Sensor Calibration and Curve Fit

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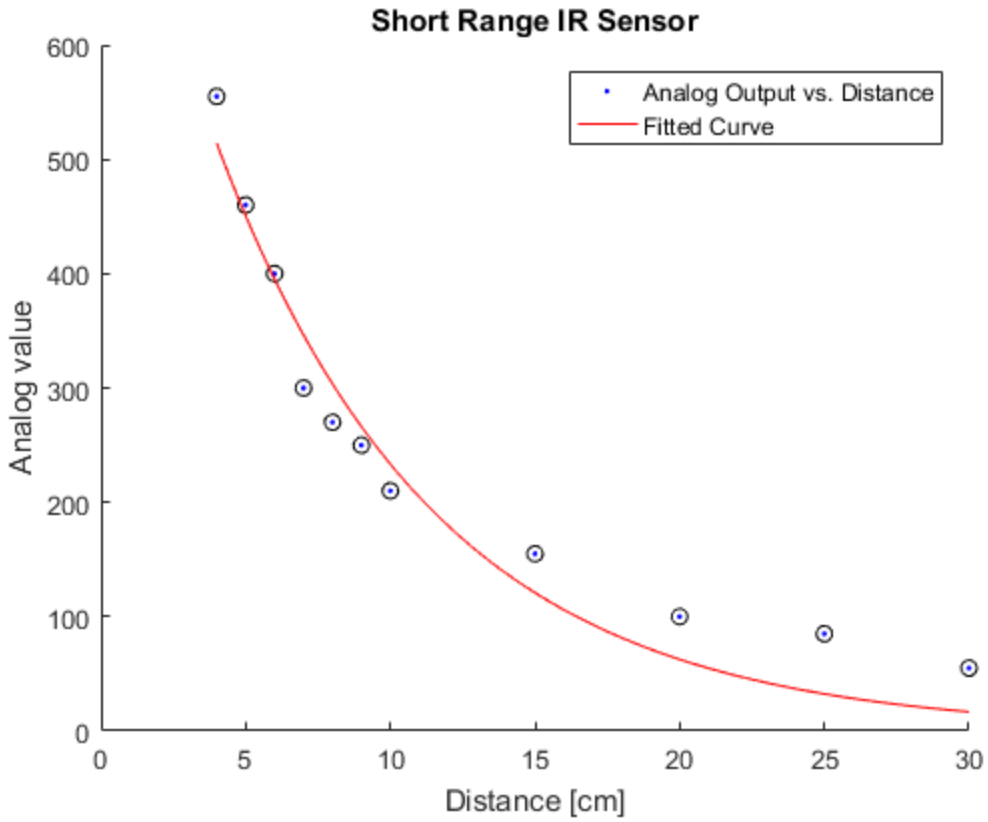
Sondre Kongsgard and James Fanchiang 10/12/2017

Short Range IR Sensor Data

```
clear all;
clc;
% Distance
d = [ 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30];

% Analog value
a = [555, 460, 400, 300, 270, 250, 210, 155, 100, 85, 55];

figure(1); clf; hold on;
plot(d, a, 'ko');
title('Short Range IR Sensor');
xlabel('Distance [cm]'); ylabel('Analog value');

f1 = fit(d',a','exp1');
h = plot(f1,d,a)
legend( h, 'Analog Output vs. Distance', 'Fitted
 Curve', 'Location', 'NorthEast' );
xlabel('Distance [cm]');
ylabel('Analog value');
hold off;
f1
```

```
h =

  2×1 Line array:

  Line    (data)
  Line    (fitted curve)
```

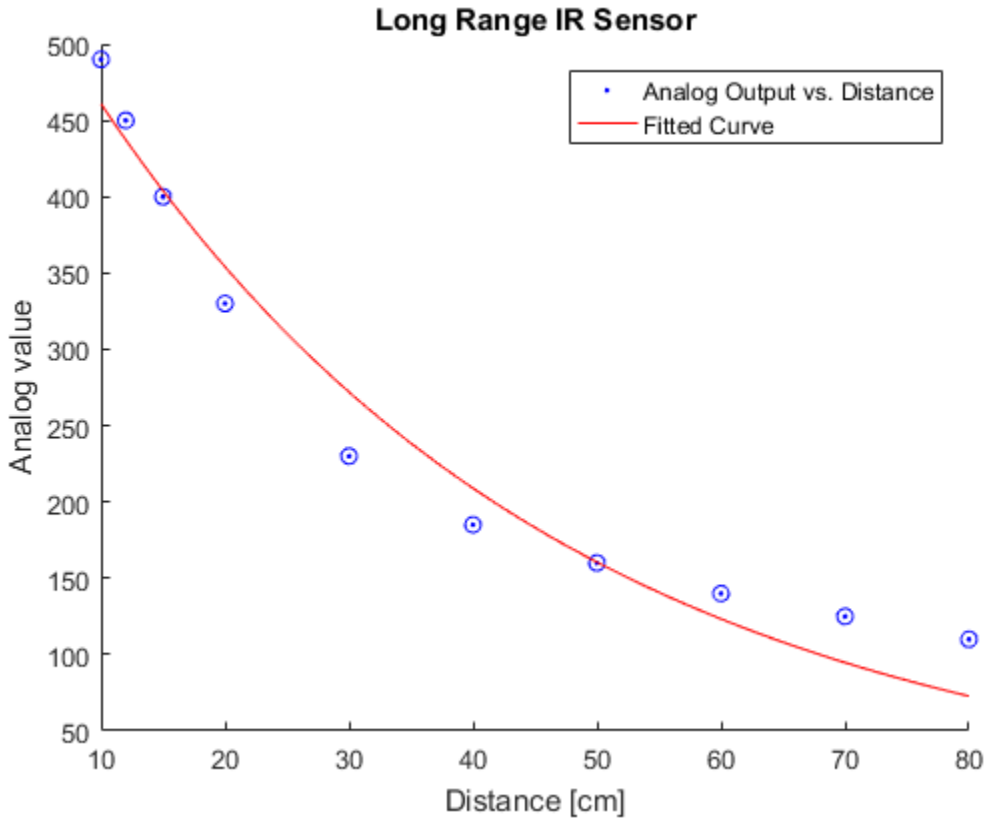
```
f1 =

     General model Exp1:
     f1(x) = a*exp(b*x)
     Coefficients (with 95% confidence bounds):
       a =       869.9  (663.7, 1076)
       b =     -0.1316  (-0.1671, -0.09603)
```



Long Range IR Sensor Data

```
clear all;
clc;
% Distance
d = [10, 12, 15, 20, 30, 40, 50, 60, 70, 80];

% Analog value
a = [490, 450, 400, 330, 230, 185, 160, 140, 125, 110];

figure(2); clf; hold on;
plot(d, a, 'bo');
title('Long Range IR Sensor');

f2 = fit(d',a','exp1');
plot(f2,d,a)
h = plot(f2,d,a)
legend( h, 'Analog Output vs. Distance', 'Fitted
 Curve', 'Location', 'NorthEast' );
xlabel('Distance [cm]');
ylabel('Analog value');
hold off;
f2


h =
```

```
  2×1 Line array:

  Line    (data)
  Line    (fitted curve)


f2 =

     General model Exp1:
     f2(x) = a*exp(b*x)
     Coefficients (with 95% confidence bounds):
       a =       599.9  (525, 674.8)
       b =    -0.02636  (-0.03173, -0.021)
```



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