	0.00015	0.9	0.9	93.886%	Bkgd	48	1	Person	5	3
								Vehicle	2	223		4	5
111	8500	10500	0.005	0.00015	0.9	0.9	91.703%	Bkgd	55	1	Person	3	4
								Vehicle	1	203		5	7
112	8500	10500	0.005	0.00015	0.9	0.9	90.830%	Bkgd	50	1	Person	4	4
								Vehicle	4	199		5	9

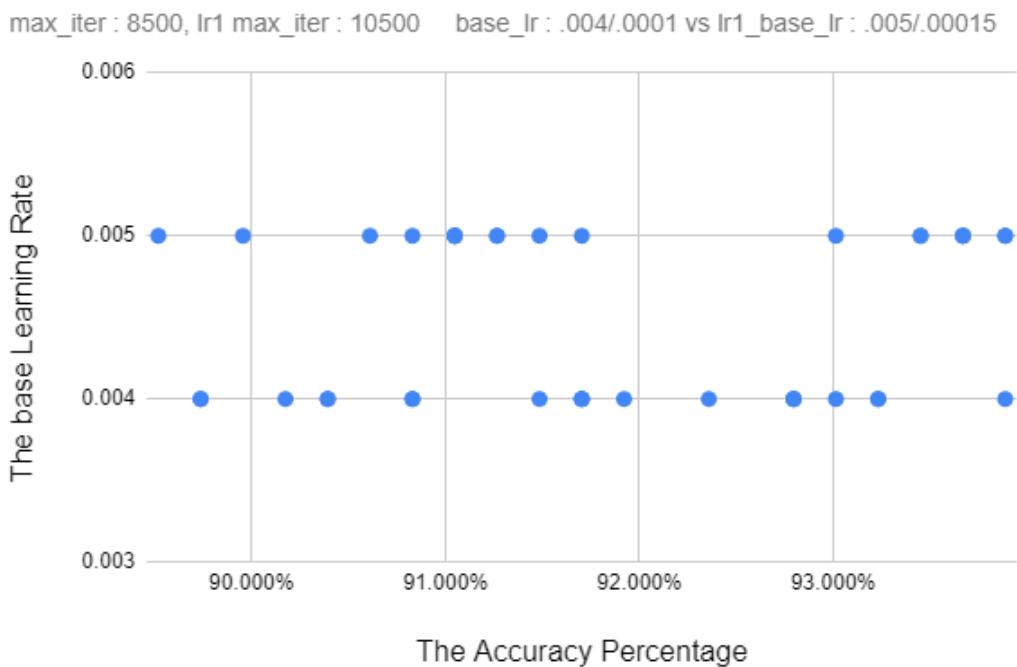
1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix				
113	8500	10500	0.005	0.00015	0.9	0.9	91.048%	Bkgd	56	0	6	4
								Vehicle	3	200	2	3
114	8500	10500	0.005	0.00015	0.9	0.9	91.048%	Person	3	3	134	6
								Other	6	1	4	27
115	8500	10500	0.005	0.00015	0.9	0.9	91.485%	Bkgd	45	3	1	1
								Vehicle	2	220	6	2
116	8500	10500	0.005	0.00015	0.9	0.9	91.266%	Person	4	0	125	8
								Other	7	0	7	27
117	8500	10500	0.005	0.00015	0.9	0.9	93.013%	Bkgd	53	4	3	5
								Vehicle	1	206	0	3
118	8500	10500	0.005	0.00015	0.9	0.9	91.048%	Person	1	3	135	7
								Other	2	3	7	25
119	8500	10500	0.005	0.00015	0.9	0.9	91.266%	Bkgd	47	2	3	3
								Vehicle	3	213	1	5
120	8500	10500	0.005	0.00015	0.9	0.9	91.048%	Person	2	124	4	5
								Other	5	5	5	20
121	8500	10500	0.005	0.00015	0.9	0.9	93.450%	Bkgd	61	3	4	5
								Vehicle	3	212	2	4
122	8500	10500	0.005	0.00015	0.9	0.9	93.450%	Person	3	112	7	7
								Other	5	114	5	31

