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Determination of Investment Success and its Factors for Russian Cinema at the Box Office Using Machine Learning

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ABSTRACT

Historical data of the box office of Russian cinema is the **object of research**. The **purpose** of the study is to determine the possibility of forecasting the cash fees of the film project at an early stage in the production of films, which is especially **important** due to withdrawal of foreign distributors from the Russian market. The analysis was carried out on **data** for the entire population (N = 1400) of Russian national films that were released from the beginning of 2004 to April 2022. These data are **introduced into scientific circulation** for the first time. The study used **methods** of evaluation of film projects based on historical profitability and classification of films by genres, directors, screenwriters. The **result** of the experiment on 7 machine learning and neural network models achieved an accuracy of 0.96 and ROC (AUC) = 0.98. The article provides **conclusions** about the directions for improving forecasting methods and conclusions about the limitations of the proposed approach. Taking into account the high volatility of the individual financial result of a film project, **recommendations** were made by the "portfolio" principle of investment, which opens the prospects of debt and equity financing of cinema using market financial instruments, issuance of bonds and shares by producers and distributors.

Keywords: investment in cinema; investment consulting; portfolio investment; machine learning; national cinema of the Russian Federation; neural networks; data science; Ministry of Culture of the Russian Federation; Cinema Fund

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INTRODUCTION

Russian cinema is undergoing a difficult stage of development: on the one hand, the departure of foreign distributors opens up opportunities for Russian producers, on the other hand, taking into account the production cycle of two years, there is a risk of loss of revenue and reduction of the cinema network. The first is the issue of the efficiency of investment in cinema, both public and private. Between 2004 and 2022, Russian cinema was a loser, with just over 11% of the films having a success in the box office. The problem of losses can be solved by increasing the percentage of successful projects using machine learning models to predict results.

Machine learning models are used in the banking and financial spheres: to predict "the share of default loans in commercial bank credit portfolios using the AI model" [1]; to "estimate the value of a company" [2] to "evaluate the state of companies, forecast bankruptcy... support management decision making" [3]. Financial forecasting involves "building prognostic models with the introduction of machine learning" [4].

The Russian cinema industry is no exception in terms of their applicability. However, it should be noted that:

- high level of investment risk [5];
- substantial share of public participation;
- limited capacity of the local film market;
- pronounced seasonality and susceptibility to difficultly predictable events with extreme degree of negative impact on the example of the COVID-19 pandemic [6].

The effects of these conditions are not always negative. For example, government support reduces industry adaptability. However, in China, it increases the capacity of the national market (second in the world in cash fees and the number of films produced) [7].

The application of "mathematical methods and models of correlation and regression analysis" [8] is not a fundamentally new approach to investment analysis of the industry It is possible to differentiate between two categories of approaches to assessing the film's success in the future: "socio-analytical" and "historical- analytical".

The first class includes the "methodology of predicting film cash fees on the emotional impact on viewers" [9], when respondents are asked questions about their emotional state after a film trailer demonstration. This method presupposes that the production cycle is started, take the first video.

The second direction involves assessing the prospects of the project on historical returns and allows to assess the investment attractiveness of a project at an early stage, when its parameters are known, the creative group is defined, and an approximate budget, but the shooting has not begun. Therefore, all settlements can be made before pitching at the "Film Foundation" or before private investors

The method of evaluation by historical profitability allows to identify potentially successful projects and to eliminate the obviously unsuccessful ones, and also offers opportunities for the correction of the creative group, budget and genre, ideological and thematic component of the project.

DATA SOURCES

During the study of the issue, the data[1] of the initial rental of 1400 genre films of Russian production from the beginning of 2004 to April 2022, starting with the dramatic film "72 meters" and ending with the children's animation "Fixikino. The universe of adventure" were analyzed. Re-releases, film almanacs, short films, projects that only appeared on television and streaming platforms were excluded. The structure of the source dataset (working data set) is presented in *Fig. 1*.

[1] The study used open data from public sources: kinopoisk.ru, film.ru, filmpro.ru, kinoafisha.info, kinometro.ru, kinonews.ru, kinobusiness.com, enriched by cross-checking.

	screens	budget	genre	director	scriptwriter1	scriptwriter2	age	time	box
0	100	46096480.0	0.509727	0.443680	1.171456	1.171456	12	115	0
1	117	57620600.0	0.940596	0.563948	0.742941	0.780971	0	98	0
2	315	121003260.0	0.940596	4.242373	1.662735	1.662735	16	115	1
3	47	46096480.0	0.509727	0.099780	0.773626	0.371797	12	101	0
4	188	57620600.0	1.260718	0.329743	0.329743	0.329743	6	90	0
...	...	...	...	...	...	...	...	...	...
1395	112	40000000.0	0.509727	0.020075	0.020075	1.316217	16	88	0
1396	108	80000000.0	0.509727	0.200000	3.949617	0.371797	16	94	0
1397	1695	120000000.0	1.872024	1.437529	0.566667	0.566667	16	105	0
1398	1662	319000000.0	0.509727	0.407003	0.181818	0.371797	12	105	0
1399	21	80000000.0	0.843633	0.200000	0.273121	0.371797	0	90	0

1400 rows × 9 columns

Fig. 1. **Fragment of the Russian Film Distribution Dataset**

Source: Compiled by the author.

Dataset description:

- screens — the number of screens on which the film was released;
- budget — film budget[2];
- genre — the main genre of the film (comedy, drama...), the use of drawing on the genre (fees/budget ratio) for the period 2004–2022;
- director — paid off on all directors' projects (fees/budget);
- scriptwriter 1 — paid off on projects of the first screenwriter;
- scriptwriter 2 — paid off on projects of the second screenwriter;
- age — age rating of the film;
- time — film length in minutes;
- box — target indication. Box = 0 — the film failed. Box = 1 — paid off (assembled more than 2 budgets).

[2] The median budget was used for 30% of Russian projects. The dataset uses the production budget, additional "promotion costs (including advertising) can be up to 30%" [10].

