University of Dayton

# Lab 4

**CPS 563 – Data Visualization**

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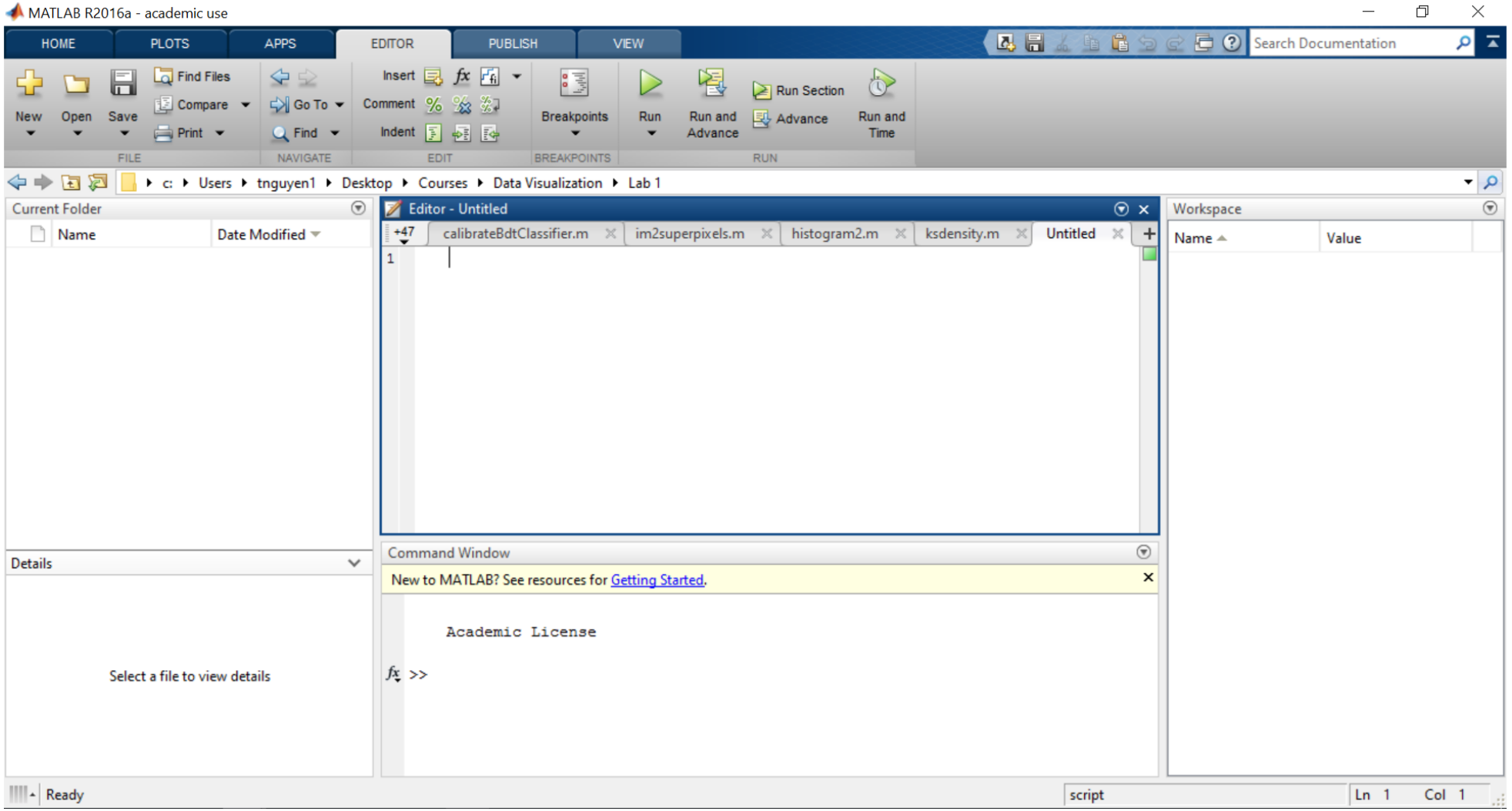
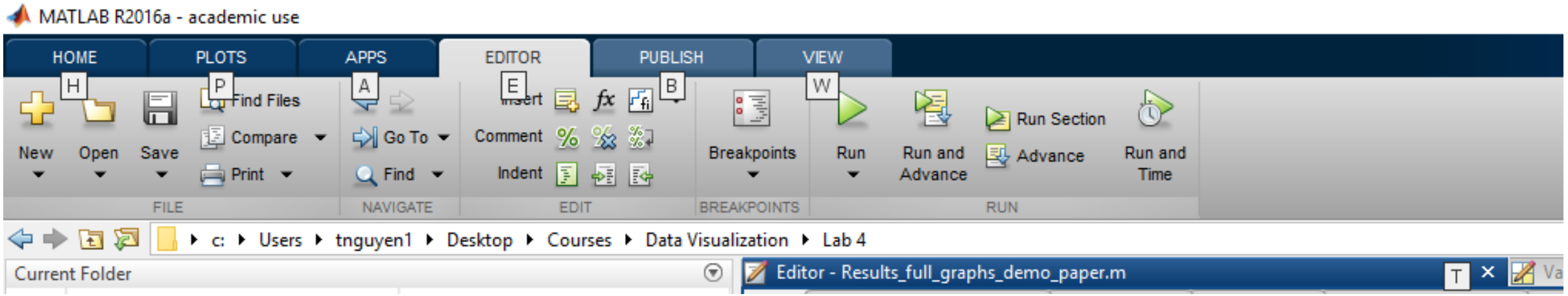
# Outline

