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Comparative Analysis of Support Vector Machine And Perceptron Algorithms In Classification Of The Best Work Programs In P2KBP3A

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***Abstract*— With the rapid growth of government agencies that are required to carry out an activity in every aspect that publishes and carries out obligations every year, it is required to be held accountable and also implemented for every device that receives such as fostered villages by utilizing the available APBD funds to maximize the work program that has been designed. so that it can be implemented as much as possible. That way, to get the best from all aspects of every work program implementation, there must be an important point from the annual work program design that is made without exception. Data mining itself can help P2KBP3A in analyzing each work program that is designed before being implemented in the future for the annual work program by looking at various aspects of past work program data and grouping work programs in the form of classification. In designing the work program, this research builds a classification model by adding a sigmoid activation function that uses SVM and perceptron to compare the accuracy results of the algorithm used to get the best work program design. From the various classifications used, the best value for classifying the dataset of the best P2KBP3A work programs can be seen from the average accuracy value of 87.5%, F1 value of 82.2%, the precision value of 80.2%, and recall value of 87.5%**

***Keywords*— Classification, Support Vector Machine, Perceptron, Sigmoid, Work Program**

I. INTRODUCTION

Government makes an important factor for a country without exception from central to regional government which makes it a guideline for carrying out important performance aspects on the wheels of a country's prosperity on the vision and mission to achieve the expected goals and prosperity for every citizen and government position, for that is in relation to the performance required to complete and even carry out all aspects of the desired establishment, not forgetting financial factors, thoughts, human resources, infrastructure, location and others [1].

In measuring to place the performance of a component run by the government which is a guideline for certainty supporting a country because it also has to get the support of supporting aspects that make it based on plans and factors that will be implemented and have even been implemented which can be measured on the performance of the implementation in getting value and good benefits from the results received such as the necessity to continue to evaluate how the program being carried out is carried out well or even not well, the facilities provided to the community to whether they get good results from services aimed at all aspects of the field, and tools how to communicate how to make important points and targets for execution to be an impetus and motivation of the implemented work program [2].

Agencies in a government to carry out good and correct performance and are responsible for actually carrying out the work programs that have been designed but now the government is getting a lot of attention because there are more and more government agencies that seem very indifferent to efforts to implement performance and also improve of each performance made to determine more efficient performance in improving the implementation of performance that is really needed and useful and clear results from its implementation because there are still many of the several designs even very far beyond even just the implementation for agencies from year to year not even there is a significant increase in performance performance that is designed even just to play around to spend the existing budget even the interest from all aspects of the implementation field is not feasible with the aim of just designing without thinking about its future for the community at large first l agi for supporters of the supporting aspects of the agency to be good and even clear from each of its programs [3].

In performance itself is having the ability to carry out work activities responsibly and seriously to achieve the actual optimal target [4] :

a. Productivity itself does not only measure the level that is close to efficiency but also measures the effectiveness of services, especially productivity in general can be understood as the ratio between input and output.
b. Service quality is used as an indicator because there are many views that lead to negative things that are formed regarding the level of public organization that arise due to community or public dissatisfaction with the services provided and also because of community satisfaction with the class of services that can be provided. can be measured which can be used as an indicator of bureaucratic performance to the public.
c. Responsiveness itself is the ability to carry out bureaucracy to the community and recognize community needs that are

desired or can be expected by compiling a priority agenda for public services, as well as being able to carry out the development of each public service program in accordance with the needs and aspirations of the community. from society.

d. The responsibility itself is to explain whether each executor of the work plan for the implementation of activities has a bureaucracy to the public which is carried out in accordance with the principles of proper administration and also with the policies of each organization, whether implementing it explicitly or even implicitly. as well as responsibility can also be carried out in carrying out when it collides with responsiveness.
e. Accountability itself is to show at what level the types of policies and bureaucratic activities are carried out and known by every public element that is subject to political officials elected by the people themselves.

Therefore, the people themselves really ask for and even demand self-government in providing good and optimal performance in implementing good goals and creating a prosperous society for government in a country. Performance is an in-depth description of the achievement of an activity in realizing the goals, vision and mission of an organization or government itself. By using a performance-based budget, the performance of each local government will be known and designed to be able to implement it, even though the budget issued is very large, it can even overshadow what should not be implemented or even become a priority in the design of work programs. Performance will be reflected in existing accountability reports in the form of achievement or performance reports based on performance achievements made, performance indicators make important points for each aspect of implementation and also make an analysis of performance standards, unit price standards and standards. minimal service. The Regional Revenue and Revenue Budget (APBD) is to provide a mandate to the community at the regional government to achieve from making to realizing the aspirations and needs of the community in one year of performance and also certain finances expressed in currency or rupiah. The embodiment of the community's mandate on the local government side can also be set forth in the form of a work plan to be carried out by the regional government using the resources it has, so that the preparation of the regional government budget must be oriented to the interests of the community, from the principle of government that is guided by its people [5].

Support vector machine or commonly abbreviated as SVM is a method that functions to solve problems such as predictions, whether in the form of classification or regression [6]. This algorithm has the advantage of high accuracy and does not require a lot of data samples to avoid overfitting [7]. This algorithm can also solve problems by using datasets that have a large feature space [8]. In addition to SVM, there is also another algorithm that is also good for use in prediction problems in the form of classification, namely the perceptron, a simple supervised learning neural network algorithm that can be used to recognize patterns in data [9].