EXPLORATORY DATA ANALYSIS

All the films in the dataset received 645.6 mln views. Total charges in the lease amounted to 137.7 bln rubles. The total budget of open source projects is 145.9 bln rubles. Given the incompleteness of the data, the total budget was estimated at 210.1 bln rubles. Attempts to statistical analysis of genres of Russian cinema have been undertaken earlier, but for a shorter period of time [11], the present study is one of the most extensive.

The average budget of the Russian film for the period was 142.7 mln rubles. Median budget is 80 mln rubles. The fee/budget ratio for the overwhelming majority of projects was only 0.28 (median), while for project returns this should be at least 2, as a portion of the profit is taken by the cinemas and other film market participants. And if investors relied only on one project, they lost, as in the case of the story from Troika

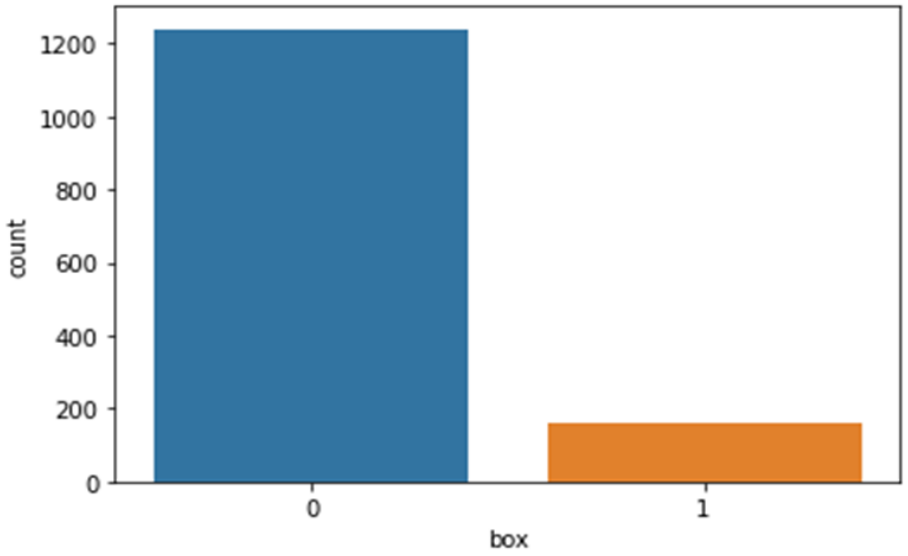

Fig 2. **The Ratio of Russian Films that Paid Off and Failed at the Box Office from the Beginning of 2004 to April 2022**

Source: Compiled by the author.

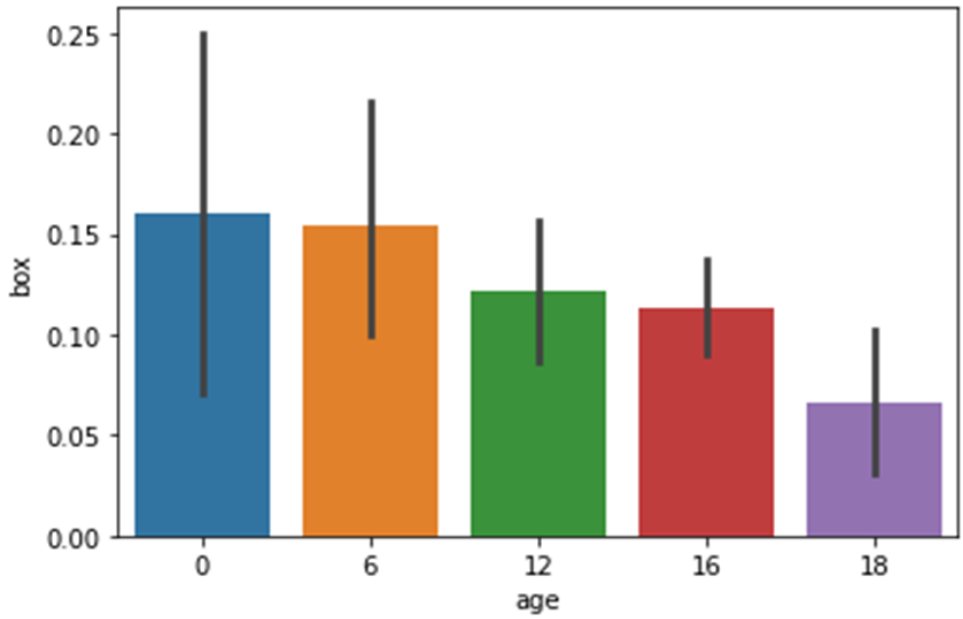

Fig. 3. **Paid Off Film Projects Depending on Age Limits**

Source: Compiled by the author.

Dialog MC and the project "Smeshariki. Beginning".[3]

According to historical data, only 11.43% of national films received cash success in the post-Russian film market (*Fig. 2*). At the same time, there are examples of films ("Kiss", "I'm losing weight", "Smerd" and others) that collect hundreds of percent of profits.

Assess such a basic feature as the age rating of the film. In Russia, movies are filmed in the rating of 16+, because it is the most relevant audience for theatres (films 18+ are intended for adults) (*Fig. 3*).

[3] "Smeshariki" did not amuse private investors. Information Service, Sostav.ru. 13.01.2012 URL: https://www.sostav.ru/news/2012/01/13/s12/ (accessed on 15.01.2023).