- Practice with line chart
- Use more patterns and colors for charts

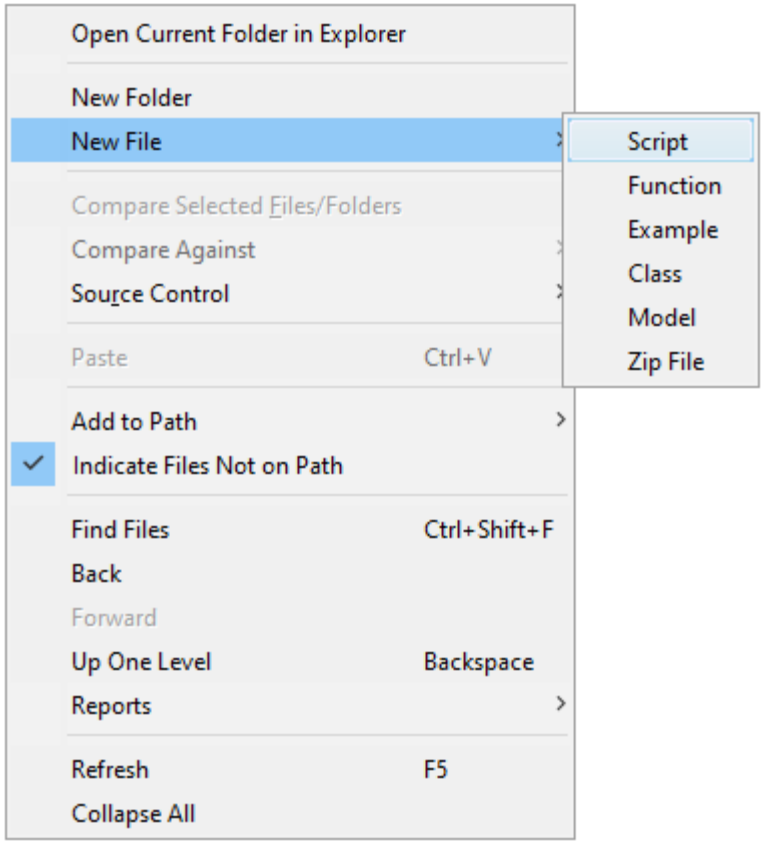
# Start MATLAB



# Create Lab 4 folder



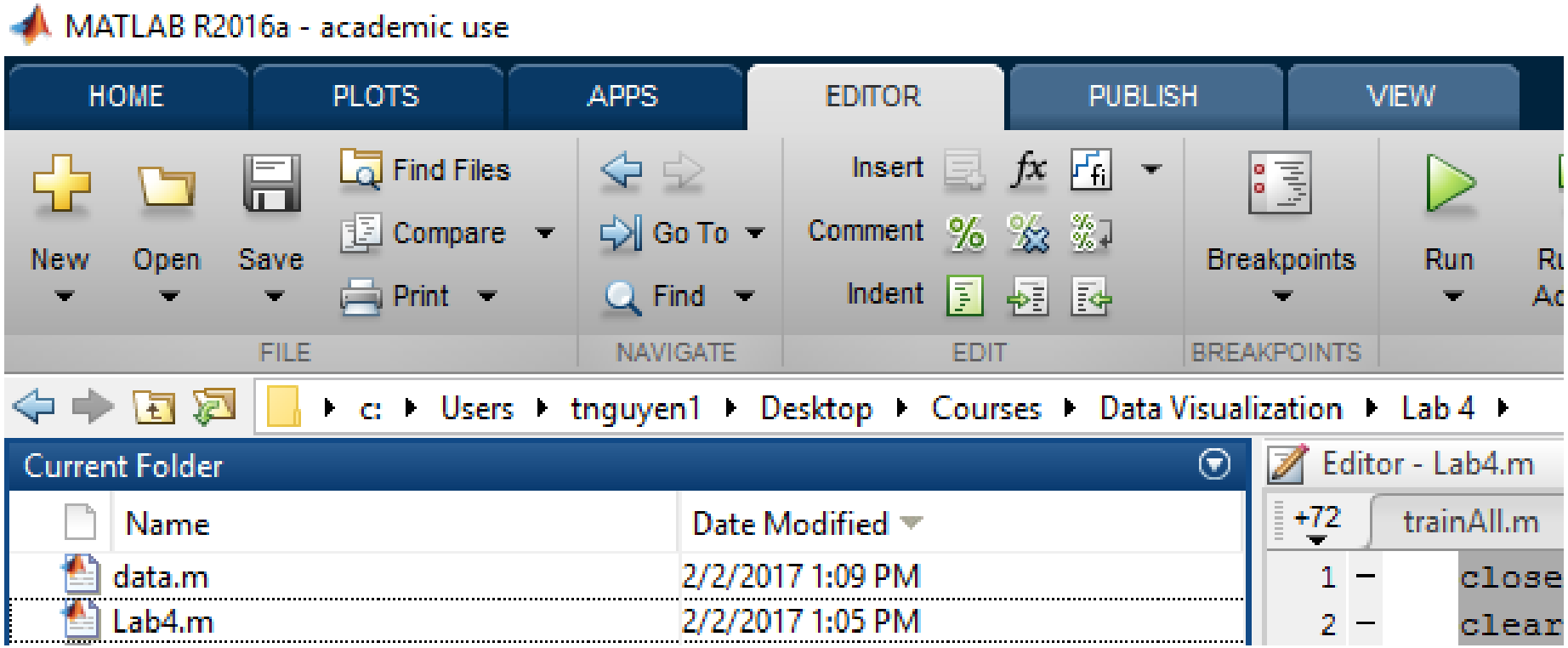
# Create new script file: Lab4.m



# Lab4.m

```
close all;
clear all;
clc;
```

# Copy data.m from isidore to Lab4 folder



# Copy all data in data.m to Lab4.m

close all;

clear all;

clc;

Recall_AIM = [1 0.997044 0.996587 0.995632 0.994169 0.992205 0.989949 0.987379 0.984501 0.981286 0.977803 0.974134 0.970227 0.966102 0.961753 0.957198 0.952443 0.947465 0.942301 0.937021 0.931543 0.925974 0.920243 0.9144 0.908434 0.902299 0.896044 0.889593 0.882937 0.876174 0.869224 0.862112 0.854833 0.847474 0.839908 0.832088 0.824061 0.815849 0.807446 0.798846 0.790017 0.781036 0.771894 0.762532 0.752989 0.743302 0.733403 0.723414 0.71332 0.70309 0.69273 0.682218 0.67157 0.660793 0.649904 0.638914 0.627783 0.616499 0.605082 0.593534 0.581826 0.569989 0.558013 0.545935 0.533719 0.521412 0.508989 0.496508 0.483929 0.47129 0.458608 0.445804 0.432952 0.420046 0.407111 0.39414 0.381178 0.368183 0.355206 0.342191 0.32915 0.31615 0.303171 0.290276 0.277485 0.264725 0.252086 0.239559 0.22713 0.21482 0.202713 0.190786 0.179088 0.167569 0.156274 0.14517 0.134337 0.123837 0.113605 0.103758 0.0942549 0.0851728 0.0764751 0.0682641 0.0605026 0.0532552 0.0465004 0.0402403 0.0344867 0.0292672 0.0245516 0.0203335 0.0166628 0.0134544 0.0107001 0.00838556 0.00645557 0.00486133 0.00359688 0.00259809 0.00182821 0.00125837 0.000838395 0.000542662 0.000340104 0.000198678 0.000111877 6.03671e-005 ];

…….

Precision_IG = [0.198478 0.209464 0.226298 0.246075 0.267286 0.289586 0.316352 0.340996 0.364231 0.38639 0.406973 0.426761 0.446929 0.465552 0.483501 0.500476 0.516069 0.531069 0.545805 0.560215 0.573436 0.58707 0.599405 0.611293 0.622695 0.633773 0.643606 0.653036 0.661896 0.671014 0.679543 0.687891 0.69587 0.70282 0.709295 0.715597 0.72139 0.726911 0.73214 0.737594 0.74251 0.747171 0.751621 0.755577 0.759999 0.763808 0.767133 0.770273 0.773311 0.77623 0.77892 0.781063 0.782931 0.784692 0.786942 0.788844 0.790199 0.791922 0.793971 0.795701 0.797162 0.798456 0.799941 0.801918 0.80484 0.806724 0.80805 0.808993 0.809806 0.810622 0.812079 0.813541 0.814878 0.816338 0.817779 0.819356 0.82053 0.82149 0.82263 0.822922 0.823254 0.823569 0.823833 0.824515 0.825153 0.825472 0.826139 0.827071 0.827615 0.828343 0.828839 0.828978 0.828834 0.828691 0.828553 0.828484 0.828336 0.828043 0.828133 0.828659 0.829021 0.828839 0.828869 0.829053 0.82843 0.827908 0.827563 0.827309 0.827379 0.828023 0.828738 0.829022 0.829417 0.829838 0.829608 0.829745 0.829709 0.829894 0.830121 0.830664 0.831046 0.831123 0.830287 0.829876 0.829822 0.830849 0.831638 0.830614 ];

# Plot the data

Precision_IG = [0.198478 0.209464 0.226298 0.246075 0.267286 0.289586 0.316352 0.340996 0.364231 0.38639 0.406973
0.426761 0.446929 0.465552 0.483501 0.500476 0.516069 0.531069 0.545805 0.560215 0.573436 0.58707 0.599405
0.611293 0.622695 0.633773 0.643606 0.653036 0.661896 0.671014 0.679543 0.687891 0.69587 0.70282 0.709295
0.715597 0.72139 0.726911 0.73214 0.737594 0.74251 0.747171 0.751621 0.755577 0.759999 0.763808 0.767133 0.770273
0.773311 0.77623 0.77892 0.781063 0.782931 0.784692 0.786942 0.788844 0.790199 0.791922 0.793971 0.795701
0.797162 0.798456 0.799941 0.801918 0.80484 0.806724 0.80805 0.808993 0.809806 0.810622 0.812079 0.813541
0.814878 0.816338 0.817779 0.819356 0.82053 0.82149 0.82263 0.822922 0.823254 0.823569 0.823833 0.824515 0.825153
0.825472 0.826139 0.827071 0.827615 0.828343 0.828839 0.828978 0.828834 0.828691 0.828553 0.828484 0.828336
0.828043 0.828133 0.828659 0.829021 0.828839 0.828869 0.829053 0.82843 0.827908 0.827563 0.827309 0.827379
0.828023 0.828738 0.829022 0.829417 0.829838 0.829608 0.829745 0.829709 0.829894 0.830121 0.830664 0.831046
0.831123 0.830287 0.829876 0.829822 0.830849 0.831638 0.830614 ];

```
plot(Recall_AIM, Precision_AIM);
plot(Recall_GB, Precision_GB);
plot(Recall_GC, Precision_GC);
plot(Recall_GU, Precision_GU);
plot(Recall_HC, Precision_HC);
plot(Recall_IG, Precision_IG);
```