As a method to enter into machine learning and focus on the type of supervised learning, it can be used to form behavioral patterns from data based on a collection of data samples that have been labeled [10]. By using the desired input and output values from a set of data, supervised learning can be used to solve classification or regression problems depending on the type of data being processed [11]. The classification itself as one part of supervised learning can be used to build a learning model, where the computer learns the input data and generates a classification function to categorize the data that is used as test material [12].

This study aims to compare the classification between the SVM algorithm and the perceptron, both of which have the addition of using the sigmoid function. The sigmoid function itself is a kernel function that is often used in non-linear classification problems using the SVM algorithm [13], and can also be used for the perceptron algorithm with the sigmoid activation function in performing comparative analysis.

Data mining itself is one of the sciences in the field of computer science which can be in the form of grouping to be used in solving problems such as predictions, such as classification, or regression [14] [15]. Machine learning itself can also be defined as a type of application to computers and also mathematical learning algorithms that are adopted by following learning concepts that come from data and also to produce predictions in the future for sure. Machine learning itself is also associated as a branch of data mining learning that has been widely used to solve a problem with classification by utilizing a neural network model [16], [17] Based on the number of hidden layers, the ANN model is divided into two types, namely single-layer ANN which has one hidden layer and there is also multi-layer ANN which has more than one hidden layer [18], [19].

Support Vector Machine (SVM) is a method that follows for self-classification which was first introduced by Vapnik in 1998. Where based on this concept is the modeling of the method so that it can work well in defining the boundary between two classes that are different from the maximum distance from the nearest available data [20]. To be able to execute obtaining by getting the maximum limit between two different classes, it must be formed into a hyperplane or the best dividing line on the input space or space obtained by measuring at the hyperplane margin and also to find the maximum point.

Single layer perceptron is a network that has one layer with weighted layers connected. The advantages also have, among others, that they can obtain necessary knowledge from the uncertainty in the data used to perform tests on the data, which can also be made from the results generalized to extraction [21]. The single-layer perceptron method itself is the most basic method for machine learning cases and also the simplest at the case level. Single-layer perceptron itself is a feedforward type, which is a type of NN where neurons in one layer can only connect with neurons in different layers. Therefore, in this case, the Single Layer perceptron network method includes supervised learning because the learning method is carried out by studying examples of known input and output [22].

This study takes a case study of population control, family planning, women's empowerment, and child protection or abbreviated as P2KBP3A Deli Serdang. Every year, several different work programs are arranged, such as family planning team training activities, provision of correspondence services, child rights convention training, coordination meetings, training in the use of tools, and consultations outside and within the region.

Other work programs totaling up to 62 work programs and even more than 62 work programs [23] by analyzing performance programs. To get a work program that is feasible to be implemented and continues to exist every year, the work program that has been evaluated and of course makes improvements. Feasibility and performance of work programs that are ready to be implemented and accounted for to be able to provide significant results for progress [24].

Based on the background of the classification problem for the prediction above, the authors collect data directly, and also in this case there has been no related research and the data used has not been processed [25], [26]. In analyzing to classify the best work program from the P2KBP3A case study using the sigmoid function which is applied to the classification problem using the SVM and perceptron algorithms. The comparison analysis used is to find the values of accuracy, precision, recall, and f-measure obtained from the evaluation of k-fold cross-validation [13], [14], to then assess which algorithm has the best performance.

II. RESEARCH METHOD

The classification system for the architectural level of research designed to look for the best work programs of case studies P2KBP3A, which is where the course of this system goes according to the procedures addressed to figure 1 as follows :

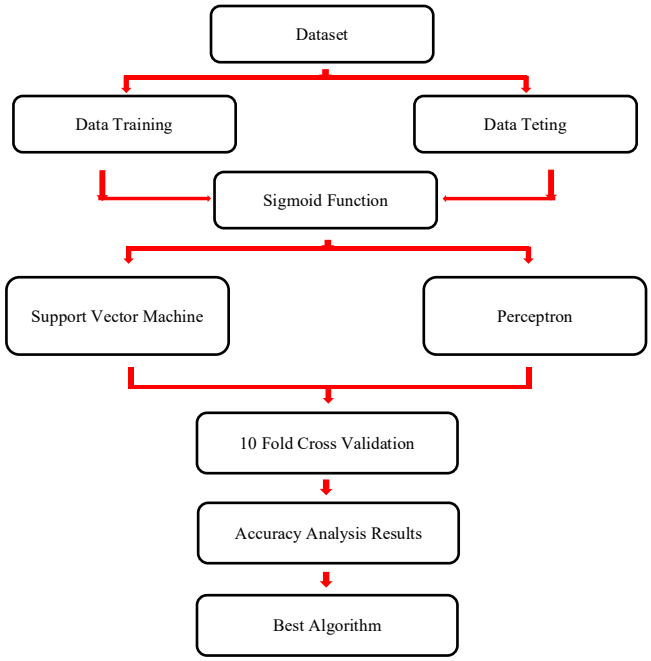

Fig. 1 Research Design Architecture

A. *Model Dataset*

In conducting research, datasets are used in the form of a range from 2018 to 2021 in the sense of using data that has been grouped for 3 years, thus testing validation data from every 3 years to find out from the value of the determination of accuracy every year after testing based on the year of testing.