1	q_s	q_s_lr1	q_s_base	q_s_lr1	q_s	q_s_lr1	Accy	matrix				
120	8500	10500	0.005	0.00015	0.9	0.9	91.048%	Bkgd	67	1	4	2
								Vehicle	4	215	3	4
121	8500	10500	0.005	0.00015	0.9	0.9	93.450%	Person	4	2	125	4
								Other	4	1	2	27

max\_iter : 9k, lr1 max\_iter : 11k base\_lr : .004/.0001 vs lr1\_base\_lr : .005/.00015



Learning rate Max iteration : 8500 , Learning rate 1 Max iteration : 10500 (Below)



**Observations:** The max average from the tests ran was 91.97%, having max iterations of 8500-11000 with the learning rate of .005 and 0.00015.

q_s max_itr	q_s_lr1 max_itr	q_s base	q_s_lr1 base_lr	Average
9000	11000	0.004	0.0001	91.86%
9000	11000	0.005	0.00015	91.17%
9000	11000	0.004	0.00015	90.90%
9000	11000	0.0036	0.00015	91.03%
9000	11000	0.005	0.0001	91.23%
8500	10500	0.004	0.0001	91.53%
8500	10500	0.004	0.00015	91.74%
8500	10500	0.005	0.00015	91.97%

Figure: Average accuracy for tests

### 3-class vs 4-class

During the early stage of the development process, we assumed there wouldn't be much difference between a 3-class classifier and a 4-class one, but after receiving the in-the-wild result, we tried everything we could do and comparing the 3-class model is one of them. To define the 3-class model, we simply remove the "other" category. By doing this, previous misclassifications caused by "other" having the highest confidence on top of the correct class as the second next to "other" are eliminated, and therefore, it improves the overall in-the-wild accuracy by 9-12%. Below is the confusion matrix of an improved 3-class classifier.

```
classifier_params_9028.cls:
Pred\Act [ 0 ][ 3 ][ 4 ][ 100 ]
[ 0 ] 110 28 24 39
[ 3 ] 16 28 8 40
[ 4 ] 43 63 50 44
[ 100 ] 75 27 18 128
Accuracy: 42.645% (incorrect=425, total=741)
```

Above is before the modification, and below is after the modification.

	Bkgd	Vehicle	Person
Bkgd	178	30	21
Vehicle	32	78	15
Person	34	38	64
Accuracy:	65.306%	(incorrect=170, total=490)	

About 5 percent of the improvements involved in the above matrix is based on augmentations of a hand-picked selection of images that are highly targeted towards the images in the testset. It was also trained with low-epoch settings since we speculated the original epoch count is overtraining the model due to the small dataset size. Experiments confirmed that the epoch count change contributed about 4-6% of the overall improvement, however, as a larger dataset is needed, the epoch count should be increased back to the original setting.

## Size of the Dataset

Our dataset originally had 2200 images. After adjusting epochs, learning rates for both phases, and momentum, the highest accuracy was still below 90%. We then increased the dataset to 2920 images and got accuracies of 90.28%, 91.67%, and 92.36%. This was tested on “in the wild” images. The results of those tests were disappointing.

```
classifier_params_9028.cls:  
Pred\Act [ 0][ 3][ 4][ 100]  
[ 0] 110 28 24 39  
[ 3] 16 28 8 40  
[ 4] 43 63 50 44  
[ 100] 75 27 18 128  
Accuracy: 42.645% (incorrect=425, total=741)  
  
classifier_params_9167.cls:  
Pred\Act [ 0][ 3][ 4][ 100]  
[ 0] 133 34 25 48  
[ 3] 23 46 5 32  
[ 4] 30 36 44 39  
[ 100] 58 30 26 132  
Accuracy: 47.908% (incorrect=386, total=741)  
  
classifier_params_9236.cls:  
Pred\Act [ 0][ 3][ 4][ 100]  
[ 0] 118 41 20 44  
[ 3] 22 33 5 38  
[ 4] 37 20 54 35  
[ 100] 67 52 21 134  
Accuracy: 45.749% (incorrect=402, total=741)
```