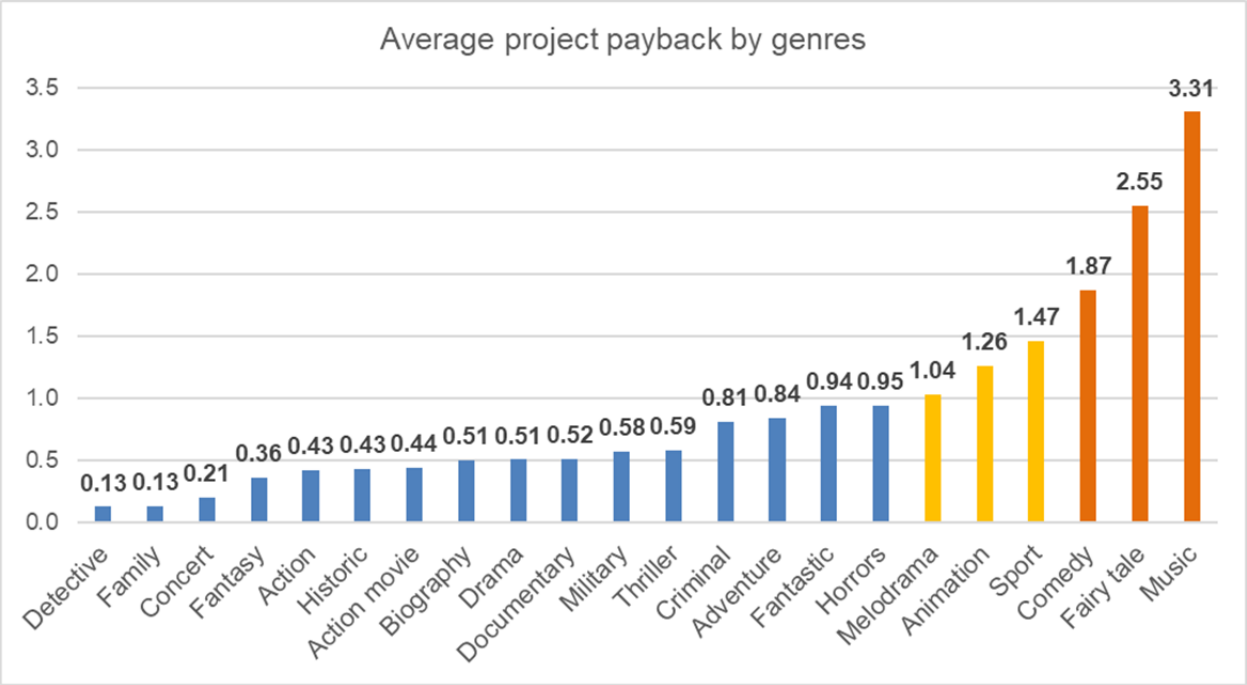

Fig. 4. **Paid Off Project Depending on Genre**

Source: Compiled by the author.

In Russia, the most chances to pay off in the categories of films 0+ and 6+, because it is under these frameworks fall the genres "story", "animation" ("films"). It should be noted that the genre "children" or "family" films, not represented by the first two categories, is lost (*Fig. 4*).

For the use of data on genres in prognostic models we estimate the average output per genre for all Russian projects for the specified period of time. The category "musical film" leads, but there are only four such films in the sample, so the genres "comedy" and "story" appear to be more promising. The Russian audience enjoys the minimum challenge of the national films of the category: "action", "thriller", "family film", "detectives", "fantasy", historical and biographical films. On the verge of payback — adventure, fantasy films and horror genre.

The length of a film is an important category. First, the budget includes the work of the creative and technical team, each minute of screen time increases the cost. On the other hand, the laws of cinematic storytelling require the exposure of the subject and the achievement of an emotional effect. The standard of one and a half hours, which producers are trying to focus on, has become the benchmark (*Fig. 5*).

The equally important indicator is related to the number of screens on which the picture appears (*Fig. 6*). Of course, film rental companies can change the number of screens to increase or decrease depending on the fees on the first days.

As a rule, do not pay off films that go on less than 200 screens. This includes authors' films for narrow target groups and projects rented out "for bars" to report to investors or the state. A separate example, the so-called "Yakutia cinema phenomenon",[4] when films are shot on enthusiasm with a minimum budget and therefore pay off in rent on a small number of screens. The best odds are for pictures that have been released on 900–1100 screens.

[4] Director Stepan Burnashev — about the phenomenon of Yakut cinema. Russian newspaper. 16.05.2022. URL: https://rg.ru/2022/05/16/reg-dfo/rezhisser-stepan-burnashev-o-fenomene-iakutskogo-kino.html (accessed on 15.01.2023).

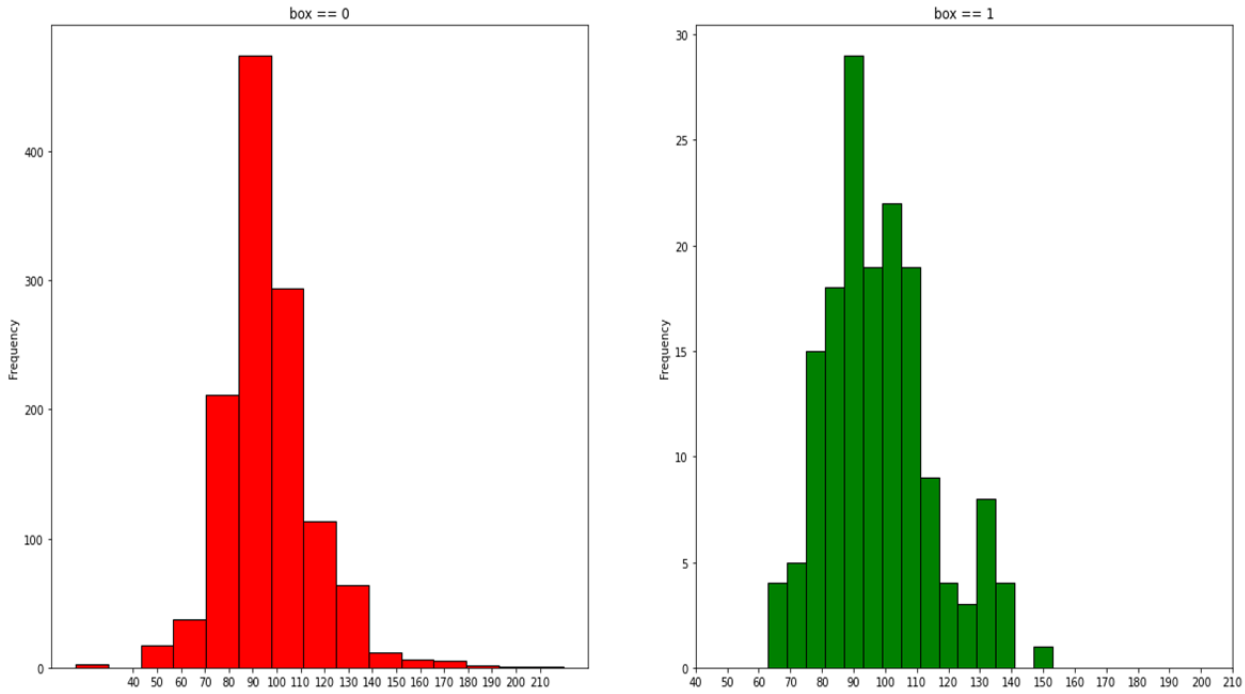

Fig. 5. **Paid Off Movie Depending on its Length Duration in Minutes**

Source: Compiled by the author.

