

## ДОДАТОК А

### Лістинг програмного коду допоміжних функцій

#### Лістинг Б.1 – Програмний код функції drawBiggestCluster

```

def drawBiggestCluster(dataset, cluster_centers_indices,
labels, n_clusters_):
    plt.figure()
    plt.clf()
    num_of_elements = 1
    selected_class_members = 0
    selected_cluster = 0

    for k in range(n_clusters_):
        class_members = labels == k

        if(len(dataset[class_members]) > num_of_elements):
            num_of_elements = len(dataset[class_members])
            selected_class_members = class_members
            selected_cluster = k

        cluster_center =
dataset[cluster_centers_indices[selected_cluster]]
        plt.scatter(
            dataset[selected_class_members,
            3],
dataset[selected_class_members, 4], color='b', marker="."
        )
        plt.scatter(
            cluster_center[3], cluster_center[4], s=14,
color='c', marker="o"
        )
        for x in dataset[selected_class_members]:
            plt.plot(
                [cluster_center[3], x[3]], [cluster_center[4],
x[4]], color='b'

```

```

    )

    print(dataset[selected_class_members])
    plt.title("Estimated number of elements: %d" %
num_of_elements)
    plt.show()

```

### Лістинг Б.2 – Програмний код функції drawOneCluster5D

```

def drawOneCluster5D(n_clusters_, labels,
cluster_centers_indices, dataset):
    fig, axs = plt.subplots(5, 5)
    fig.set_dpi(100)
    fig.set_size_inches(18.5, 10.5, forward=True)
    fig.tight_layout(pad=2.0)

    num_of_elements = 1
    selected_class_members = 0
    selected_cluster = 0

    for k in range(n_clusters_):
        class_members = labels == k

        if(len(dataset[class_members]) > num_of_elements):
            num_of_elements = len(dataset[class_members])
            selected_class_members = class_members
            selected_cluster = k

        cluster_center =
dataset[cluster_centers_indices[selected_cluster]]

    titles = tx.columns

    for i in range(5):
        for j in range(5):
            axs[i, j].scatter(

```

```
        dataset[selected_class_members, i],
dataset[selected_class_members, j], color='b', marker="."
    )
    axs[i, j].scatter(
        cluster_center[i], cluster_center[j],
s=14, color='c', marker="o"
    )
    for x in dataset[selected_class_members]:
        axs[i, j].plot(
            [cluster_center[i], x[i]],
[cluster_center[j], x[j]], color='skyblue'
        )
        axs[i, j].set_title(titles[i]+" + "+titles[j])

print(dataset[selected_class_members])
plt.show()
```