Figure: Results of “in the wild” tests on our classifier trained on 2920 images

We then added about 1654 new images and 4,574 augmented images to the dataset, raising the total number of images to 9,148. Testing on our test data we had improved accuracies of 94.54%, 93.89%, and 93.89%. Unfortunately, this still did not do well with “in the wild” testing, with a significant percentage of vehicle images misclassified as people.

```

classifier_params_9454.cls:
Pred\Act [ 0][ 3][ 4][ 100]
[ 0] 107 27 33 24
[ 3] 24 38 6 26
[ 4] 46 60 42 68
[ 100] 67 21 19 133
Accuracy: 43.185% (incorrect=421, total=741)

classifier_params_9389.cls:
Pred\Act [ 0][ 3][ 4][ 100]
[ 0] 110 9 13 25
[ 3] 30 43 13 34
[ 4] 41 54 55 59
[ 100] 63 40 19 133
Accuracy: 46.019% (incorrect=400, total=741)

classifier_params_9389_2.cls:
Pred\Act [ 0][ 3][ 4][ 100]
[ 0] 103 16 41 27
[ 3] 25 46 14 25
[ 4] 43 63 21 58
[ 100] 73 21 24 141
Accuracy: 41.970% (incorrect=430, total=741)

```

Figure: Results of “in the wild” tests on our classifier trained on 9,148 images.

After increasing the vehicle class with more aerial images and vehicles on unpaved roads like “in the wild” vehicle images, a lower percentage of vehicles were misclassified as people. The “in the wild” test overall accuracy improved by a percentage. Our final dataset consists of 5091 unique images.

	Bkgd	Vehicle	Person	Other	
Bkgd	140	23	33	46	
Vehicle	15	42	5	13	
Person	40	49	38	49	
Other	49	32	24	143	
Accuracy:	48.988%	(incorrect=378, total=741)			

Figure: Result of final “in the wild” test on our classifier trained on 9487 images.

So overall accuracy improves with more data. Therefore, in order to reach 99% both on the dataset test data and “in the wild” test data, a much larger dataset is required.

## Differences in Datasets

There were a few differences in patterns throughout the test dataset and our dataset that we’ve created. A lot of these discrepancies revolve around images of cars. Throughout the test dataset there are a large portion of car images with the background being a dirt road. Whereas our dataset has almost all of the car images being taken on paved roads. The differences in backgrounds may also be as a result of more tightly cropped images in our dataset, while the test dataset had images from a further view. Our dataset being more tightly cropped also means

that many images do not have the full figures, but only half or the majority of the figure. Where the classifier's images are cropped to contain the full image.

## Tools and Scripts

### JPEGCrops

As per the requirement to gather images of cars and humans to help us train the classifier, we needed to find the dataset which consists of a lot of images of cars and humans. We started by looking for street view pictures with many cars driving by and humans walking by and we needed to crop each car and human specifically for this we used JPEGCrops. JPEGCrops is one of the tools we used for our process to extract images of objects from video footage and the image was JPEGCrops. This cropping tool made the cropping objects of cars and humans easy for us as we could add multiple pictures to it and frame the object and click the crop button which was then saved into a separate folder.

Link to : JPEGCrops (<http://ekot.dk/programmer/JPEGCrops/download.html>),

### Converter.py (Image formatting script)

There was a specific rule on how our dataset should be like. Rules included all the cropped images should be 32x32 pixels size, black and white color scheme, and .png extension file. To achieve this, two of our team members Zhe and Tim developed a python script, converter.py, that took the cropped images and formatted them into the required dataset with 32x32 pixels, black and white, and .png format which was then saved into an output folder.

```
C:\Users\sanad\Desktop\peep>py converter.py sanad 0
Processing Images... 21 images converted.
```

```
C:\Users\sanad\Desktop\peep>
```

Fig:- Running Converter.py

To run this first move script into the folder containing the images. Then change directory into the directory you put the script into and call “py converter.py [name] [number]” in the command line. Where name is your first name and number is the number you want to start the numbering at. After entering this command an output directory will be created by the script and the formatted images will be saved there. We did the naming of images to prevent naming conflicts when we combine everyone's images, and to distinguish who extracted the images and how many images to see the contribution made by each team member to the dataset.