From the dataset itself, it has more than 600 data on annual performance work program plans where the average annual performance plan range is 40% to 28%, which means that from one year the work plan from P2KBP3A is around 180 to 260 work plan data made. and must be carried out annually.

In this study, the sigmoid activation function was applied to the SVM and perceptron algorithms to classify the best work program at P2KBP3A Deli Serdang based on pre-determined categories. The results of the classification with the output of target achievement and realization of work programs with low, medium, and high categories are then analyzed using cross-validation with a value of K = 10 to obtain the accuracy, precision, recall, and f-measure values for each algorithm. These values are then compared to determine which algorithm, between SVM and perceptron, the sigmoid activation function results in a better classification of the best working program problem.

This study compares the support vector machine and perceptron, which consists of the sigmoid function, to the best work program dataset in the P2KBP3A case study using the Orange 3.30 application which uses different annual calculations from 2018 to 2021 which is carried out annually in the form of a model. as shown in Figure 2.

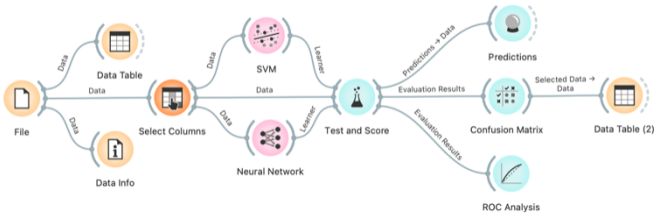

Fig. 2 Classification Model

This study also has details to identify the classification on the models used from SVM and perceptron to activate the sigmoid function with the caption Figure 3 and Figure 4 SVM Model and Perceptron model as follows :

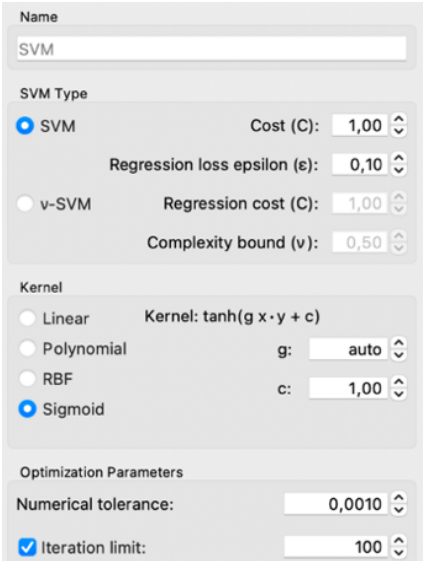

Fig. 3 Sigmoid Function Model Of SVM

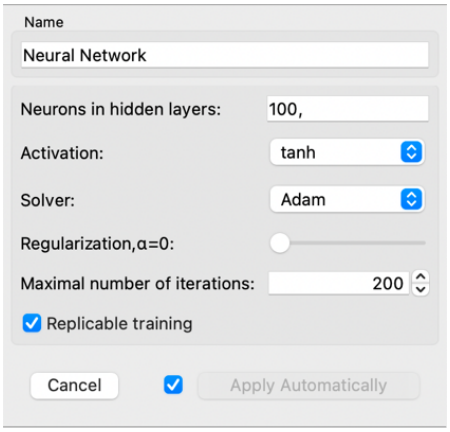

Fig. 4 Sigmoid Function Model Of Perceptron

B. Work Program Plan Data

Data from the work program plan from P2KBP3A which is used as reference material to determine the feasibility of the work program, from the work program plan that is used as data is taken with a range of years starting from 2018 to 2021 as test material. from each work program data each year has a different range of work programs with the following specifications :

- Data for 2018 with a total number of work program plans of as many as 262 implementers.
- Data for 2019 with a total number of work program plans of as many as 189 implementers.
- Data for 2020 with a total number of work program plans of as many as 174 implementers.
- Data for 2021 with a total number of work program plans of as many as 161 implementers.

The result is that each year has a reduced work program from the initial year which has filtered the feasibility of the work program but does not demand the possibility of increasing each work program.

The features used in determining the criteria for the work program plan are 1 and 1 as the target, the following features are used and the explanations are as follows :

Table 1. Classification Features And Targets

No	Feature
1	Jumlah Ikut Serta Desa Binaan
2	Lama Kegiatan
3	Sumber Anggaran Dana
4	Anggaran Biaya
5	Insfrastruktur Program Kerja
6	Jumlah Ikut Peserta
7	Jumlah Kegiatan Kecamatan 1 Bulan
8	Sisa Anggaran Biaya
9	Target Pencapaian Kinerja 1 Bulan
10	Penerimaan Hasil Pelaksana
11	Tingkat Kegiatan
12	Dana Indikatif Sisa Anggaran Dana Awal
13	Tahun Rencana Kerja
14	Target Pencapaian

Explanation of features and targets used :

