Portfolio optimization

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Optimization of Porfolio 1

For the portfolio 1, we are given next input data (see Table 1):

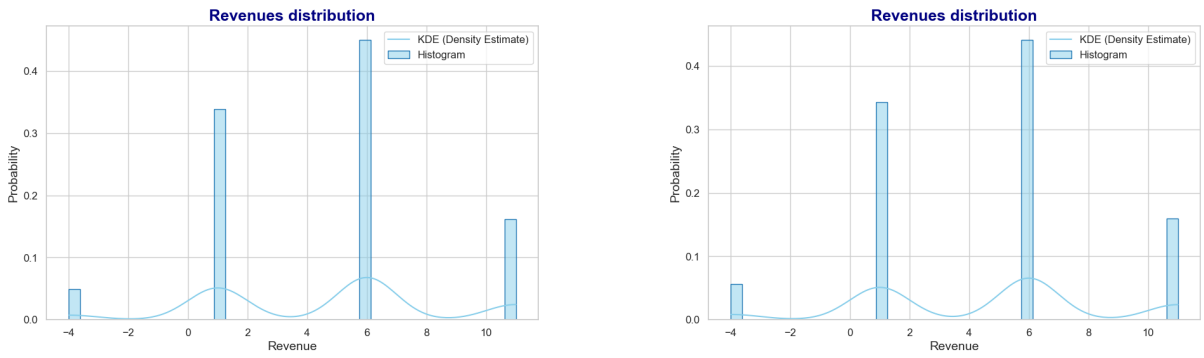
Table 1: Input data for Portfolio 1

project	benefit	cost	risk	dependence
Milana	0.100000	1	0.100000	-
Arthur	0.500000	2	0.200000	-
Malika	0.500000	1	0.500000	-
Daniil	0.500000	1	0.600000	-
Yerzhan	0.500000	3	0.700000	-
Azamat	0.500000	4	0.800000	-
Tamila	0.500000	1	0.900000	-
Andrey	0.500000	3	0.900000	-
Mamea	0.500000	1	0.900000	-
Papa	0.500000	5	0.600000	-

Based on the provided data, the model managed to find next solution that satisfies all of the constraints of the problem (see Table 2):

Table 2: Advised projects to invest for Portfolio 1

project	benefit	cost	risk	dependence
Arthur	0.500000	2	0.200000	-
Malika	0.500000	1	0.500000	-
Daniil	0.500000	1	0.600000	-



(a) Distribution of revenues on a train set

(b) Distribution of revenues on a test set

Figure 1: Distribution of revenues given provided solution

As you can see from the plot (see Figure 1), the revenues on the test approximately follow the train set (if there are enough of scenarios). With given solution, we managed to get expected profit of 4.62€. Expected value of the perfect information is 3.28€ and price of stochastic solution is 3.12€.

Optimization of Porfolio 2

For the portfolio 2, we are given next input data (see Table 3):

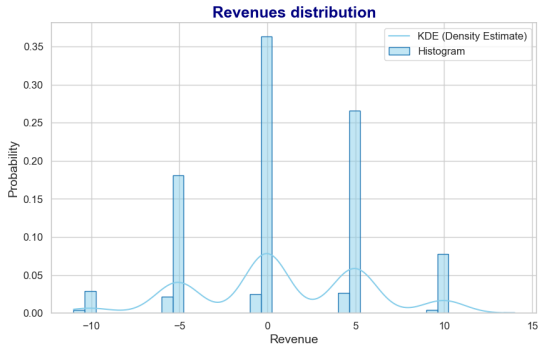
Table 3: Input data for Portfolio 2

project	benefit	cost	risk	dependence
Milana	0.100000	1	0.100000	2,3,4
Arthur	0.500000	2	0.200000	1,3,4
Malika	0.500000	1	0.500000	-
Daniil	0.500000	1	0.600000	-
Yerzhan	0.500000	3	0.700000	-
Azamat	0.500000	4	0.800000	-
Tamila	0.500000	1	0.900000	-
Andrey	0.500000	3	0.900000	-
Mamea	0.500000	1	0.900000	-
Papa	0.500000	5	0.600000	9