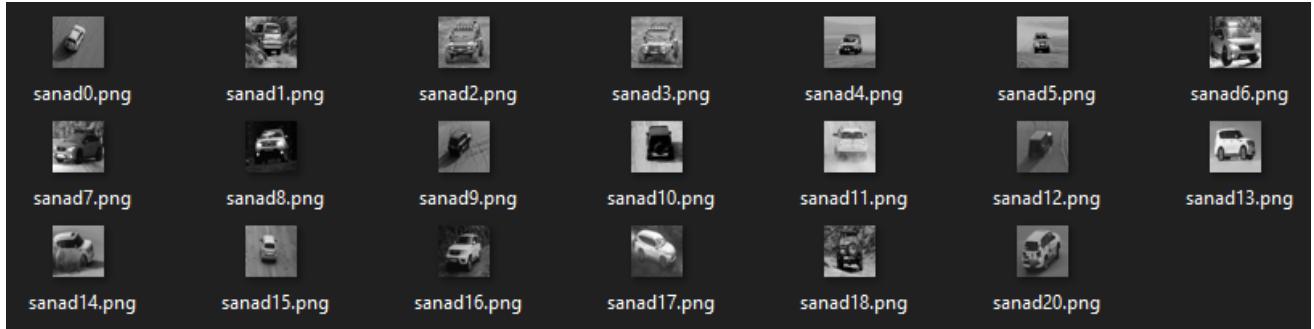


Figure: - Pictures in required format after using converter.py script.

## Test Automation Script (run.py file)

For this project we had to run countless tests in order to tune the classifier. These tests took anywhere from 45 minutes to an hour and half depending on the dataset size and the max iteration variables if you didn't have a Nvidia GPU. This was already taking us a great amount of time to test, luckily 3 of us had an Nvidia GPU which took 5 to 10 minutes to test the same dataset. This reduction of time change was drastic and made the testing phase faster.

On top of that we also had to manually change the settings on multiple files like quick\_solver and quick\_solver\_lr1 and then run `python create_trained_model.py` before actually running the test on dataset using `python sl_test_model.py .output/testWIn.txt --image_root=Dataset`. This was a tedious process for us so our team's scripters Zhe and

```
image_root = "Dataset"

# quick_solver settings - first phase
max_iter = 7000
base_lr = 0.004
momentum = 0.9
weight_decay = 0.004

random_seed = 34
lr_policy = "fixed"

# quick_solver_lr1 settings - second phase
lrl_max_iter = 10500
lrl_base_lr = 0.00015
lrl_momentum = 0.9
lrl_weight_decay = 0.004

lrl_random_seed = 34
lrl_lr_policy = "fixed"
```

Figure:- run.py file to change all the settings on a single file.

Tim and Zhe decided to make a run.py file that would help automate this part of the testing process and enable us to change the settings on a single file. All we had to do was change the settings and run this file and the training and testing was handled by the script. It creates an output file that contains the settings used and the test results. The .output folder is renamed as well to prevent losing them when moving onto the next test. The script allows for the flexibility to

create very intricate test sets.

```
(py35) C:\SightLine Applications\SLA-Classifier-Tools 3.04.02\ClassifierTraining>python run.py
run.py:176: SyntaxWarning: name 'max_iter' is assigned to before global declaration
    global max_iter
run.py:177: SyntaxWarning: name 'base_lr' is assigned to before global declaration
    global base_lr
run.py:178: SyntaxWarning: name 'momentum' is assigned to before global declaration
    global momentum
run.py:179: SyntaxWarning: name 'lr1_max_iter' is assigned to before global declaration
    global lr1_max_iter
run.py:180: SyntaxWarning: name 'lr1_base_lr' is assigned to before global declaration
    global lr1_base_lr
run.py:181: SyntaxWarning: name 'lr1_momentum' is assigned to before global declaration
    global lr1_momentum
run.py:182: SyntaxWarning: name 'weight_decay' is assigned to before global declaration
    global weight_decay
run.py:183: SyntaxWarning: name 'lr1_weight_decay' is assigned to before global declaration
    global lr1_weight_decay
./: python create_trained_model.py
Executing create_training_set...
Executing create_sl_lmdb...
Creating train lmdb...
Directory doesn't exist: .output_1639018826/sl_train_lmdb
.output_1639018826/: set GLOG_logtostderr=1 & "C:\SightLine Applications\SLA-Classifier-Tools 3.04.02\ClassifierTraining\Dataset/" trainWin.txt sl_train_lmdb
I1208 19:00:28.216715 12928 convert_imageset.cpp:89] A total of 7318 images.
I1208 19:00:28.226689 12928 db_lmdb.cpp:40] Opened lmdb sl_train_lmdb
libpng warning: iCCP: profile 'ICC Profile': 'RGB ': RGB color space not permitted on grayscale PNG
libpng warning: iCCP: profile 'ICC Profile': 'RGB ': RGB color space not permitted on grayscale PNG
libpng warning: iCCP: profile 'ICC Profile': 'RGB ': RGB color space not permitted on grayscale PNG
```

