

The Machine Learning Paradigm

From coding to learning...



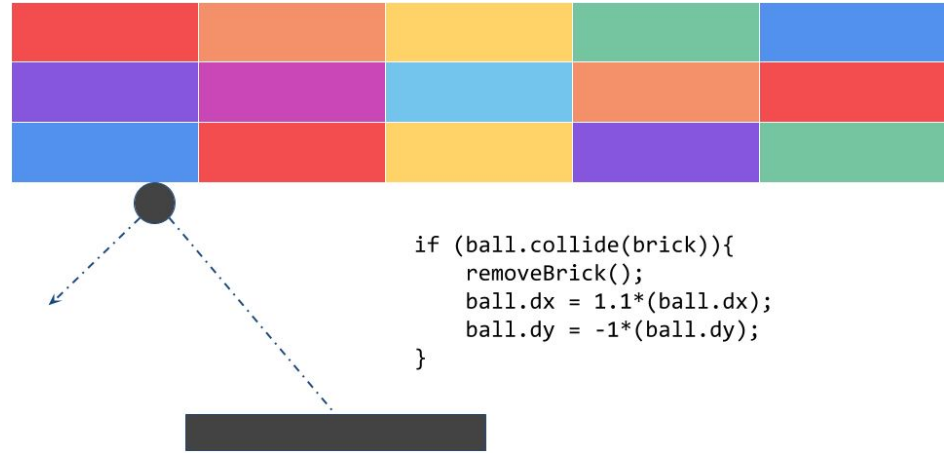
Laurence Moroney, Google

Explicit Coding

Defining rules that determine behavior of a program

Everything is pre-calculated and pre-determined by the programmer

Scenarios are limited by program complexity



The Traditional Programming Paradigm



Consider Activity Detection



```
if(speed<4){  
    status=WALKING;  
}
```



```
if(speed<4){  
    status=WALKING;  
} else {  
    status=RUNNING;  
}
```



```
if(speed<4){  
    status=WALKING;  
} else if(speed<12){  
    status=RUNNING;  
} else {  
    status=BIKING;  
}
```

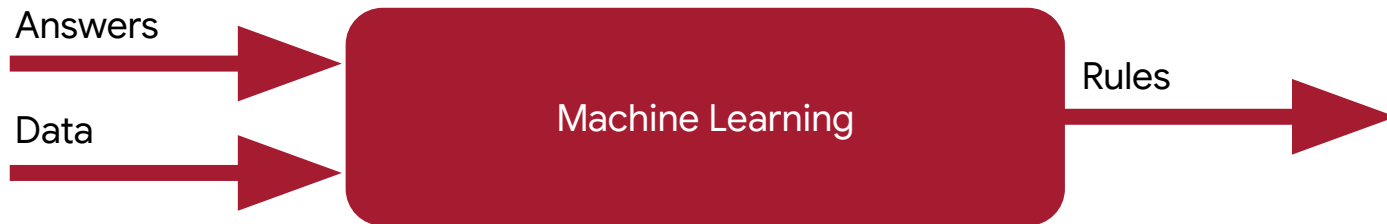


```
// ???
```

The Traditional Programming Paradigm



The Machine Learning Paradigm



Activity Detection with Machine Learning



```
0101001010100101010
1001010101001011101
0100101010010101001
0101001010100101010
```

Label = WALKING



```
1010100101001010101
0101010010010010001
0010011111010101111
1010100100111101011
```

Label = RUNNING



```
1001010011111010101
1101010111010101110
1010101111010101011
1111110001111010101
```

Label = BIKING



```
1111111111010011101
0011111010111110101
0101110101010101110
1010101010100111110
```

Label = GOLFING

The Machine Learning Paradigm



```
0101001010100101010
1001010101001011101
0100101010010101001
0101001010100101010
```

Label = WALKING



```
1010100101001010101
0101010010010010001
0010011111010101111
1010100100111101011
```

Label = RUNNING



```
1001010011111010101
1101010111010101110
1010101111010101011
1111110001111010101
```

Label = BIKING



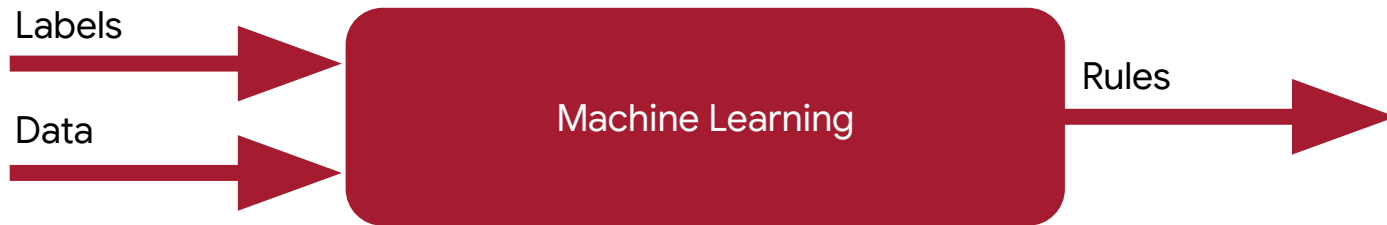
```
1111111111010011101
0011111010111110101
0101110101010101110
10101010100111110
```

Label = GOLFING

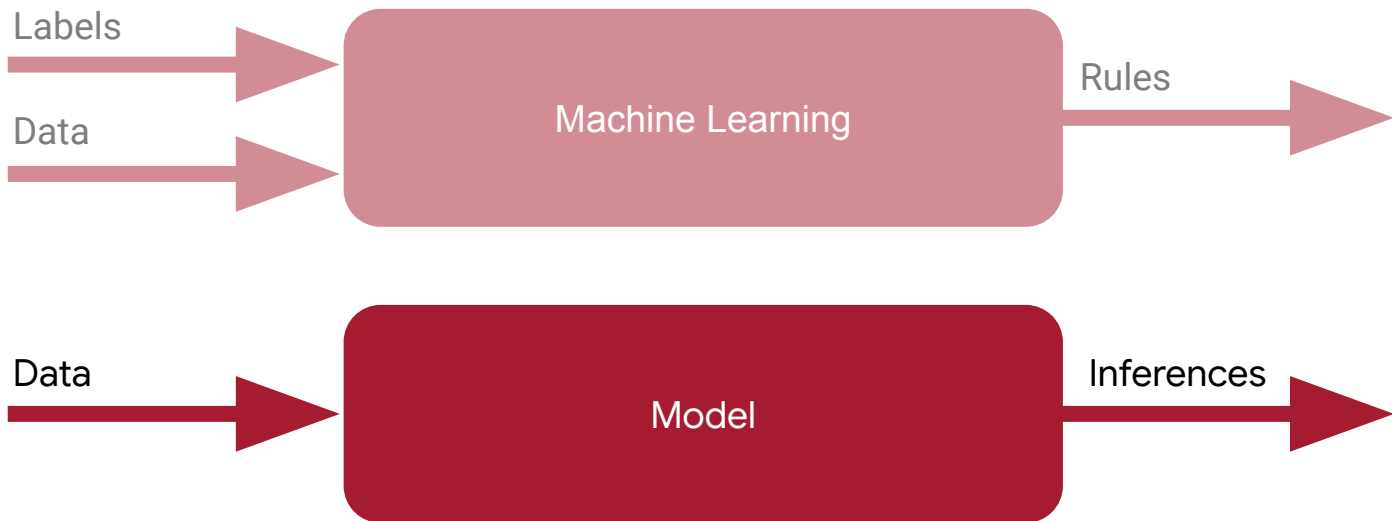
The Machine Learning Paradigm



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Your turn!