1. The number of assisted villages participating explained that the assisted villages participating in the work program activities carried out the work program with the intention that the more villages that could participate the better it would be by sending village officials.
2. Activity duration, describes the duration of the activity which can be said to range from hours to days.
3. Sources of budget funds, explaining where the budget funds issued to carry out the implementation of activities come from.
4. Budget, explains the budget issued for activities in the work program to be implemented and is an important aspect of this implementation.
5. work program, explains how the allocation of available infrastructure is good or not.
6. The number of participants, explained from village officials or officials who recruit experts to take part in activities with the more participants the better.
7. The number of sub-district activities is 1 month, explaining each work program carried out by village officials in 22 sub-districts with a 1-month recapitulation that has been carried out.
8. Residual budget, explains how the remaining budget from the initial budget is issued with a slightly better remaining budget.
9. Performance achievement targets for 1 month, explaining how the work program targets have been implemented and also given for 1 month.
10. Acceptance of the results of the implementation, the average value of the results of this implementation ranges from 0 to 100 for the implementation that has been carried out.
11. Levels of activity, explaining how the level of implementation is addressed from 4 levels, namely from the lowest level are cities, districts, sub-districts and villages.
12. Indicative funds remaining from the initial budget, explaining the results of the difference between the initial budget and the remaining budget funds by calculating the smaller the difference in the budget, the better.
13. Year of work plan, describes the year of activity that is not included in the use of features and only serves as a marker for the annual work program.
14. Achievement target, namely the target result of all features used with appropriate and inappropriate information.

The following is a sample of the data for the work program plan carried out starting from 2018 in table 2 as follows :

Table 2. 2018 Work Program Plan Data

No	Indikator Rencana Program Kerja
1	Rapat koordinasi dan konsultasi ke luar dan dalam daerah
2	Penyediaan jasa administrasi kantor
3	Penyediaan Alat Instalasi Air
4	Penyediaan Peralatan dan Perlengkapan Kerja
5	Penyediaan jasa publikasi perkantoran
6	Pembinaan Organisasi Perempuan

7	Kegiatan Pendidikan dan Pelatihan Peningkatan Peran Serta dan Kesetaraan Gender
8	Kegiatan Penyuluhan Bagi Ibu Rumah Tangga dalam Membangun Keluarga Sejahtera
9	Kegiatan Bimbingan Manajemen Usaha bagi Perempuan Dalam Mengelola Usaha
10	Kegiatan Pameran Karya Perempuan dibidang Pembangunan
11	Monitoring, Evaluasi dan Pelaporan
12	Operasiona Dharma Wanita Persatuan
13	Operasional Gabungan Organisasi Penyelenggara Taman Kanak - Kanak Indoensia
14	Operasional Gabungan Organisasi Wanita
15	Pendidikan dan Pelatihan Peningkatan Peran Serta dalam Kesetaraan Gender
16	Pembuatan Profil tentang Kualitas Hidup Perempuan dan Kualitas Keluarga
17	Pelaksanaan Kebijakan perlindungan Perempuan di Daerah
18	Pelatihan Bagi Pelatih (TOT) SDM Pelayanan dan Pendampingan Korban KDRT
19	Sosialisasi dan Advokasi Kebijakan penghapusan Buta Aksara (PBAP)
20	Sosialisasi dan Advokasi Kebijakan Perlindungan Tenaga Kerja Perempuan
21	Sosialisasi sistim Pencatatan dan Pelaporan KDRT
22	Fasilitasi Upaya Perlindungan Perempuan terhadap tindakan kekerasan
23	Monitoring, Evaluasi dan Pelaporan
24	Pendampingan Korban Kekerasan Dalam Rumah Tangga dan Traffiking
25	Pendampingan Ekonomi Perempuan Marginal
26	Pembinaan Ekonomi Perempuan di Sektor Informal
27	Penyuluhan bagi Ibu Rumah Tangga dalam Membangun Kualitas Hidup Perempuan dan Kualitas Hidup Keluarga
28	Sosialisasi dan Advokasi tentang Pengarusutamaan Gender bagi Tenaga Kerja Perempuan
29	Fasiliasi Pengembangan Pusat pelayanan Terpadu Pemberdayaan Perempuan (P2TP2)
30	Pemetaan potensi organisasi dan lembaga masyarakat yang berperan dalam pemberdayaan perempuan dan anak

The following is a sample of the data for the work program plan carried out starting from 2019 in table 3 as follows :