Figure:- Running the run.py after changing the settings.

## Further Improvements

In order to further increase the accuracy of our classifier, we must address the cases where it was performing poorly “in the wild” datasets, or images that it had never encountered before. Post our initial testing, we discovered that a large portion of the misclassifications were of the “other” category, largely due to the fact that it was such a generalized class, containing any moving objects such as pets, planes, boats, birds, etc. In order to train a classifier to generalize upon all of these types of objects, we require a much larger and more representative dataset to feed it. A specific case that it was failing on was lack of varied terrain under vehicles, e.g. dirt or snow as compared to our dataset mainly being on asphalt roads. This is an example of variation that we would need to address.

In addition to increasing the number of images in the “background” and “other” classes, we also noticed that our dataset consisted mainly of vehicles such as cars or suburban SUVs; this would cause a decrease the generalizability of offroad vehicles, minivans, trailers, trucks, buses, etc. In order to mitigate this, we would need to expand our dataset by a significant amount to contain these types of vehicles. There is also the case that most of our dataset consisted of “traffic cam” or aerial drone angle footage, which was all we could find as royalty-free car images online. A small portion of our dataset was created through our own dashcam footage of street-level views, however this was not enough to train the classifier effectively, and it consisted mostly of rear views of cars in front or oblique views of cars approaching from the oncoming lane, so it wasn’t as varied as would be required for a high-accuracy classifier.

In conclusion, the main improvement we can make to the classifier is to increase the cardinality of the Dataset for every class involved. This ensures a large enough set of images for the classifier to recognize the key, differentiating attributes of each class. However, this proved to be a challenging undertaking for us, as we could not use any royalty-incurring datasets from the internet, and also had to ensure that data freely available on the internet could be used for purposes with monetary gain involved. Given more time and access to more resources in a professional setting, we can train the classifier to exhibit a significant increase in accuracy.

## Resources

Many images were sourced from videos we took ourselves and are not included in the resource section. Here are the image sources for the dataset we didn't take ourselves.

<https://www.kaggle.com/psvishnu/pennfudan-database-for-pedestrian-detection-zip>

<https://www.kaggle.com/aryashah2k/ucsd-pedestrian-database>

<https://www.kaggle.com/dasmehdixtr/uavid-v1>

<https://detrac-db.rit.albany.edu/download>

<https://www.kaggle.com/swaroopkml/cifar10-pngs-in-folders>

<https://www.kaggle.com/insaneshadowzaman/highway-cctv-footage-images>

<https://www.kaggle.com/clorichel/boat-types-recognition/version/1>

<https://www.kaggle.com/abtabm/multiclassimagedatasetairplanecar>

<https://www.kaggle.com/adityamahimkar/image-classify-data>

<https://www.kaggle.com/tyslonpo/bike-ads-images-prices-specifications?select=images>

<https://www.kaggle.com/flo2607/traffic-signs-classification>

<https://www.kaggle.com/tongpython/cat-and-dog>

<https://www.kaggle.com/andrewmvd/car-plate-detection>

<https://www.kaggle.com/senemanu/stanfordcarsfcs>

<https://www.kaggle.com/ajaykgp12/cars-wagonr-swift>

<https://www.pexels.com/video/birds-eye-view-of-a-multi-lane-highway-3150502/>

<https://www.pexels.com/video/drone-footage-of-crossroad-in-the-city-while-vehicles-driving-8063640/>

<https://www.pexels.com/video/people-crowding-the-beach-6966977/>

<https://www.pexels.com/video/the-downtown-area-of-buenos-aires-argentina-4762116/>