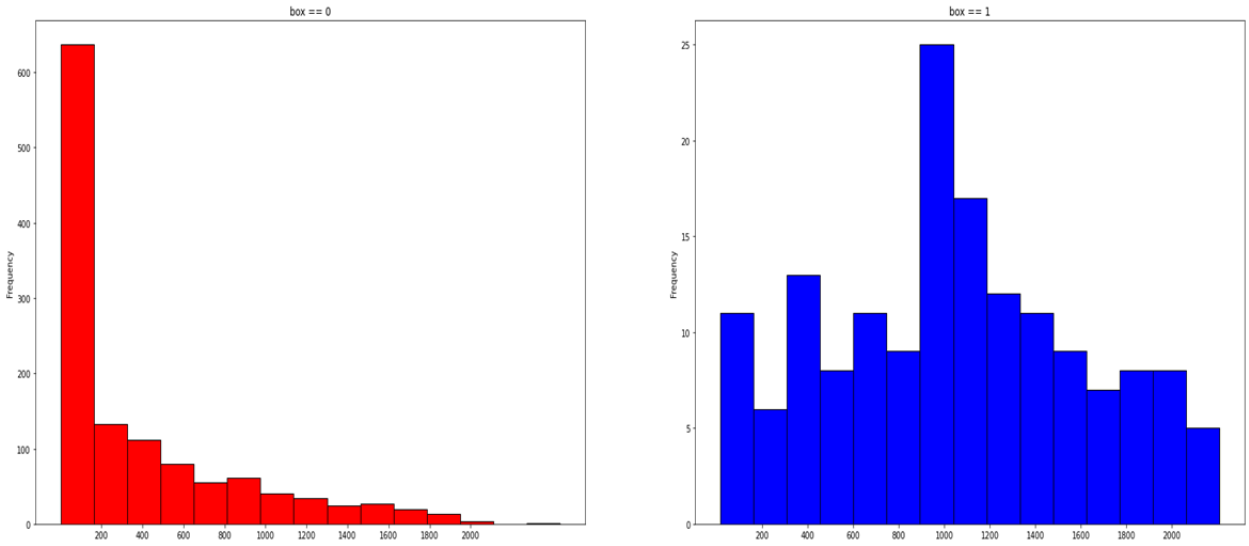

Fig. 6. **Paid Off Movie Depending on the Number of Screens in the Box Office**

Source: Compiled by the author.

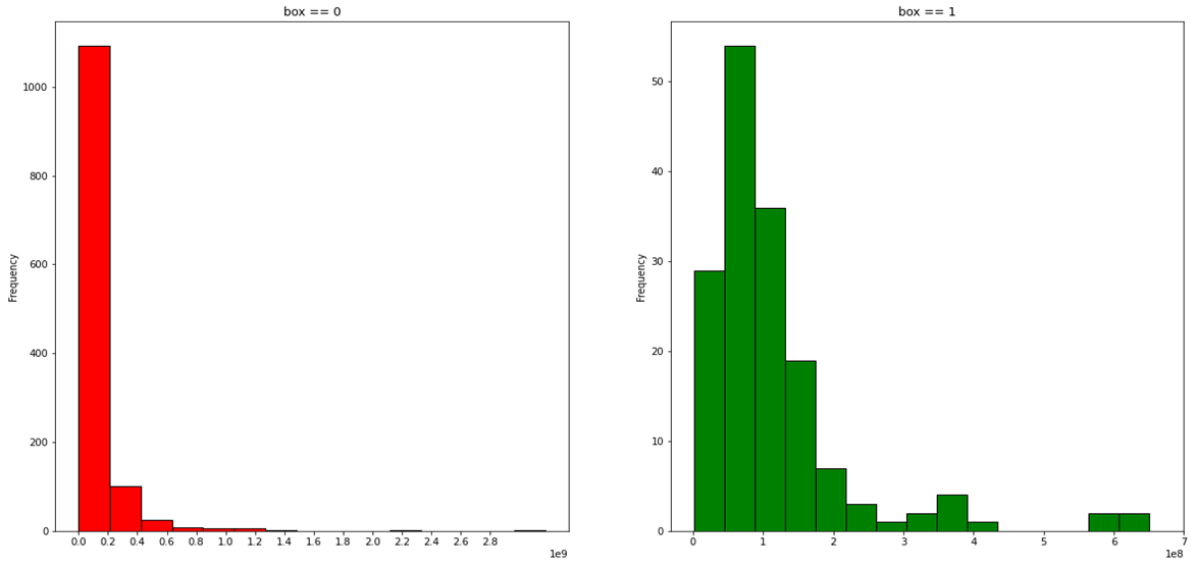

Fig. 7. **Paid Off Movie Depending on the Size of the Production Budget**

Source: Compiled by the author.

The low number of rental screens and the inevitable failure of low-budget films are related to these reasons:

1. Low quality of projects.
2. Very narrow and specific audience (author's cinema, documentary and so on).
3. Lack of marketing budget, poor quality of information.
4. Absence of "connections" in beginner film producers with distributors.