# Run Lab4.m

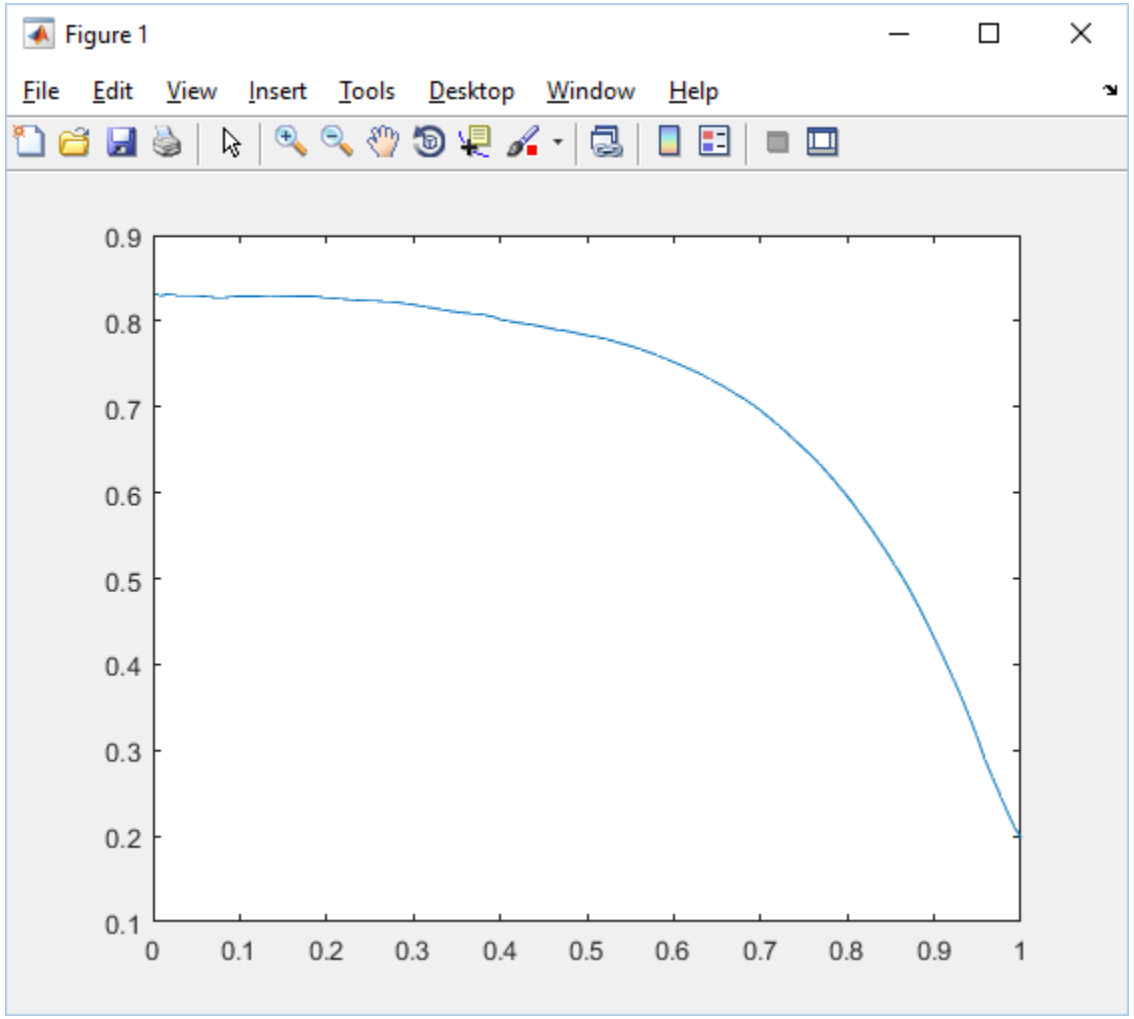
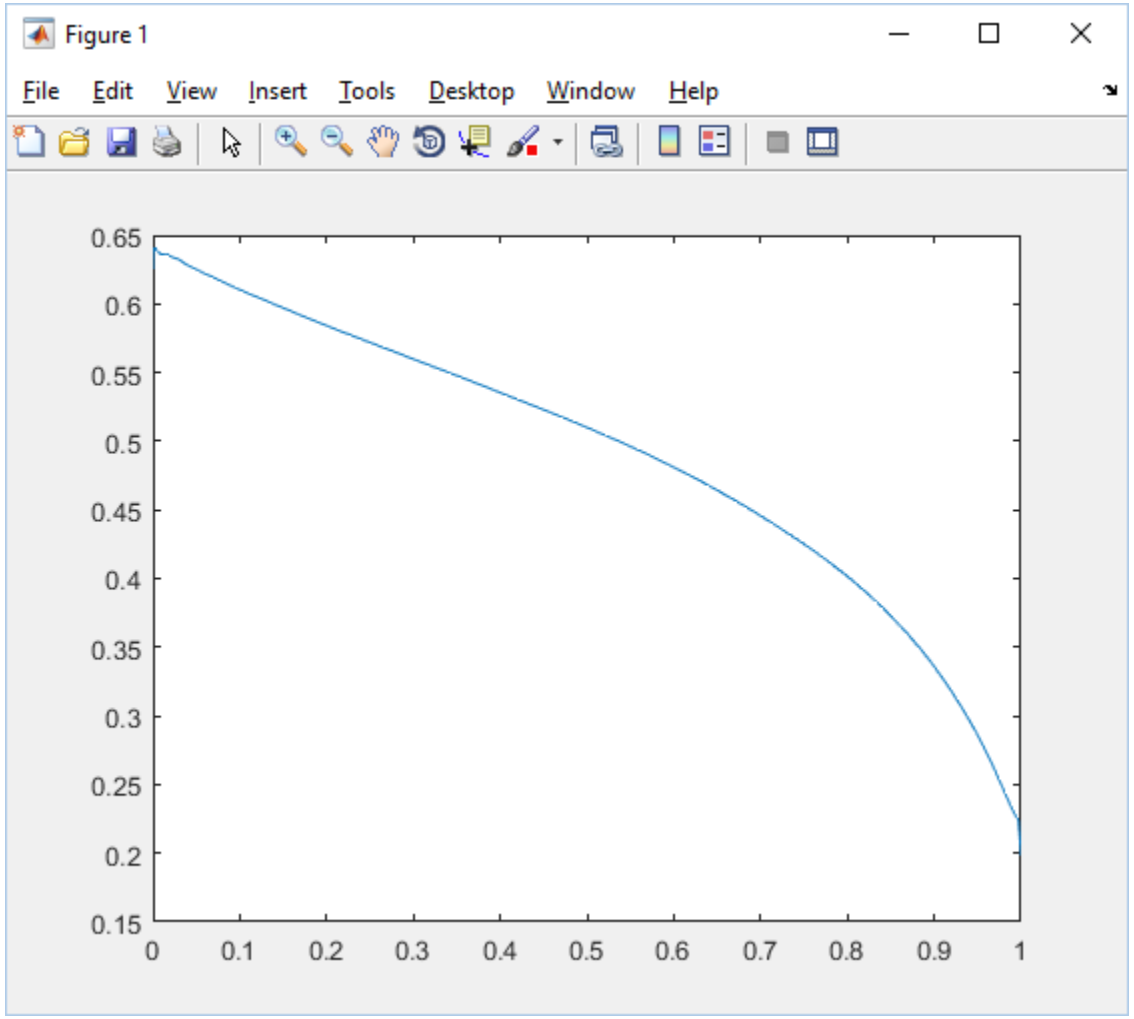


Figure 1
File Edit View Insert Tools Desktop Window Help
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

# Comment the last 5 lines of code

```
plot(Recall_AIM, Precision_AIM);
% plot(Recall_GB, Precision_GB);
% plot(Recall_GC, Precision_GC);
% plot(Recall_GU, Precision_GU);
% plot(Recall_HC, Precision_HC);
% plot(Recall_IG, Precision_IG);
```

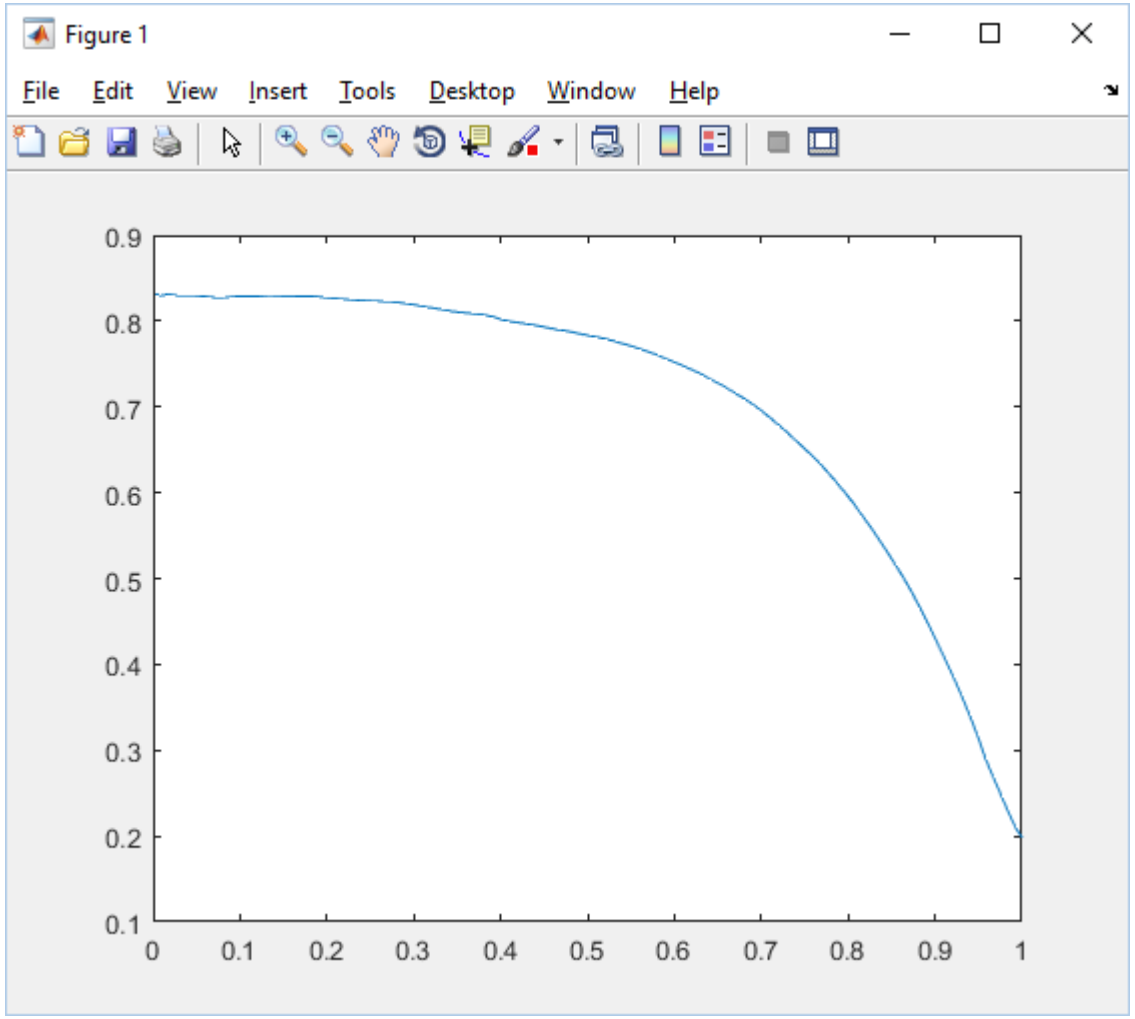
# Run Lab4.m again



# Only plot IG method

```
% plot(Recall_AIM, Precision_AIM);
% plot(Recall_GB, Precision_GB);
% plot(Recall_GC, Precision_GC);
% plot(Recall_GU, Precision_GU);
% plot(Recall_HC, Precision_HC);
plot(Recall_IG, Precision_IG);
```