<https://ieee-dataport.org/open-access/cd-lp-compressed-domain-license-plate-detection-database#files>

<https://www.pexels.com/video/drone-footage-of-a-road-system-9700456/>

<https://www.pexels.com/video/cars-on-a-busy-highway-4877060/>

<https://www.pexels.com/video/drone-footage-of-a-building-9041648/>

<https://www.pexels.com/video/people-in-a-park-3105196/>

<https://www.pexels.com/photo/cars-parked-beside-mountains-724948/>

<https://www.pexels.com/photo/traffic-on-modern-city-street-near-contemporary-buildings-5834955/>

<https://www.pexels.com/photo/vehicles-on-side-of-road-3046252/>  
<https://www.pexels.com/photo/timelapse-photography-of-vehicles-on-road-3043592/>  
<https://www.pexels.com/photo/black-and-white-photograph-of-people-walking-at-the-subway-1795985/>  
<https://www.pexels.com/video/black-and-white-video-of-people-853889/>  
<https://www.pexels.com/photo/black-and-white-photograph-of-people-walking-at-the-subway-1795985/>  
<https://www.pexels.com/video/video-of-flow-of-traffic-in-the-city-during-daytime-2054085/>  
<https://www.pexels.com/video/united-kingdom-city-of-london-road-traffic-time-lapse-video-10060022/>

<https://www.pexels.com/photo/car-on-a-dessert-4318822/>  
<https://www.pexels.com/photo/two-vehicles-on-desert-dunes-909654/>  
<https://www.pexels.com/photo/white-vehicles-on-desert-2182449/>  
<https://www.pexels.com/photo/a-car-on-the-road-between-conifer-trees-near-a-mountain-7893107/>  
<https://www.pexels.com/photo/white-4x4-car-on-dirt-road-in-mountains-9920226/>  
<https://www.pexels.com/photo/photo-of-white-mitsubishi-montero-sport-on-dirt-road-1213292/>  
<https://www.pexels.com/photo/photo-of-vehicles-on-dirt-road-3551225/>  
<https://www.pexels.com/photo/miniatures-of-atv-car-on-asphalt-6642328/>  
<https://www.pexels.com/photo/off-road-car-endurance-racing-8498613/>  
<https://www.pexels.com/photo/two-white-suvs-on-snow-covered-road-3568630/>  
<https://www.pexels.com/photo/photo-of-vehicle-on-dirt-road-surrounded-by-tall-trees-2477292/>  
<https://www.pexels.com/photo/photo-of-vehicle-on-dirt-road-2291071/>  
<https://www.pexels.com/photo/white-vehicle-on-dirt-road-2994306/>  
<https://www.pexels.com/video/traffic-in-the-city-main-road-5664970/>  
<https://www.pexels.com/video/man-siting-on-top-of-moving-car-8343321/>  
<https://www.pexels.com/video/drone-footage-of-cars-on-highway-8566705/>  
<https://www.pexels.com/video/drone-footage-of-a-car-in-a-desert-8826220/>  
<https://www.pexels.com/video/a-moving-car-in-a-desert-8826219/>  
<https://www.pexels.com/video/a-drone-footage-of-a-moving-car-in-a-desert-8826224/>  
<https://www.pexels.com/video/aerial-view-of-a-car-in-a-desert-8826223/>  
<https://www.pexels.com/video/drone-footage-of-a-car-in-a-desert-8826225/>  
<https://www.pexels.com/video/an-off-road-vehicle-on-a-desert-8399532/>  
<https://www.pexels.com/video/drone-footage-of-a-car-in-a-desert-8826222/>  
<https://www.pexels.com/video/a-drone-footage-of-moving-cars-on-the-beach-8700167/>  
<https://www.pexels.com/photo/car-on-a-dessert-4318822/>  
<https://www.pexels.com/photo/red-pickup-truck-parked-outside-lifeguard-station-2959588/>  
<https://www.pexels.com/photo/white-car-parked-near-roy-s-signage-2986248/>  
<https://www.pexels.com/photo/red-vintage-car-9843278/>  
<https://unsplash.com/s/photos/cars-on-sand>