Table 3. 2019 Work Program Plan Data

No	Indikator Rencana Program Kerja
1	Penyediaan Bahan Bacaan Dan Peraturan Perundangan
2	Penyediaan Makanan Dan Minuman
3	Rapat-Rapat Koordinasi dan Konsultasi ke Luar Daerah
4	Penyediaan Jasa Administrasi Kantor
5	Penyediaan peralatan dan Perlengkapan Kerja
6	Pembangunan Rumah Dinas
7	Pembangunan Gedung Kantor
8	Pengadaan Kendaraan Dinas/Operasional
9	Pengadaan meubelair
10	Pemeliharaan Rutin / Berkala Gedung Kantor
11	Pemeliharaan Rutin / Berkala Kendaraan Dinas / Operasional
12	Rehabilitasi Sedang / Berat Rumah Dinas
13	Rehabilitasi Sedang / Berat Gedung Kantor
14	Pengadaan Pakaian Dinas Beserta Perlengkapannya
15	Monitoring dan Evaluasi Kepegawaian
16	Penyediaan Jasa Surat Menyurat
17	Penyediaan Jasa Komunikasi, Sumber Daya Air dan Listrik
18	Penyediaan Jasa Peralatan dan Perlengkapan Kantor
19	Penyediaan Jasa Administrasi Keuangan
20	Penyediaan Jasa Kebersihan Kantor
21	Penyediaan Jasa Perbaikan Peralatan Kerja
22	Penyediaan Alat Tulis Kantor
23	Penyediaan Barang Cetakan dan Penggandaan
24	Penyediaan Komponen Instalasi Listrik/Penerangan Bangunan Kantor
25	Penyediaan Peralatan dan Perlengkapan Kantor
26	Penyediaan Peralatan Rumah Tangga
27	Penyediaan Bahan Bacaan dan Peraturan Perundang - Undangan
28	Penyediaan Makanan dan Minuman
29	Rapat - Rapat Koordinasi dan Konsultasi ke Luar dan Dalam Daerah
30	Penyediaan Jasa Administrasi Kantor

The following is a sample of the data for the work program plan carried out starting from 2020 in table 4 as follows :

Table 4. 2020 Work Program Plan Data

No	Indikator Rencana Program Kerja
1	Pemantapan keterpaduan BKB Posyandu PADU
2	Perumusan Kebijakan Peningkatan Kualitas Hidup Perempuan di Bidang Ilmu Pengetahuan dan Teknologi
3	Perumusan Kebijakan Peningkatan Peran dan Posisi Perempuan di Bidang Politik dan Jabatan Publik
4	Pelaksanaan Sosialisasi yang terkait dengan keswetaraan Gender, Pemberdayaan Perempuan dan Perlindungan Anak
5	Monitoring, evaluasi dan pelaporan
6	Pelatihan Konvensi Hak Anak (KHA)
7	Sosialisasi Pembentukan Lembaga Pemberdayaan Perempuan Lanjut Usia (LPPLU)
8	Sosialisasi dan Advokasi Keterwakilan Perempuan di Parlemen
9	Fasiliasi Pengembangan Pusat pelayanan Terpadu Pemberdayaan Perempuan (P2TP2)
10	Pemetaan potensi organisasi dan lembaga masyarakat yang berperan dalam pemberdayaan perempuan dan anak
11	Pengembangan materi dan Pelaksanaan KIE Tentang KKG
12	Penguatan Kelembagaan Pengarusutamaan Gender dan Anak
13	Evaluasi Pelaksanaan PUG
14	Peningkatan Kapasitas dan Jaringan Kelembagaan Pemberdayaan Perempuan dan Anak
15	Pengembangan Sistem Informasi Gender dan Anak
16	Monitoring, evaluasi dan pelaporan
17	Peringatan Ibu Tingkat Kabupaten
18	Peringatan Kartini Tingkat Kabupaten
19	Evaluasi Kabupaten Layak Anak
20	Pelatihan Tahap Pengembangan Model Perlindungan Anak Terpadu (PATBM) Berbasis Masyarakat
21	Sosialisai Lingkungan Keluarga dan Pengasuhan Alternatif
22	Pembuatan Rencana Aksi Daerah (RAD)
23	Pelatihan Program Perencanaan P enganggaran Responsive Gender (PPRG)
24	Pelaksanaan Kebijakan perlindungan Perempuan di Daerah
25	Pelatihan Bagi Pelatih (TOT) SDM Pelayanan dan Pendampingan Korban KDRT
26	Sosialisasi dan Advokasi Kebijakan

	penghapusan Buta Aksara (PBAP)
27	Sosialisasi dan Advokasi Kebijakan Perlindungan Tenaga Kerja Perempuan
28	Sosialisasi sistim Pencatatan dan Pelaporan KDRT
29	Fasilitasi Upaya Perlindungan Perempuan terhadap tindakan kekerasan
30	Monitoring, Evaluasi dan Pelaporan

The following is a sample of the data for the work program plan carried out starting from 2021 in table 5 as follows :