# Run Lab4.m again

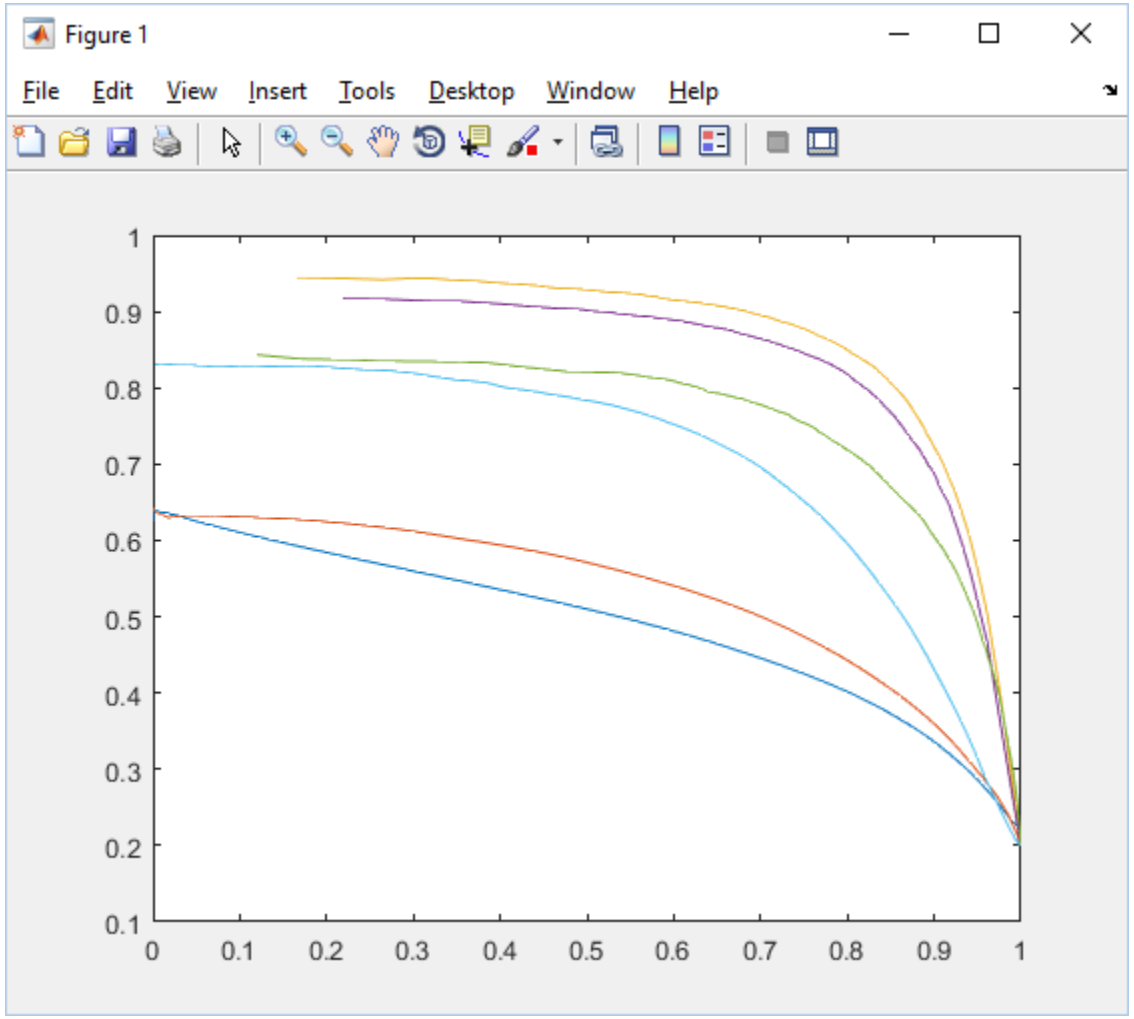


# How to solve it?

```
% plot(Recall_AIM, Precision_AIM);
% plot(Recall_GB, Precision_GB);
% plot(Recall_GC, Precision_GC);
% plot(Recall_GU, Precision_GU);
% plot(Recall_HC, Precision_HC);
% plot(Recall_IG, Precision_IG);
```

```
plot(Recall_AIM, Precision_AIM, Recall_GB, Precision_GB, Recall_GC,
Precision_GC, Recall_GU, Precision_GU, Recall_HC, Precision_HC, Recall_IG,
Precision_IG);
```

# Run Lab4.m again



# Is it perfect?

```
% plot(Recall_AIM, Precision_AIM);
% plot(Recall_GB, Precision_GB);
% plot(Recall_GC, Precision_GC);
% plot(Recall_GU, Precision_GU);
% plot(Recall_HC, Precision_HC);
% plot(Recall_IG, Precision_IG);
```

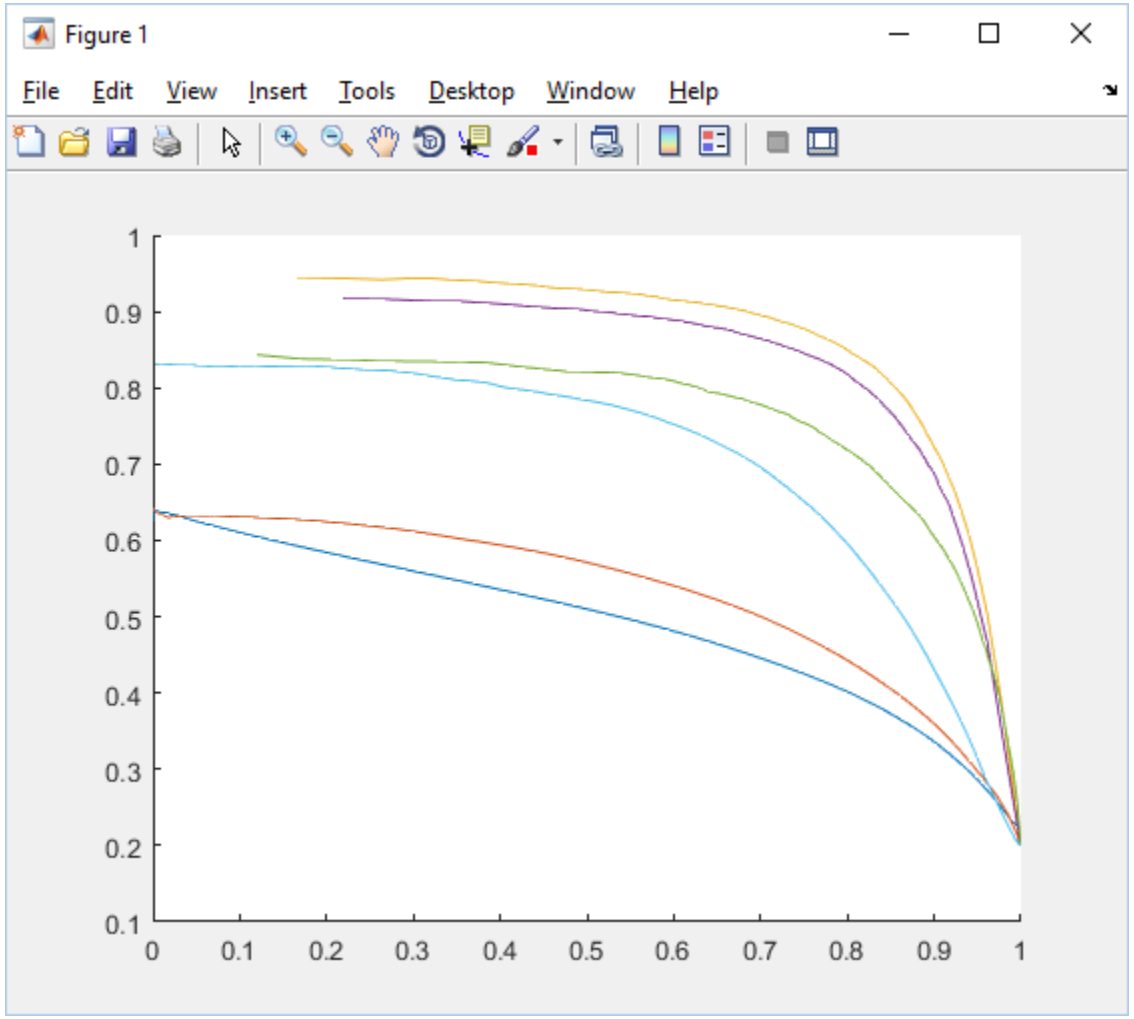
```
plot(Recall_AIM, Precision_AIM, Recall_GB, Precision_GB, Recall_GC,
Precision_GC, Recall_GU, Precision_GU, Recall_HC, Precision_HC, Recall_IG,
Precision_IG);
```

# Use hold on and hold off

```
hold on;
plot(Recall_AIM, Precision_AIM);
plot(Recall_GB, Precision_GB);
plot(Recall_GC, Precision_GC);
plot(Recall_GU, Precision_GU);
plot(Recall_HC, Precision_HC);
plot(Recall_IG, Precision_IG);
hold off;
```

```
% plot(Recall_AIM, Precision_AIM, Recall_GB, Precision_GB, Recall_GC,
Precision_GC, Recall_GU, Precision_GU, Recall_HC, Precision_HC, Recall_IG,
Precision_IG);
```

