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| **EX.NO:4 PATTERN RECOGNITION APPLICATION USING BAYESIAN INFERENCE** | |
| IN [1] | **from** IPython.display **import** HTML  **%matplotlib** inline |
| IN [2] | **from** scipy.stats **import** beta  **import** matplotlib.pyplot **as** plt  **import** numpy **as** np  **def** plot\_beta(a,b,ax, print\_interval**=True**):  ax**.**set\_xlabel("p")  ax**.**set\_ylabel("probability density")  x **=** np**.**linspace(0.00,1, 100)  label **=** "$\\alpha= " **+** str(a) **+** ", \\beta=" **+** str(b) **+** "$"  dist **=** beta(a,b)  *# plot density*  ax**.**plot(x, dist**.**pdf(x),  lw**=**2, alpha**=**0.6, label**=**label)  ­­­­­­­  **if** print\_interval:  print("Interval containing 95% of the distribution: ", dist**.**interval(0.95)) |
| IN [3] | fig, ax **=** plt**.**subplots(1,1)  plot\_beta(10,10,ax)  handles, labels **=** ax**.**get\_legend\_handles\_labels()  ax**.**legend(handles, labels); |
| IN [4] | fig, ax **=** plt**.**subplots(1,1)  plot\_beta(100,100,ax)  handles, labels **=** ax**.**get\_legend\_handles\_labels()  ax**.**legend(handles, labels); |
| IN [5] | fig, ax **=** plt**.**subplots(1,1)  plot\_beta(1000,1000,ax)  handles, labels **=** ax**.**get\_legend\_handles\_labels()  ax**.**legend(handles, labels); |
| IN [6] | fig, ax **=** plt**.**subplots(1,1)  plot\_beta(10,1,ax)  handles, labels **=** ax**.**get\_legend\_handles\_labels()  ax**.**legend(handles, labels); |
| IN [7] | fig, ax **=** plt**.**subplots(1,1)  plot\_beta(1,1,ax)  handles, labels **=** ax**.**get\_legend\_handles\_labels()  ax**.**legend(handles, labels); |

**OUTPUT:**

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| OUT [3] | Interval containing 95% of the distribution: (0.28864324791699886, 0.7113567520830011) |
| OUT [4] | Interval containing 95% of the distribution: (0.43095093094181725, 0.5690490690581828) |
| OUT [5] | Interval containing 95% of the distribution: (0.4780947196206835, 0.5219052803793165) |
| OUT [6] | Interval containing 95% of the distribution: (0.6915028921812392, 0.9974714214555382) |
| OUT [7] | Interval containing 95% of the distribution: (0.025000000000000022, 0.975) |