The budget factor of the film is also important (*Fig. 7*). Most of the small-budget films are niche, often made by directors and new producers, both for their own money and for the money of investors from the immediate environment. The chances of success are minimal, as arrangements with rental companies are required.

The initial schedule tells us that in Russia until April 2022 there were no repayments in the rental projects with a budget of more than 650 mln rubles. As a result, the probability of a project failing with a large budget is higher.[5] Accordingly, the chances of pay off can be only in the case of international distribution, positioning for foreign audiences.

Most of the chances to collect your cash in the small budget 50–150 mln rubles and medium-budget (up to 300–400 mln rubles) projects with high-quality information campaign.

It is able to follow the correlations between the prisms that define the indications of film rental. Use the standard correlation search method for Python and the Pandas library with settings: df.corr(), annot = True, cmap = 'RdYlGn' (*Fig. 8*).

When analyzing the factors affecting fees, we can note that there is no strong correlation (0.7 and above) for all characteristics. However, there are factors that influence the outcome: the performance of the director, the first screenwriter and the second screenwriter. The thesis that it is the scenario that determines success is true. The second screenwriter is also important for the project. The first is either a "title" for attracting attention or the initiator of the project. And the second acts as the main author or script-doctor, who brings the project to the end. The film can have a greater number of screenwriters: the

[5] The budget of the film "Cheburashka" amounted to 850 million rubles, repayed many times, this is due to the absence of foreign competitors and high indicators of the project. URL: https://www.kinopoisk.ru/film/4370148/ (accessed on 15.01.2023).

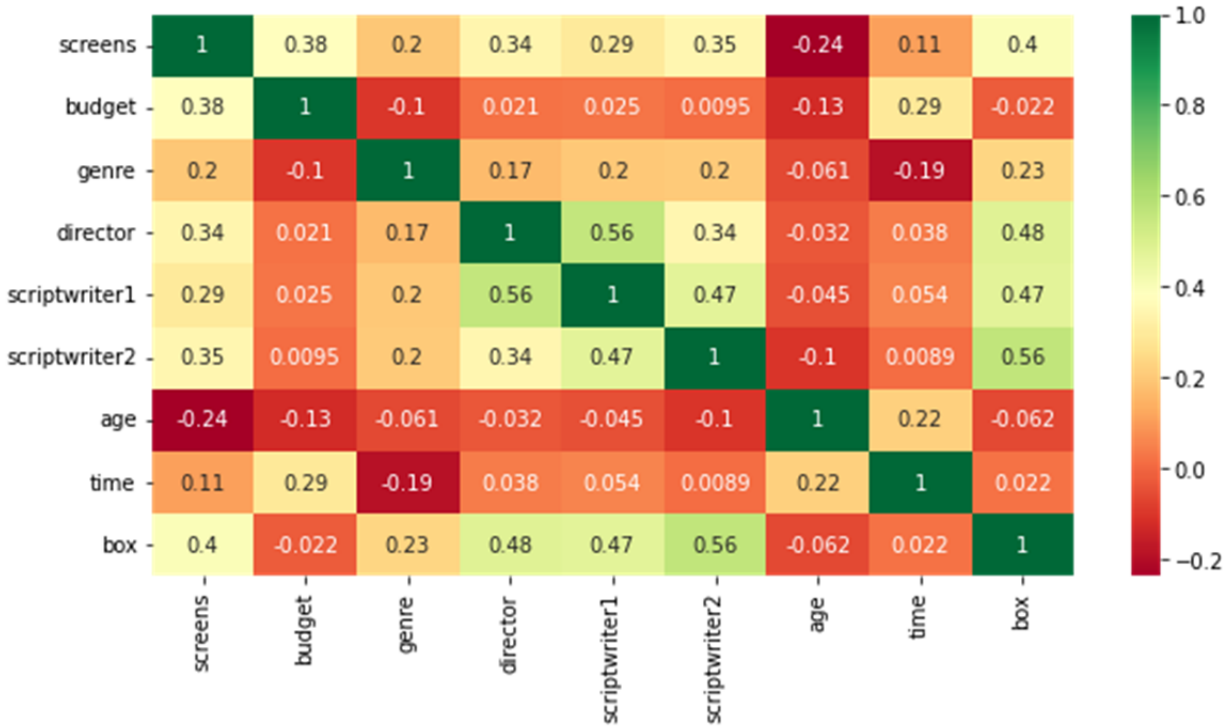

Fig. 8. **Factor Correlation**

Source: Compiled by the author.

	screens	budget	genre	director	scriptwriter1	scriptwriter2	age	time
1237	43	255000000.0	0.509727	0.047059	7.581268	0.371797	16	145
993	172	54000000.0	0.509727	0.068519	0.068519	0.068519	18	124
425	8	30000000.0	0.509727	0.008020	0.004405	0.371797	12	94
1195	125	57880000.0	0.843633	0.532768	0.011036	0.016569	16	99
236	1041	158626500.0	1.872024	1.079107	2.408914	3.486177	12	113
...	...	...	...	...	...	...	...	...
1095	965	270000000.0	0.586462	0.487389	0.177778	0.249644	16	113
1130	11	80000000.0	0.509727	0.200000	0.133805	0.371797	16	80
1294	1170	80000000.0	0.508580	0.672599	0.273121	0.371797	16	127
860	3	80000000.0	1.260718	0.200000	0.364516	0.371797	0	53
1126	78	80000000.0	0.518263	0.200000	0.200000	0.371797	16	90

980 rows × 8 columns

Fig. 9. **Training Sample of 980 Movies**

Source: Compiled by the author.

	screens	budget	genre	director	scriptwriter1	scriptwriter2	age	time
665	70	73149480.0	1.872024	0.008571	0.087768	0.371797	16	79
624	1550	609579000.0	1.037808	0.458381	0.789069	0.789069	12	120
115	5	80000000.0	0.509727	0.159895	0.273121	0.371797	16	97
478	114	80000000.0	0.509727	0.075462	0.021250	0.021961	16	80
233	3	660000.0	0.843633	0.265152	0.273121	0.371797	16	60
...	...	...	...	...	...	...	...	...
287	6	101600000.0	1.872024	0.004695	0.136580	0.371797	16	99
1349	36	80000000.0	0.508580	0.099780	0.273121	0.371797	16	117
1163	96	80000000.0	0.509727	0.200000	0.273121	0.371797	16	96
294	218	45554550.0	0.945690	0.801380	0.999900	0.371797	16	78
1357	150	97745000.0	0.509727	0.185077	0.009249	0.009249	12	118

420 rows × 8 columns

Fig. 10. **Test Sample of Movies**

Source: Compiled by the author.