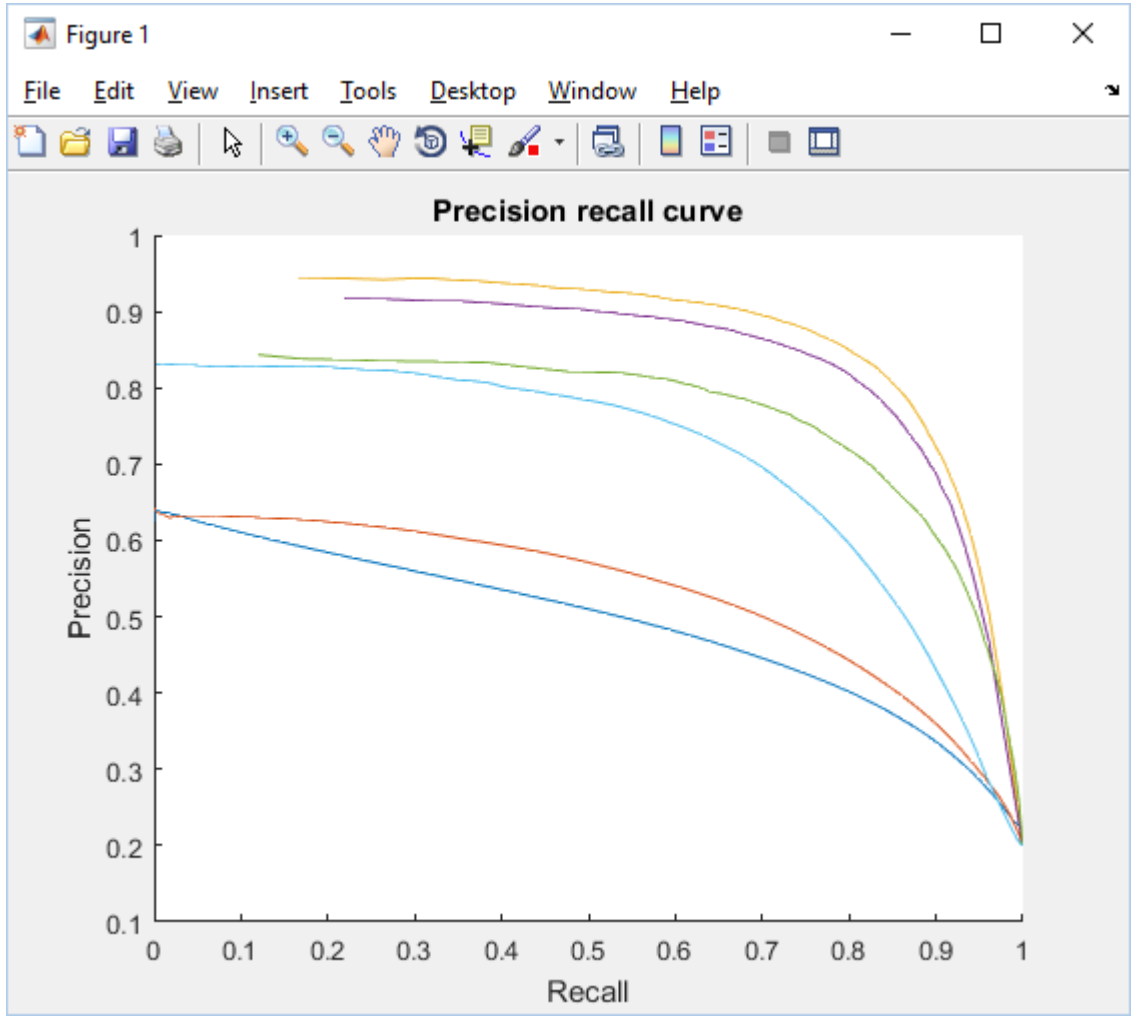
# Run Lab4.m again



# Update x, y labels and chart title

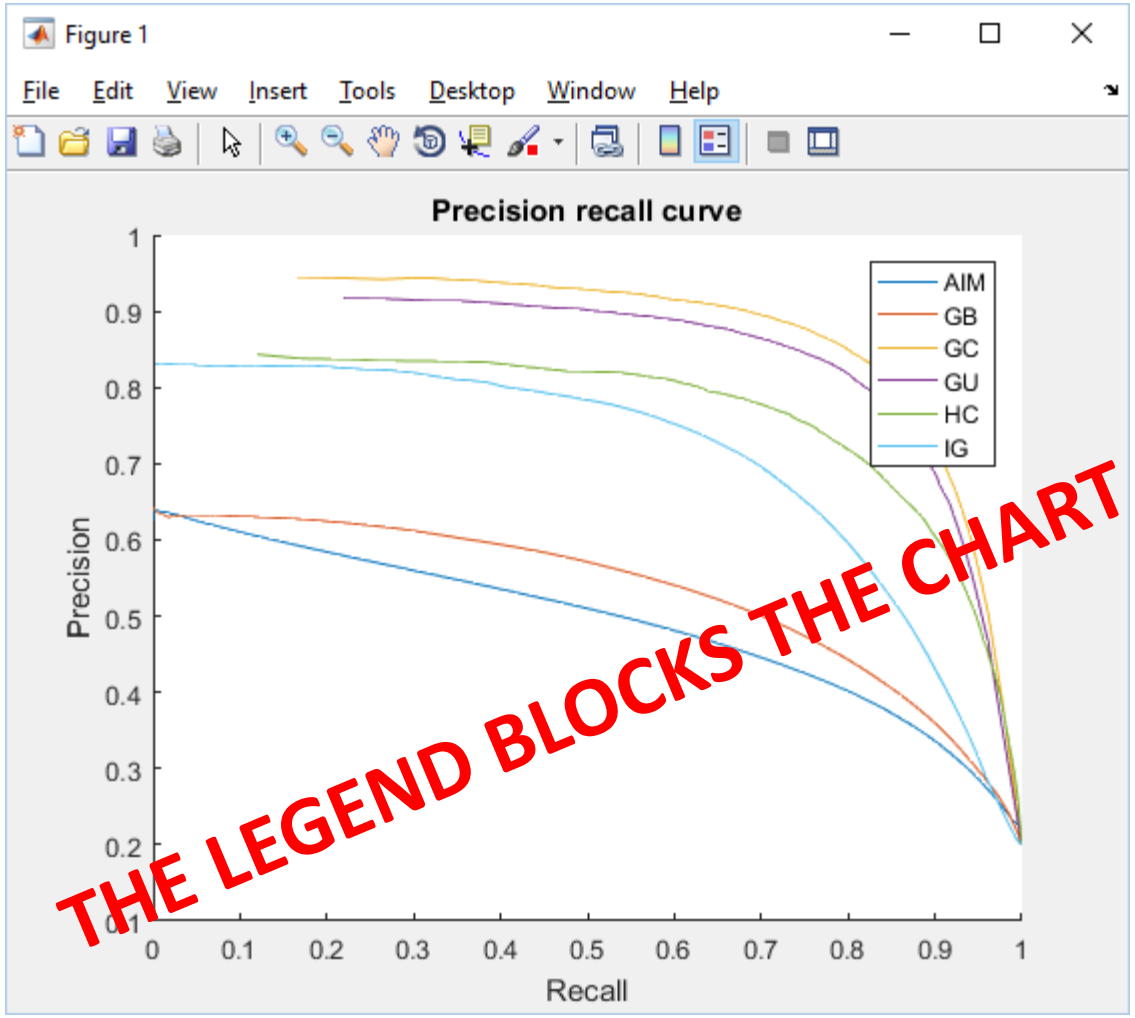
```
hold on;
plot(Recall_AIM, Precision_AIM);
plot(Recall_GB, Precision_GB);
plot(Recall_GC, Precision_GC);
plot(Recall_GU, Precision_GU);
plot(Recall_HC, Precision_HC);
plot(Recall_IG, Precision_IG);
hold off;
```

```
xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
```