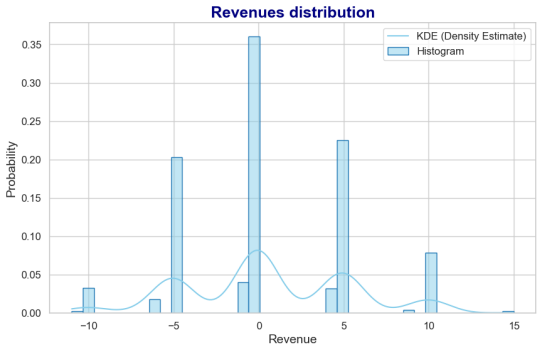
Based on the provided data, the model managed to find next solution that satisfies all of the constraints of the problem (see Table 4):

Table 4: Advised projects to invest for Portfolio 2

project	benefit	cost	risk	dependence
Milana	0.100000	1	0.100000	2,3,4
Arthur	0.500000	2	0.200000	1,3,4
Malika	0.500000	1	0.500000	-
Daniil	0.500000	1	0.600000	-
Mamea	0.500000	1	0.900000	-
Papa	0.500000	5	0.600000	9



(a) Distribution of revenues on a train set



(b) Distribution of revenues on a test set

Figure 2: Distribution of revenues given provided solution

As you can see from the plot (see Figure 2), the revenues on the test approximately follow the train set (if there are enough of scenarios). With given solution, we managed to get expected profit of 0.87€. Expected value of the perfect information is 1.24€ and price of stochastic solution is 1.56€.

Optimization of Porfolio 3

For the portfolio 3, we are given next input data (see Table 5):

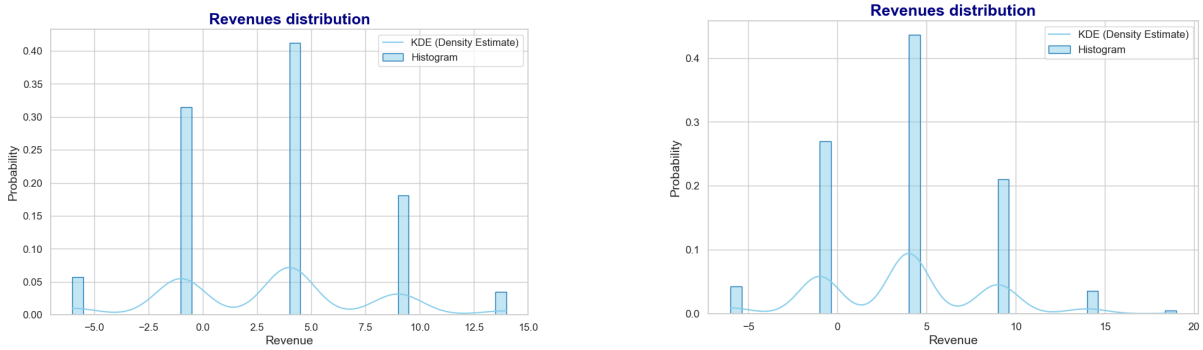
Table 5: Input data for Portfolio 3

project	benefit	cost	risk	dependence
Milana	0.100000	1	0.100000	-
Arthur	0.500000	2	0.200000	-
Malika	0.500000	1	0.500000	-
Daniil	0.500000	1	0.600000	-
Yerzhan	0.500000	3	0.700000	-
Azamat	0.500000	4	0.800000	-
Tamila	0.500000	1	0.900000	9
Andrey	0.500000	3	0.900000	-
Mamea	0.500000	1	0.900000	-
Papa	0.500000	5	0.600000	-

Based on the provided data, the model managed to find next solution that satisfies all of the constraints of the problem (see Table 6):

Table 6: Advised projects to invest for Portfolio 3

project	benefit	cost	risk	dependence
Arthur	0.500000	2	0.200000	-
Malika	0.500000	1	0.500000	-
Daniil	0.500000	1	0.600000	-
Tamila	0.500000	1	0.900000	9
Mamea	0.500000	1	0.900000	-



(a) Distribution of revenues on a train set

(b) Distribution of revenues on a test set

Figure 3: Distribution of revenues given provided solution

As you can see from the plot (see Figure 3), the revenues on the test approximately follow the train set (if there are enough of scenarios). With given solution, we managed to get expected profit of 3.11€. Expected value of the perfect information is 2.59€ and price of stochastic solution is 2.25€.