Table 5. 2021 Work Program Plan Data

No	Indikator Rencana Program Kerja
1	Pemantapan keterpaduan BKB Posyandu PADU
2	Perumusan Kebijakan Peningkatan Kualitas Hidup Perempuan di Bidang Ilmu Pengetahuan dan Teknologi
3	Perumusan Kebijakan Peningkatan Peran dan Posisi Perempuan di Bidang Politik dan Jabatan Publik
4	Monitoring, evaluasi dan pelaporan
5	Pelatihan Konvensi Hak Anak (KHA)
6	Pelatihan Konvensi Hak Anak (KHA)
7	Sosialisasi Pembentukan Lembaga Pemberdayaan Perempuan Lanjut Usia (LPPLU)
8	Sosialisasi dan Advokasi Keterwakilan Perempuan di Parlemen
9	Fasiliasi Pengembangan Pusat pelayanan Terpadu Pemberdayaan Perempuan (P2TP2)
10	Pemetaan potensi organisasi dan lembaga masyarakat yang berperan dalam pemberdayaan perempuan dan anak
11	Penyediaan Peralatan Rumah Tangga
12	Penyediaan bahan bacaan dan peraturan perundang-undangan
13	Penyediaan makanan dan minuman
14	Rapat-rapat koordinasi dan konsultasi ke luar dan dalam daerah
15	Penyediaan jasa administrasi kantor
16	Penyediaan Alat Instalasi Air
17	Penyediaan Peralatan dan Perlengkapan Kerja
18	Penyediaan jasa publikasi perkantoran
19	Pembangunan gedung kantor
20	Pengadaan Perlengkapan Gedung Kantor
21	Pengadaan Peralatan Rumah Jabatan / Dinas
22	Pengadaan Peralatan Gedung / Kantor
23	Pengadaan Mebeleur
24	Monitoring,Evaluasi dan pelaporan
25	Pemeliharaan Rutin / Berkala Rumah Dinas
26	Pemeliharaan Rutin / Berkala Gedung Kantor
27	Pemeliharaan Rutin / Berkala Mobil Jabatan
28	Pemeliharaan Rutin / Berkala Kendaraan Dinas / Operasional
29	Pemeliharaan Rutin / Berkala Perlengkapan Gedung Kantor
30	Pemeliharaan Rutin / Berkala Peralatan Gedung Kantor

As for the split of the scale of each feature into a range of numbers starting from 1 – 5 on each type of feature for the extraction of the initial data value and also for the target used in the target name, the achievement is called the feasible and unfeasible extraction result where each target category This achievement is given a score for worthy of being given a value of 1 while it is not worthy of being given a value of 0, the following is an explanation of the results of the features and extraction targets as follows :

Table 6. Data Extraction Feature 1

No	Extraction	Value Range
1	More Than 20	5
2	More Than 15	4
3	More Than 10	3
4	More Than 5	2
5	More Than 0	1

Table 7. Data Extraction Feature 2

No	Extraction	Value Range
1	More Than 15	5
2	More Than 10	4
3	More Than 7	3
4	More Than 4	2
5	More Than 0	1

Table 8. Data Extraction Feature 3

No	Extraction	Value Range
1	APBD	5
2	APBD/BAK	1

Table 9. Data Extraction Feature 4

No	Extraction	Value Range
1	More Than 250 Million	5
2	More Than 150 Million	4
3	More Than 75 Million	3
4	More Than 25 Million	2
5	More Than 0 Rupiah	1

Table 10. Data Extraction Feature 5

No	Extractions	Value Range
1	Very Good	5
2	Good	4
3	Very Quite	3
4	Enough	2

Table 11. Data Extraction Feature 6

No	Extraction	Value Range
1	More Than 0	**5**
2	More Than 5	**4**
3	More Than 10	**3**
4	More Than 17	**2**
5	More Than 25	**1**

Table 12. Data Extraction Feature 7

No	Extraction	Value Range
1	More Than 500	5
2	More Than 300	4
3	More Than 150	3
4	More Than 75	2
5	More Than 0	1

Table 13. Feature Extraction Data 8

No	Extraction	Value Range
1	More Than 10	5
2	More Than 8	4
3	More Than 5	3
4	More Than 2	2

5	More Than 0	1

Table 14. Data Extraction Feature 9

No	Extraction	Value Range
1	More Than 0 Rupiah	5
2	More Than 5 Million	4
3	More Than 10 Million	3
4	More Than 25 Million	2
5	More Than 50 Million	1

Table 15. Data Extraction Feature 10

No	Extraction	Value Range
1	More Than 10	5
2	More Than 7	4
3	More Than 4	3
4	More Than 2	2
5	More Than 0	1

Table 16. Feature Extraction Data 11

No	Extraction	Value Range
1	More Than 85	5
2	More Than 70	4
3	More Than 60	3
4	More Than 50	2
5	More Than 0	1

Table 17. Feature Extraction Data 12

No	Extraction	Value Range
1	Desa	5
2	Kecamatan	4
3	Kabupaten	3
4	Kota	2

Table 18. Feature Extraction Data 13

No	Extraction	Value Range
1	More Than 0 Rupiah	5
2	More Than 5 Million	4
3	More Than 10 Million	3
4	More Than 15 Million	2
5	More Than 25 Million	1

Table 18. Target Extraction Data – Achievements

No	Extraction	Value Range
1	Worthy	1
2	Not Feasible	0

The classification process with the SVM and perceptron algorithms uses the number of folds for cross validation of 10, and the sigmoid activation function.