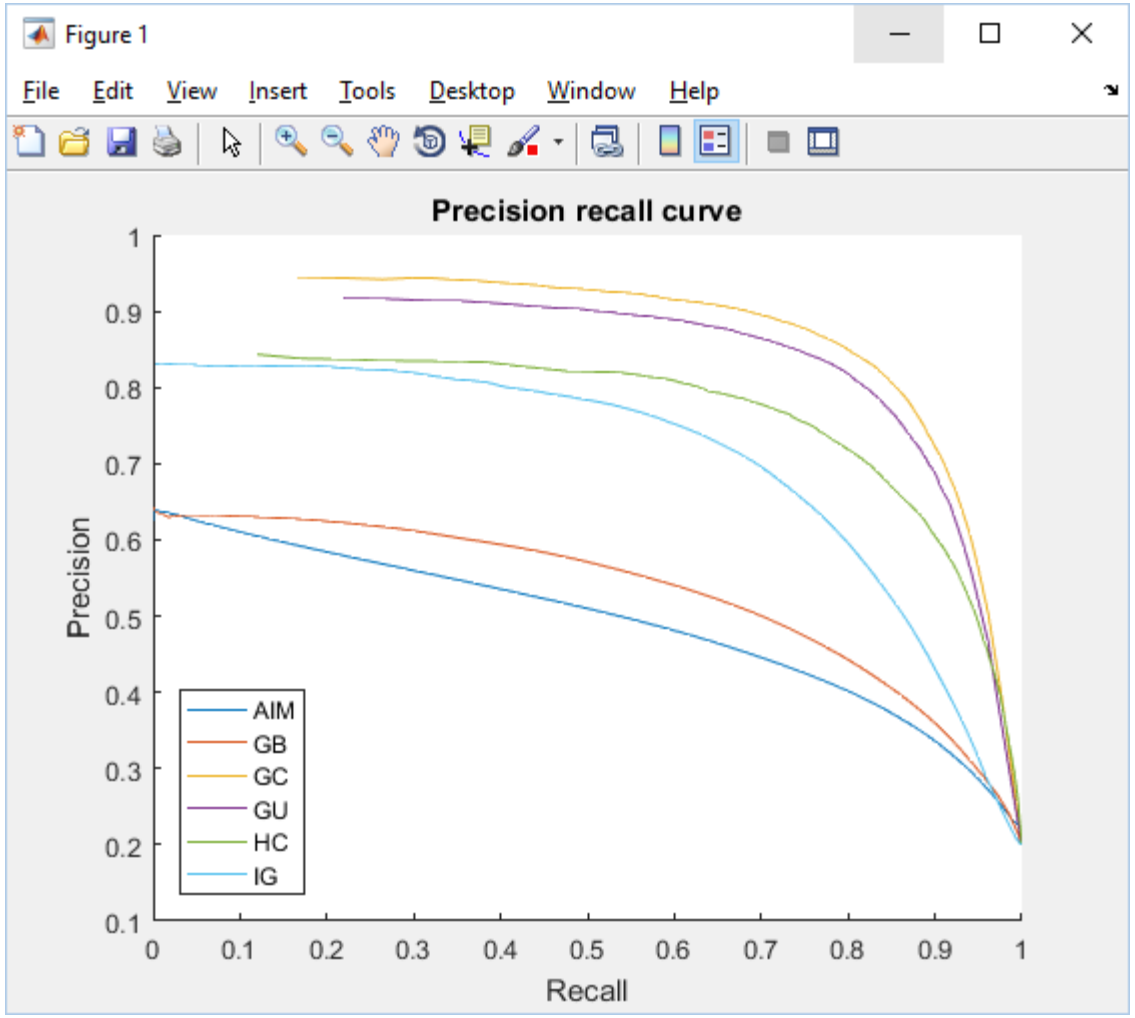
# Update chart legend

```
xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG');
```



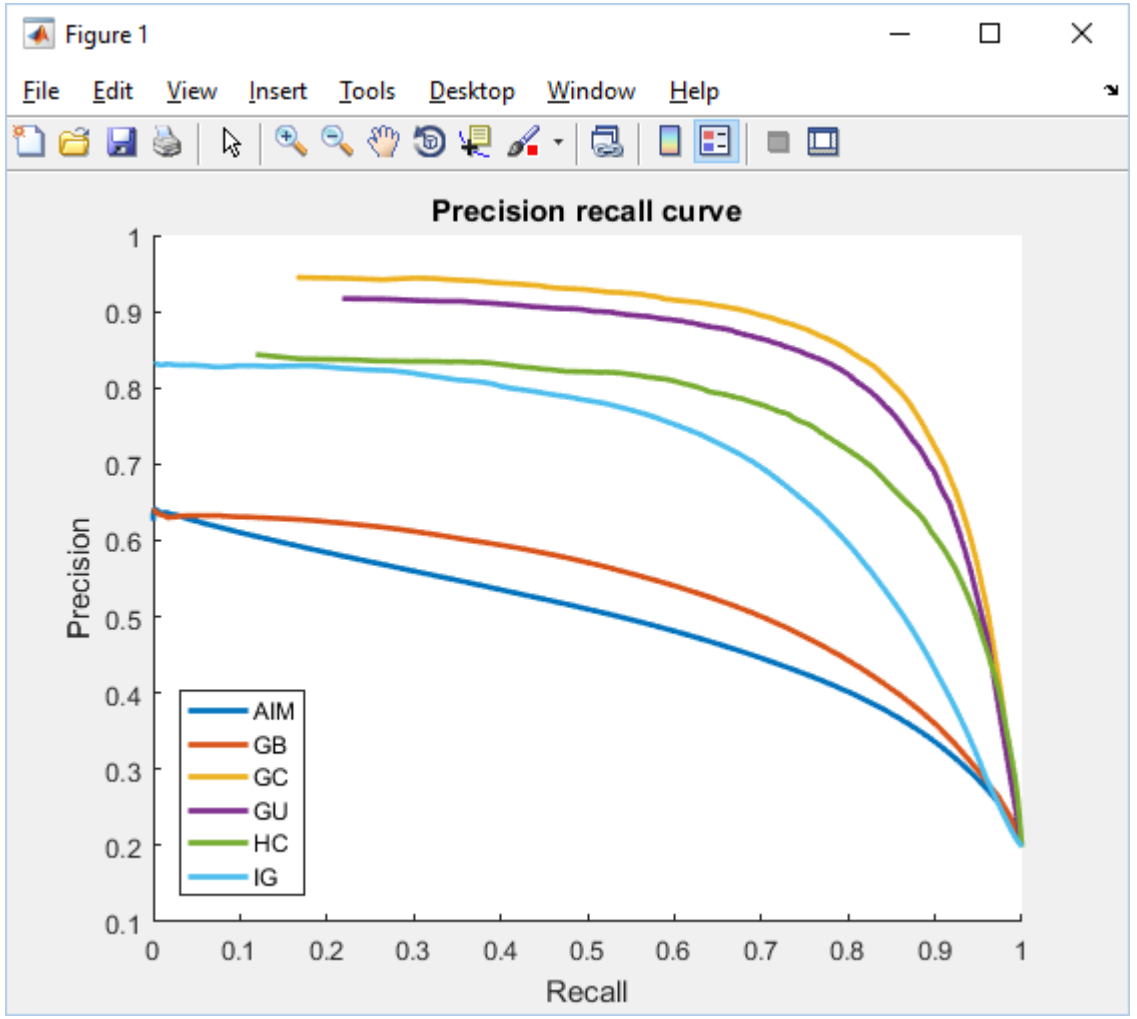
# Update chart legend

```
xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
% legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG');
legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG',
'Location','southwest');
```



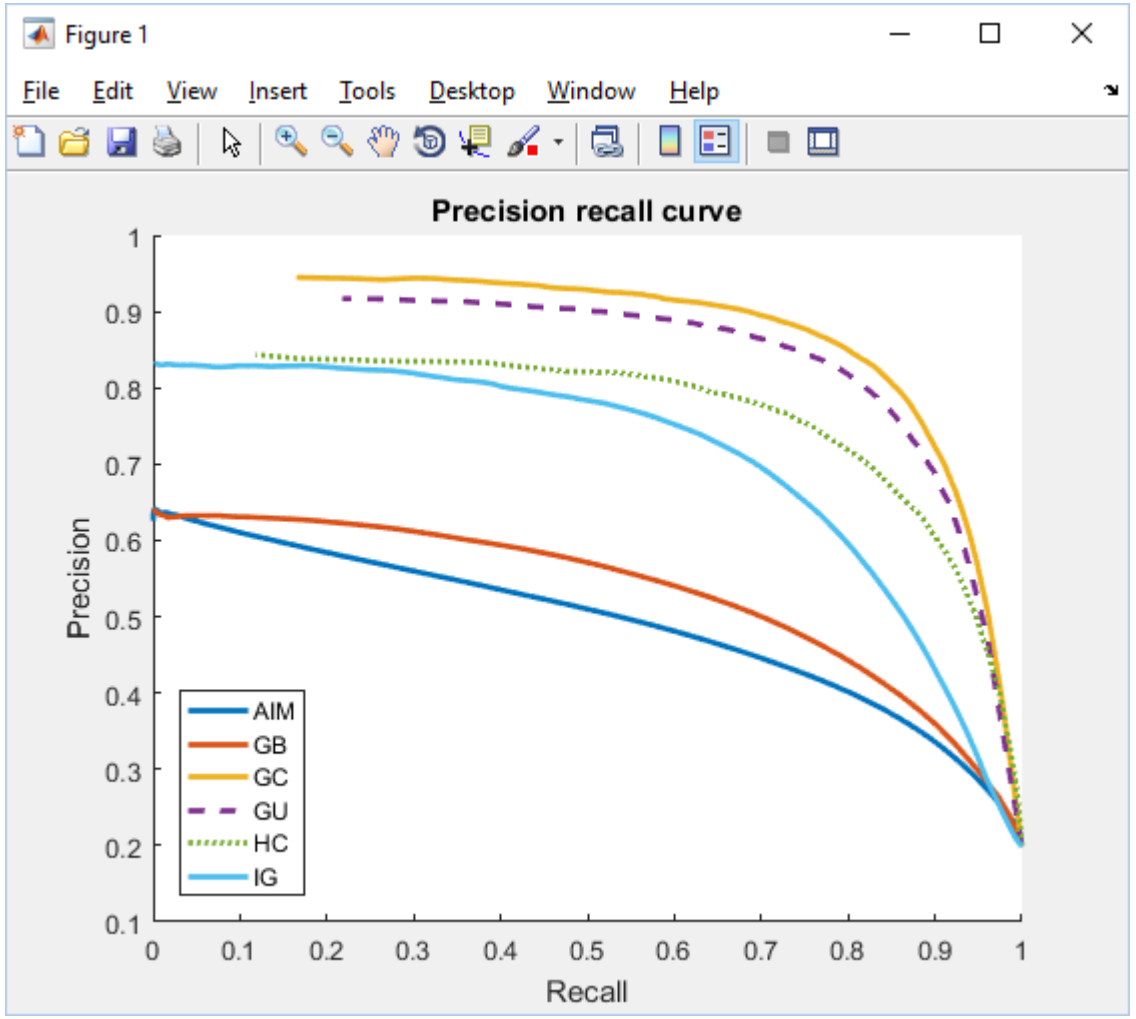
# Update line thickness

```
hold on;
plot(Recall_AIM, Precision_AIM, 'linewidth', 2);
plot(Recall_GB, Precision_GB, 'linewidth', 2);
plot(Recall_GC, Precision_GC, 'linewidth', 2);
plot(Recall_GU, Precision_GU, 'linewidth', 2);
plot(Recall_HC, Precision_HC, 'linewidth', 2);
plot(Recall_IG, Precision_IG, 'linewidth', 2);
hold off;

xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG', 'Location','southwest');
```