Fig. 11. **The Results of Evaluating the Effectiveness of the Logistic Regression Model**

Source: Compiled by the author.

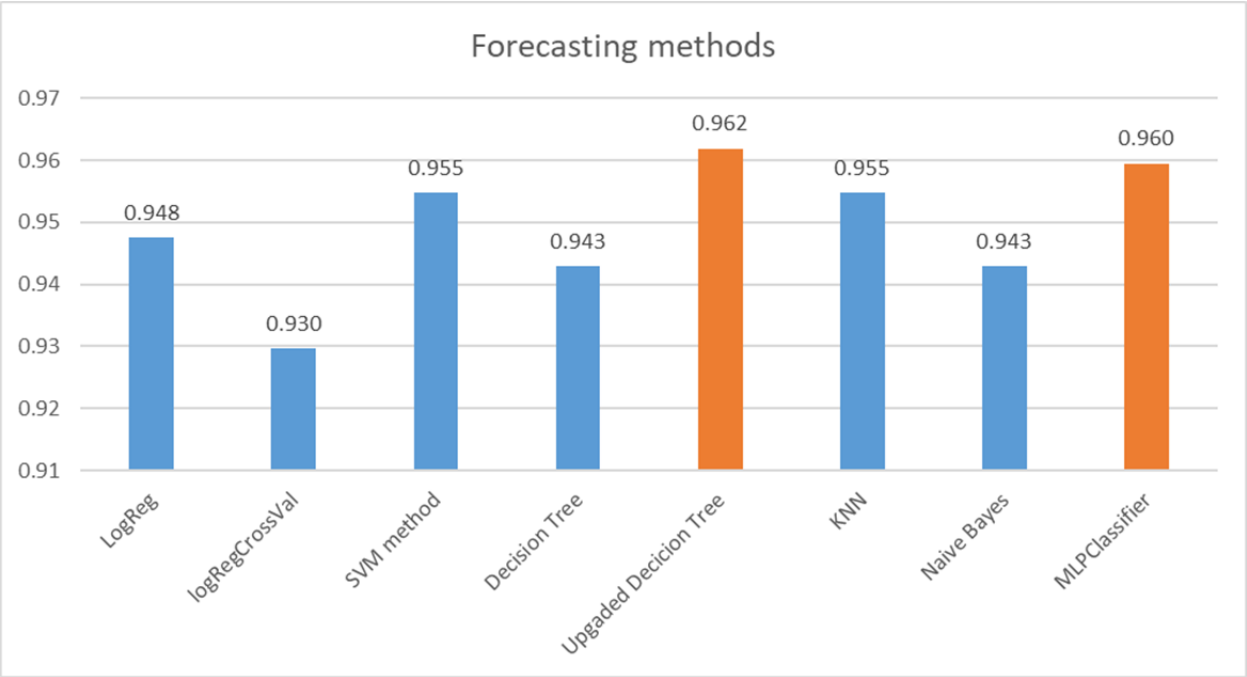

Fig. 12. **Aggregated Data on the Accuracy of Forecasting Models**

Source: Compiled by the author.

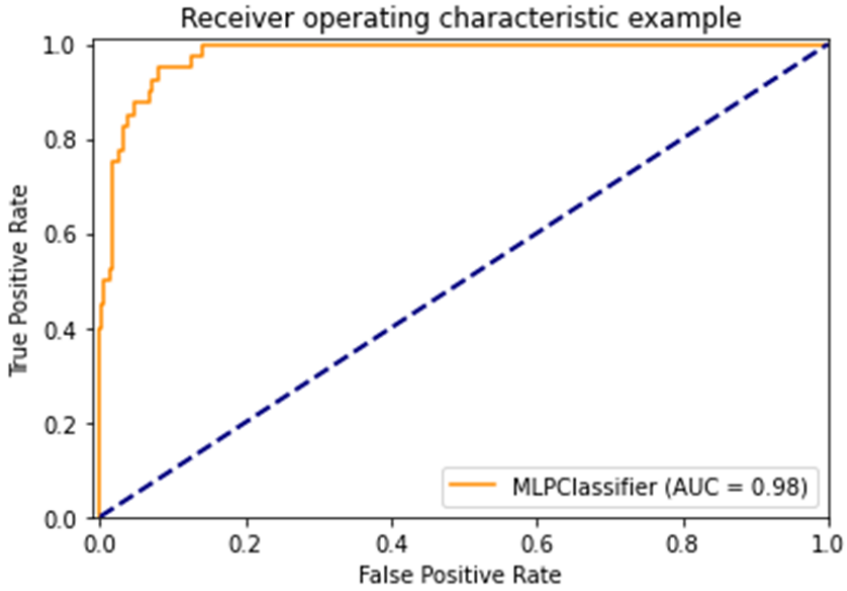

Fig. 13. **MLPClassifier Model Evaluation Metrics**

Source: Compiled by the author.

"scenarists" in the description can add and the director, and the producer, and key actors.

EXPERIMENTAL RESULTS WITH MACHINE LEARNING MODELS AND NEURAL NETWORKS

The selection of all films (N = 1400) was randomly divided using the train_test_split method by the following parameters: test_size = 0.3, random_state = 42. Thus, two samples were obtained: training (980 lines) and test (420 lines) (*Fig. 9, 10*).

The pinning sample is related to values from 0 to 1 using the StandardScaler method. Test sample relief with training sample metrics.

Imported from sklearn.linear_model logistic regression model was trained at parameter: random_state = 2019, solver = 'lbfgs'.