C. Evaluation

Based on the evaluation of the classification, it is scored to the size of the results of classification accuracy, F1, precision and recall which are calculated using the equations from (1) to (4) as follows [29] :

Precision is the ratio of the correct positive prediction to the overall result of positive predictions. Precision is calculated using Equation (1).

$$Precision = \frac{tp}{tp+fp} \quad \text{..... (1)}$$

Recall It's the ratio between a positive prediction and positive global data. Recall is calculated using Equation (2).

$$Recall = \frac{tp}{tp+fn} \quad \text{..... (2)}$$

F1-score is a kind of balance between accuracy and recall in the system. It is the harmonized average of the precision and recovery values. F1-score is calculated using Equation (3).

$$Fscore = (1+\beta^2)\ \frac{Precision*Recall}{\beta^2 * Precision+Recall} \quad \text{..... (3)}$$

Accuracy is the correct prediction ratio to the number of aggregate estimates. The formula for calculating the accuracy is shown in Equation (4).

$$Accuracy = \frac{tp+tn}{tp+tn+fp+fn} \quad \text{..... (4)}$$

Regarding the evaluation of the results used, one of which is a confusion matrix which is obtained from the results of accuracy, precision, and recall as well as from the ROC curve to measure the AUC value. That way, the larger the area under the curve (AUC) the better the prediction results. The following is Table 19 of the confusion matrix [30] :

Tabel 19. Confusion Matrix

Actually	Prediction	
	True	False
True	TP	FN
False	FP	TN

III. RESULT AND ANALYSIS

Each classification model from Figure 3 is inputted into the SVM and perceptron models in Figure 2 with a maximum number of epochs of 100. Accuracy, F1, precision, and recall values are obtained from the classification results using variations of the sigmoid function using 10-Fold Cross Validation as shown in Figure 3 and Figure 4. Table 20 :

Tabel 20. Cross Validation Results – Fold 10

Model	Year	Cross Validation			
		Accuracy	F1	Precision	Recall
SVM	2018	86.3	80.2	75.0	86.3
	2019	88.4	82.9	78.1	88.4
	2020	87.4	81.5	76.3	87.4
	2021	88.8	83.6	78.9	88.8
	Average	87.5	82.2	77.2	87.5
Perceptron	2018	87.4	82.8	85.9	87.4
	2019	86.8	82.1	77.9	86.8
	2020	85.6	80.6	76.1	85.6
	2021	85.7	82.8	80.6	85.7
	Average	86.5	82.2	80.2	86.5

From Table 20 it can be seen that the sigmoid activation function in the evaluation of 10-fold cross-validation produces an accuracy value of 88.8% in 2021 for the SVM model, the F1 value is 83.6% in 2021 for the SVM model, the precision value is 85, 9% in 2018 for the perceptron model, and a recall value of 88.8% in 2021 for the SVM model.

For the SVM and perceptron models using the sigmoid function with the use of the best work program data from the average obtained every year from 2018 to 2021 for an accuracy value of 87%, for an F1 value of 82.2%, for a precision value of 78.7 %, for the recall value of 87%. In this way, the results in

table 20 get good results for 2021 which are higher than the average results from the previous year.

IV. CONCLUSION

From the results of the classification evaluation looking for the best work program plan implementer from P2KBP3A using this sigmoid function, it can be concluded that the best work program plan for 2021 in classifying work program plans, as seen from the values of accuracy, F1, precision and recall which get higher results than classification that uses the SVM and perceptron models is a work program in 2021.

From the results of the evaluation obtained in searching for the implementation of the best work program from P2KBP3A itself using a comparison of the SVM and perceptron algorithms that use the sigmoid function, it can be concluded from the results of the research raised that the SVM algorithm model is more dominant in collecting this new P2KBP3A data from 2018 to 2021 is the one with the highest level of accuracy in its model field.

On this occasion, in conducting research, the data used is the original data and only testing for new cases. It is also hoped that further research from this research, it can test uses other than k-fold 10 and also adopt other algorithm models or also can use a function model other than sigmoid.

Figure 5 shows a graph of the results of our proposed model training with the 2018 work plan.

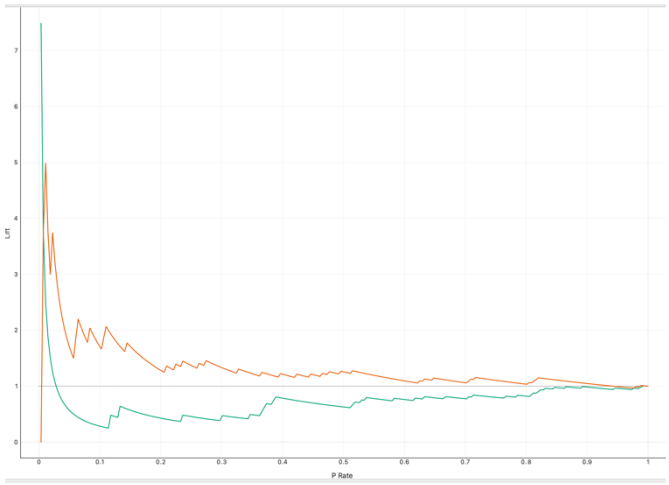

Fig. 5 The results of the 2018 work plan chart

Figure 6 shows a graph of the results of our proposed model training with the 2019 work plan.