# Update line patterns

```
hold on;
plot(Recall_AIM, Precision_AIM, 'linewidth', 2);
plot(Recall_GB, Precision_GB, 'linewidth', 2);
plot(Recall_GC, Precision_GC, 'linewidth', 2);
plot(Recall_GU, Precision_GU, '--', 'linewidth', 2);
plot(Recall_HC, Precision_HC, ':', 'linewidth', 2);
plot(Recall_IG, Precision_IG, 'linewidth', 2);
hold off;


xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG', 'Location','southwest');
```

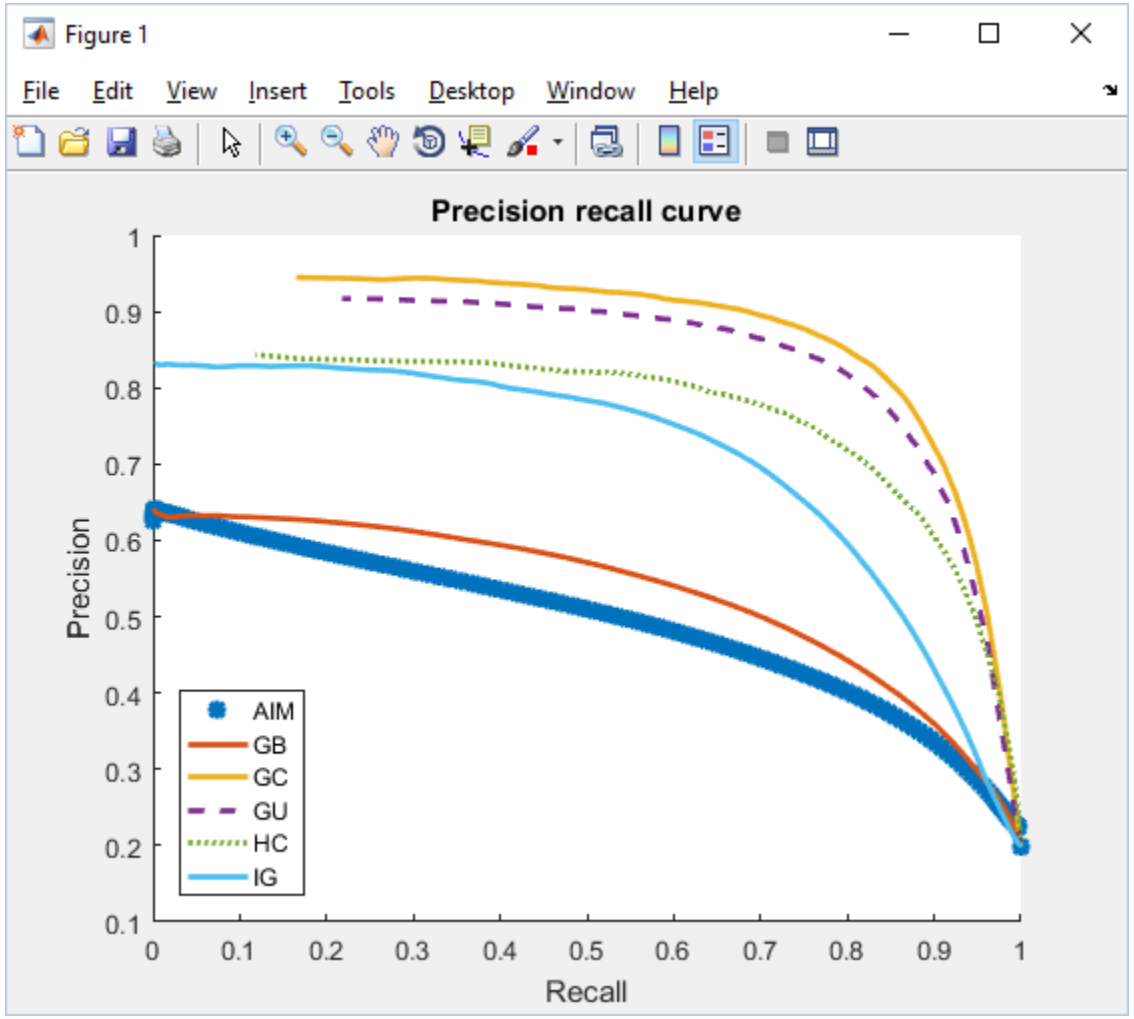


# Line patterns in MATLAB

| Line Style | Description | Resulting Line |
|---|---|---|
| '-' | Solid line | |
| '--' | Dashed line | |
| ':' | Dotted line | |
| '-.' | Dash-dotted line | |
| 'none' | No line | No line |

# Update line markers

```
hold on;
plot(Recall_AIM, Precision_AIM, ‘*’, 'linewidth', 2);
plot(Recall_GB, Precision_GB, 'linewidth', 2);
plot(Recall_GC, Precision_GC, 'linewidth', 2);
plot(Recall_GU, Precision_GU, '--', 'linewidth', 2);
plot(Recall_HC, Precision_HC, ':', 'linewidth', 2);
plot(Recall_IG, Precision_IG, 'linewidth', 2);
hold off;


xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG', 'Location','southwest');
```

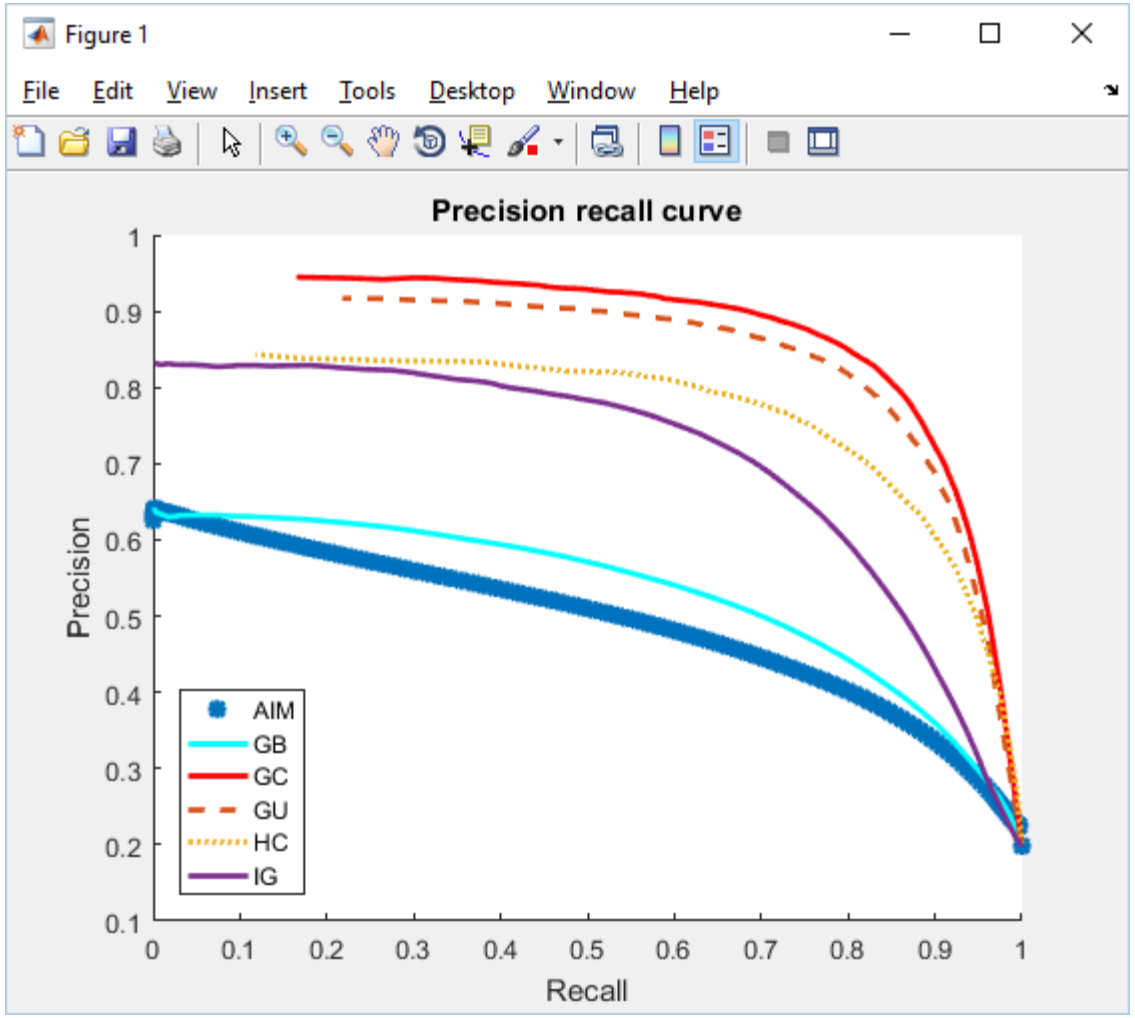


# Line markers in MATLAB

| Value | Description |
|---|---|
| 'o' | Circle |
| '+' | Plus sign |
| '*' | Asterisk |
| '.' | Point |
| 'x' | Cross |
| 'square' or 's' | Square |
| 'diamond' or 'd' | Diamond |
| '^' | Upward-pointing triangle |
| 'v' | Downward-pointing triangle |
| '>' | Right-pointing triangle |
| '<' | Left-pointing triangle |
| 'pentagram' or 'p' | Five-pointed star (pentagram) |
| 'hexagram' or 'h' | Six-pointed star (hexagram) |
| 'none' | No markers |