The accuracy was rounded to 0.948. Thus, the test sample correctly predicted 398 outcomes out of 420. The numerical area (Area Under Curve) under the Binary Classification (Receiver Operator Characteristic) representation curves is 0.95 (*Fig. 11*).

When ROC_AUC values above 0.9 the quality of the prognostic model is considered excellent.

The logistical regression model with cross-validation (divided by 2–10 sub-selections) showed less accuracy. Also used were: the support vector machine, the decision tree classifier, the K-nearest neighbor method, and the "Naive Bayesian algorithm". The next stage of the experiment is the use of a neural network. (MLPClassifier). The aggregate data on the accuracy of the models are presented in *Fig. 12*.

The most accurate were the "Decision tree" with selected parameters and the MLPClassifier (multi-layer perceptron) neural network. In the second case, the ROC_AUC was 0.98 (*Fig. 13*).

The main conclusion of the study has been confirmed. For the Russian market of 100 film projects can be achieved accurate predictions regarding 96, which is much higher than any subjective expert method of assessment.

FURTHER INVESTIGATION DIRECTIONS

Modern algorithms based on the analysis of known information have a disadvantage. Based on past statistics, they are unable to identify a radically new cash hit from the young authors. For example, "Star Wars" by J. Lucas in the late '70s would get a negative forecast.

The prospective direction of the research is advanced technologies of "machine learning with reinforcement", operating "in the paradigm of optimism", when the algorithm makes a choice in favor of the study of the environment and new data. An example is the Bayes-UCBVI algorithm from an international team of scientists.

One of the directions of improvement of the model is related to the expansion of the list of parameters, the inclusion of data on producers, screenwriters, composers, actors and other members of the creative team.

As an example, we can cite the project of the Higher School of Economics[6] to assess the American film market, related to the creation of a neural network that takes into account 20 parameters, the standard relative error of the model was 13.8%, the determination coefficient was 0.86 [12]. Although the use of this model in Russian conditions may lead to a decrease in accuracy due to the consideration of ratings and film awards. The models presented in the study did not use the ratings, because there is no significant relationship between the "Kinopoisk" rating and the box office (less than 0.06). It is possible to analyse the text of the script, synopsis and annotation (tagline, logline), as well as images from trailers and posters. An example is the work "Forecasting the success of the film based on brief descriptions of the plot using deep learning models" by Yu. Jin Kim, Yoon Gen Chong and Chong Hong Lee at the Storytelling Workshop 2019[7] in Florence, based on the analysis of plot plans from 42 306 films from around the world.[8] The ScriptBook[9] project

[6] The neural network is going to the movies. Artificial intelligence predicts commercial success of films. Scientific and educational portal IQ — 12.03.2018. URL: https://iq.hse.ru/news/216956320.html (accessed on 15.01.2023).

[7] Storytelling Workshop 2019. August 1, 2019 Florence, Italy. URL: http://www.visionandlanguage.net/workshop2019/program.html (accessed on 15.01.2023).

[8] Artificial intelligence was trained to predict the success of the film. indicator.ru. 02.08.2019. URL: https://indicator.ru/mathematics/nejroseti-predskazyvayut-uspeh-filma-02–08–2019.htm (accessed on 15.01.2023).

[9] Artificial Intelligence Could One Day Determine Which Films Get Made. Variety. 05.08.2018 URL: https://variety.com/2018/artisans/news/artificial-intelligence-hollywood-1202865540/ (accessed on 15.01.2023).

Table

"Model" Investment Portfolio with Directors' Assessment

No.	Director	Number of movies	Average number of rental screens	Average fees per film, mln rubles	Average budget of the film, mln rubles	Average ratio of fees to budget	Rating of Kinopoisk	Rating of IMDb
1	Jora Krizovnikov	5	1 616	899 400 000	147 035 213	8.33	5.30	5.02
2	Klim Shipenko	7	914	645 428 571	156 418 750	5.72	6.67	6.37
3	Alexey Nuzhnyi	6	1 359	489 833 333	240 746 282	4.63	6.48	6.02
4	Timur Bekmambetov	8	996	646 912 500	207 097 668	4.24	5.88	5.53
5	Dmitri Dyachenko	11	1 191	784 272 727	204 079 197	3.81	6.30	5.87
6	Victor Shamirov	5	469	130 256 800	32 212 625	3.54	6.50	5.94
7	Egor Baranov	8	1 068	227 250 000	109 270 671	3.22	6.15	5.79
8	Roman Karimov	8	766	69 500 000	39 403 482	3.06	5.93	5.89
9	Marius Weisberg	12	1 213	336 333 333	119 268 489	3.04	4.92	4.40
10	Sarik Andreasyan	15	1 070	231 866 667	165 582 204	2.46	4.26	4.93
11	Fedor Bondarchuk	6	1 131	887 500 000	701 020 636	1.71	5.35	5.68
12	Svyatoslav Podgayevsky	6	1 059	91 833 333	56 213 542	1.68	4.68	4.70
13	Artem Aksenenko	6	862	120 500 000	84 866 725	1.50	4.70	3.98
14	Petr Buslov	5	931	268 480 000	258 826 950	1.44	6.30	6.10
15	Karen Oganesyan	10	726	90 240 000	91 451 456	1.27	6.06	5.53
16	Oleg Asadulin	7	831	54 557 143	102 189 567	0.80	4.79	4.08
17	Pavel Ruminov	6	342	37 000 000	44 454 390	0.75	4.88	4.88
18	Denis Chernov	6	1 412	209 333 333	435 707 450	0.70	6.90	5.67
19	Nikolai Khomeriki	7	749	99 320 429	317 694 742	0.67	6.04	5.82
20	Anna Matison	6	488	23 211 667	68 246 093	0.66	6.02	5.50
21	Valery Todorovsky	5	647	171 200 000	286 256 875	0.59	6.60	6.42
22	Ruslan Baltzer	5	241	37 915 600	85 224 183	0.56	4.30	3.33
23	Konstantin Buslov	5	1 022	68 435 600	233 362 363	0.55	6.36	5.70
24	Dmitri Suvorov	5	769	40 320 000	89 039 815	0.51	4.38	4.32
25	Pavel Lungin	6	390	52 833 333	212 740 640	0.49	6.68	6.55
26	Renat Davletyarov	7	987	69 257 143	178 029 725	0.41	6.61	5.59
27	Anna Melikyan	7	279	17 494 000	63 292 820	0.34	6.69	6.43
28	Igor Voloshin	5	333	39 099 000	110 597 050	0.33	5.66	5.36
29	Alexey Uchitel'	7	608	109 785 714	430 643 520	0.32	6.29	5.86
30	Kirill Serebrennikov	8	187	22 106 375	96 067 100	0.27	6.99	6.88