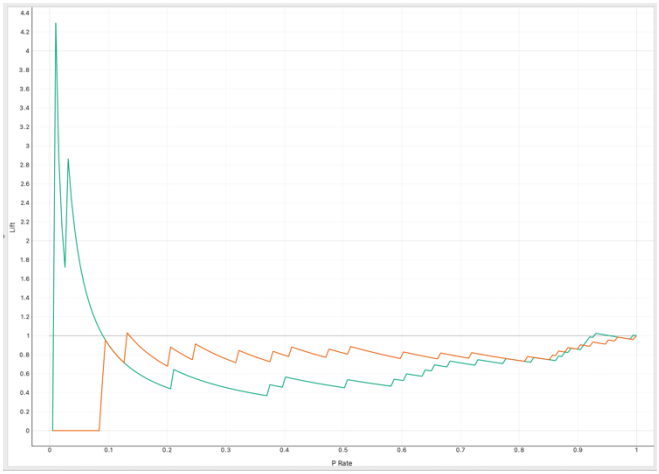

Fig. 6 The results of the 2019 work plan chart

Figure 7 shows a graph of the results of our proposed model training with the 2020 work plan.

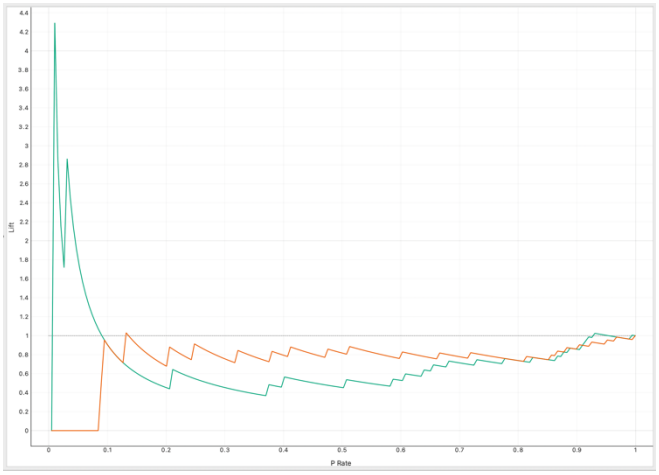

Fig. 7 The results of the 2020 work plan chart

Figure 8 shows a graph of the results of our proposed model training with the 2021 work plan.

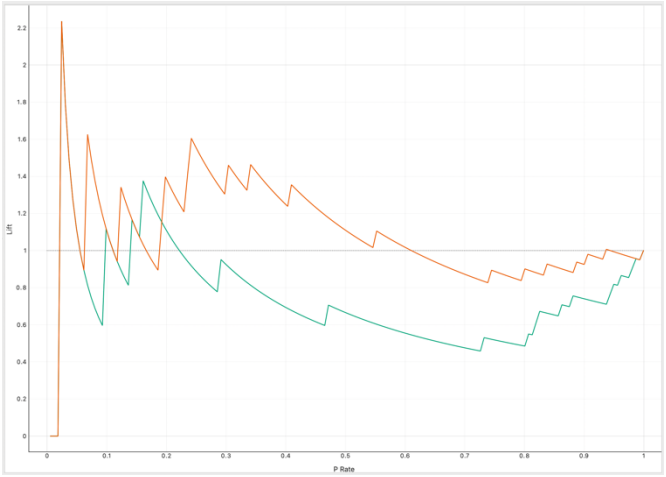

Fig. 8 The results of the 2021 work plan chart

Figure 5, 6, 7, and 8 explain line graphs green color is SVM and the orange color is the perceptron.

SVM line.

Perceptron line.

Figure 9 confusion matrix with 2018 work plan.

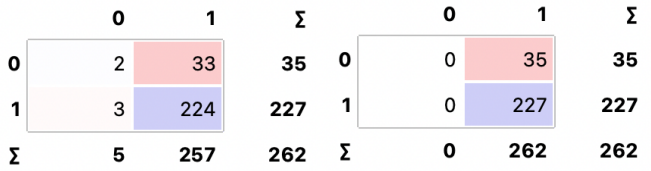

Fig. 9 SVM and Perceptron

Figure 10 confusion matrix with 2019 work plan.

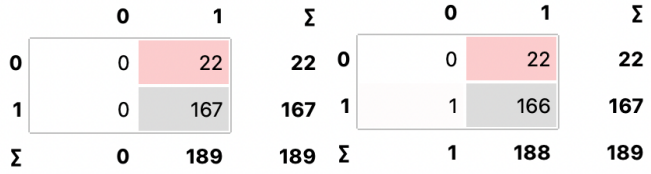

Fig. 10 SVM and Perceptron

Figure 11 confusion matrix with 2020 work plan.

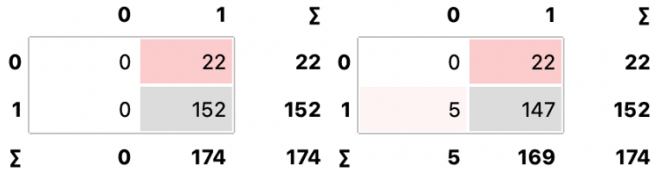

Fig. 11 SVM and Perceptron

Figure 12 confusion matrix with 2021 work plan

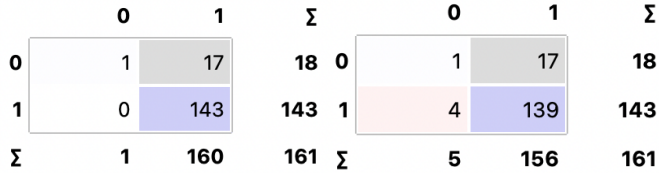

Fig. 12 SVM and Perceptron

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