# Change line colors

```
hold on;
plot(Recall_AIM, Precision_AIM, '*', 'linewidth', 2);
plot(Recall_GB, Precision_GB, ‘c', 'linewidth', 2);
plot(Recall_GC, Precision_GC, 'r', 'linewidth', 2);
plot(Recall_GU, Precision_GU, '--', 'linewidth', 2);
plot(Recall_HC, Precision_HC, ':', 'linewidth', 2);
plot(Recall_IG, Precision_IG, 'linewidth', 2);
hold off;


xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG', 'Location','southwest');
```

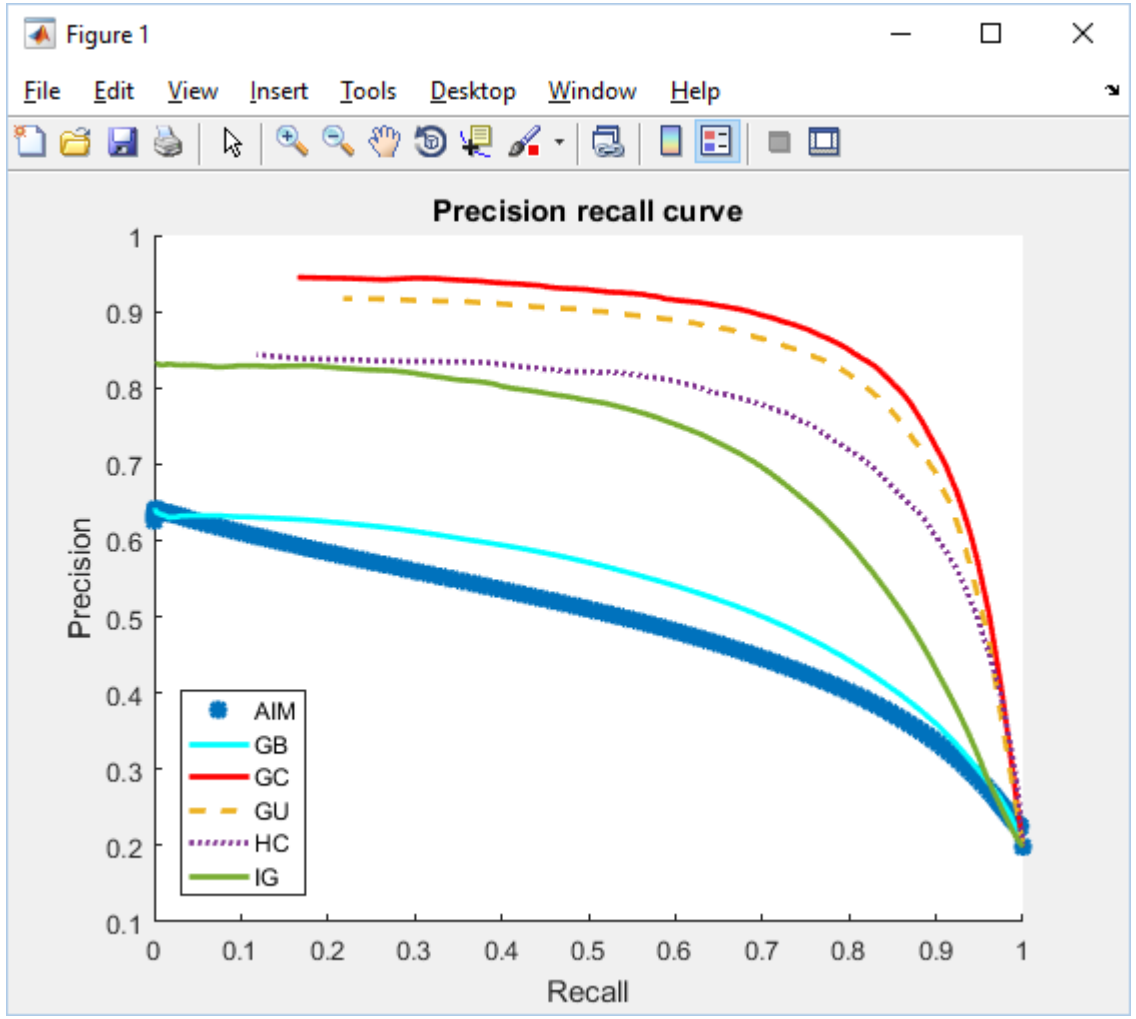


# Recall: Color in MATLAB charts

| Long Name | Short Name | RGB Triplet |
|---|---|---|
| 'yellow' | 'y' | [1 1 0] |
| 'magenta' | 'm' | [1 0 1] |
| 'cyan' | 'c' | [0 1 1] |
| 'red' | 'r' | [1 0 0] |
| 'green' | 'g' | [0 1 0] |
| 'blue' | 'b' | [0 0 1] |
| 'white' | 'w' | [1 1 1] |
| 'black' | 'k' | [0 0 0] |

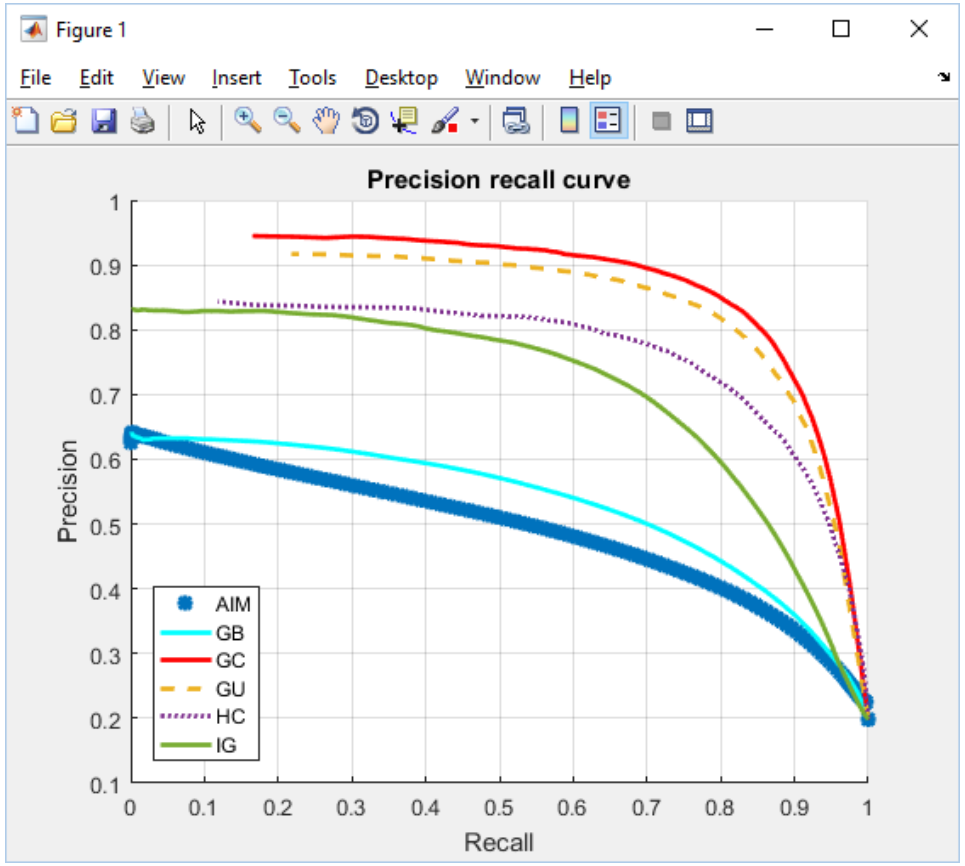
# Change line colors

```
hold on;
plot(Recall_AIM, Precision_AIM, '*', 'linewidth', 2);
plot(Recall_GB, Precision_GB, 'c', 'linewidth', 2);
plot(Recall_GC, Precision_GC, 'color', [1 0 0], 'linewidth', 2);
plot(Recall_GU, Precision_GU, '--', 'linewidth', 2);
plot(Recall_HC, Precision_HC, ':', 'linewidth', 2);
plot(Recall_IG, Precision_IG, 'linewidth', 2);
hold off;

xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG', 'Location','southwest');
```



# Add grid on

```
hold on;
plot(Recall_AIM, Precision_AIM, '*', 'linewidth', 2);
plot(Recall_GB, Precision_GB, 'c', 'linewidth', 2);
plot(Recall_GC, Precision_GC, 'color', [1 0 0], 'linewidth', 2);
plot(Recall_GU, Precision_GU, '--', 'linewidth', 2);
plot(Recall_HC, Precision_HC, ':', 'linewidth', 2);
plot(Recall_IG, Precision_IG, 'linewidth', 2);
hold off;


xlabel('Recall');
ylabel('Precision')
title('Precision recall curve');
legend('AIM', 'GB', 'GC', 'GU', 'HC', 'IG', 'Location','southwest');
grid on;
```



# Q&A