Source: Compiled by the author.

can be cited as a technology for analyzing the whole script, a model based on 6 500 scenarios with an accuracy of 0.84.[10]

According to Data Science methods, it is possible to predict not only the financial indicators of the film project and the number of views, but also the ratings of Rotten Tomatoes, IMDB and Kinopoisk, determine trends and audience preferences. For example, the popular "The Movies Dataset"[11] among researchers, which containing basic data on the film, can be used to predict the audience rating.

Some Hollywood producers use predictive algorithms to determine "who to take on the role and predict how much money can be earned".[12] The lack of publicity in the use of machine learning for cinema is related to the specifics of the industry, where the role of charisma and personal connections is great.

PRACTICAL APPLICATION: FORMATION OF INVESTMENT PORTFOLES

Most methods based on historical profitability give a reliable result on a large amount of data. Investing in one film project, even approved, is risky. By analogy with the principle of asset diversification, it is proposed to invest in 20–30 film projects implemented by 10–15 directors over several years.

The study analysed historical data for all Russian directors with 5 or more projects. A promising group of 10 authors with a positive financial result and 5 directors who can show a positive result has been identified.

The presented *Table* shows the historical indicators of the rental. The main parameter for the formation is the ratio of fees to the production budget. Data as of April 2022.

In ideal conditions, with equal budgets for each of the projects of each director, taking into account the production cycle of two years from the launch of the "portfolio of film projects" will reach a yield of 130% per annum. This value is indicative, achieved under the following conditions:

- the director works in his usual genre;
- the capacity of the film market and its other characteristics are unchanged;
- there are no crisis events and "black swans";
- the portfolio is focused on projects with a budget of no more than 400 mln rubles;
- the intervention of the state, an inexperienced private investor, possible "conservative" [13] and other installations not related to economic activity are absent;
- the characteristics of creative and production groups are comparable.

This methodology can be improved by optimizing the portfolio structure based on forecast profitability by analogy with financial asset portfolios [14].

CONCLUSION

The "predictability" of the investment portfolio opens up new opportunities for financing cinema. The state can issue "movie bonds" within the framework of national projects, stimulating investors with guarantees and investment benefits: set-off of payments to the budget, preferential taxation and full tax exemption for reinvestment. There is an opportunity to create global film franchises that combine feature films, TV series, book series, video games and other elements of the modern creative industry, the possibility of using cross-media communication channels. Private film producers and distributors

[10] Savchenko G. Neural network taught to predict the success of films in the rental: the system works with an accuracy of 84%. Bird In Flight. 6.08.2018. URL: https://birdinflight.com/ru/novosti/20180706-artificial-intelligence-scriptbook.html (accessed on 15.01.2023).

[11] Rounak Banik. The Movies Dataset. Metadata on over 45,000 movies. 26 million ratings from over 270,000 users. URL: https://www.kaggle.com/datasets/rounakbanik/the-movies-dataset (accessed on 15.01.2023).

[12] James Vincent. Hollywood is quietly using AI to help decide which movies to make. The Verge. 28.05.2019. URL: https://www.theverge.com/2019/5/28/18637135/hollywood-ai-film-decision-script-analysis-data-machine-learning (accessed on 15.01.2023).

will be able to raise funds through bonds and equity. If we consider cinema as an important component of the modern experience industry and perceive each film as a fundamental element of a franchise or "umbrella brand", it is possible to evaluate the entire franchise, including its components and digital content, broadcast through different communication channels and modern cross-media.

The study proved the existence of stable patterns due to the specifics of the audience and the conditions of film production, which with high accuracy can indicate the success of the project at an early stage.

Profit-oriented public and private entities can assess the potential and prospects of each project impartially.

A private investor with exchange market financing mechanisms is able to invest through standard financial instruments — stocks, bonds and funds. Risks and financing conditions can also be calculated, as well as the rating of film projects, film producers and distributors by agencies assessing creditworthiness. A film franchise may become an object of intellectual property, under which a loan can be obtained.

Local film markets of Russia, China, India, Europe or the United States and the global market offer to solve similar tasks for forecasting fees with a standard algorithm: exploration analysis, promotion of primary hypothesis, collection of historical data, identification of dependencies, model training, forecasting of the result. The specifics of each film market may lie in different "weights" of the model factors, for example, the demand for certain genres. Accordingly, it is possible to create your own "investment portfolio" for each film market.

Russian film production has until recently been dominated by the trend of creating high-budget "blockbusters" receiving state funding. "At the same time, the box office shows that the audience is more often attracted to films that are not so epic, but about the lives of our contemporaries today and tomorrow" [15]. "The disadvantages of state economic support for Russian film art are the reason for the relatively low competitiveness of Russian films" [16]. Researchers of this issue note the urgent need to reform the industry of support for national cinema [17].

The approach proposed based on the results of the study based on medium-budget films, the formation of diversified portfolios and the forecast of payback using machine learning will lead to the following results: the situation with the selection of projects will significantly improve; the dependence on the "need of state support" will decrease[18]; the industry will move to a "normal dialogue" [19] between the state and economic actors; financial stability [20] of the industry will increase; additional financing mechanisms will be attracted, such as crowdfunding, co-production, product placement, fundraising, copyright lending, pre-sale agreements [21]; conditions will be created for the implementation of international film production [22, 23].

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