IOT Sensor Blinding

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Progress Summary

Task	Completion %	To Do
Setup/Build IoT Lab	100%	Done
Collect Data	95%	Collect doorbell data
Parse Data	100%	All Parsers are built and implemented at scale.
Create Machine learning models	60%	RF Classifier model is working but needs to be further refined.

Milestone 5

Goals for Milestone 5

- Task 1: Further Develop machine learning models
  - Use TensorFlow
  - Look at other classifier type regression models.
  - Fine tune the features.
  - Explore adding alternate features (Bidirectional data transfer statistics)
- Task 2: Continue collecting data.
  - Look at places where more data would increase model accuracy.
- Task 3: Begin using case testing
  - Create simulated tests of different iot devices and let the model try to classify them.

Developing Machine Learning Models

- Using SciKit Learn instead of TensorFlow
- Will be looking at other classifier type regression models.
- Fine tune the features.
- Adding alternate features like Bidirectional data transfer statistics.

In [564]:
```
import sklearn as sk
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import train_test_split

X = data[['Time','Length','Device_August','Device_Yale','Device_Schlage']] # Features

y=data['Full Label']  # Labels

# Split dataset into training set and test set
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3)
```

In [565]:
```
from sklearn.ensemble import RandomForestClassifier

#Create a Gaussian Classifier
clf=RandomForestClassifier(n_estimators=100)

#Train the model using the training sets y_pred=clf.predict(X_test)
clf.fit(X_train,y_train)

y_pred=clf.predict(X_test)
```

In [566]:
```
#Import scikit-learn metrics module for accuracy calculation
from sklearn import metrics
# Model Accuracy, how often is the classifier correct?
print("Accuracy:",metrics.accuracy_score(y_test, y_pred))
```

```
Accuracy: 0.71875
```

Continue Collecting Data

- Door lock data were completely collected and classified.
- The data collected include lock actions, unlock actions, and doing nothing.
- The data were parsed into csv files for machine learning.
- Camera data has been collected.

Begin Using Case Testing

- By combining captures of different locks performing different actions we can use our model and record its accuracy.

- Accuracy Stats
  - Average: 62.71%
  - High: 71.875%
  - Low: 50.0%

Student Design Poster and E-Book

- The Poster and E-Book are still being made for the new due date of April 27th.

Conference Paper

- CSET still being held August 12-14 until further notice
- Researched related works

Task Matrix for Milestone 5

	Alex	Cole	Jeremy	Steven	Todd	Left to do
Data Collection	0%	30%	0%	60%	0%	10%
Machine Learning	60%	0%	0%	0%	0%	40%
Use Case Testing	50%	0%	0%	0%	0%	50%
Conference Paper	0%	0%	20%	0%	10%	70%
E-Book and Poster	5%	0%	70%	0%	70%	(50%) (95%)

Further Work

IoT Lab Closure

- The IoT Lab has been closed due to the COVID-19 Outbreak.
- This restricts the use of the lab through VPNs only.

Milestone 6

- Task 1: Finalize model and identifying lab devices
  - Perform any final tuning to the model.
- Task 2: Write Paper and prep for Conference
  - Ready materials.
- Task 3: Student Design Showcase

Questions?