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***GENERATIVE-BASED CHATBOT MENGGUNAKAN LONG  
SHORT-TERM MEMORY PADA WEBSITE DIREKTORI  
AKADEMIK FAKULTAS SAINS DAN TEKNOLOGI***

**TUGAS AKHIR**

Diajukan Sebagai Salah Satu Syarat  
untuk Memperoleh Gelar Sarjana Komputer pada  
Program Studi Sistem Informasi

Oleh:



**SURYANI**  
**12050320389**



UIN SUSKA RIAU

**FAKULTAS SAINS DAN TEKNOLOGI**  
**UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM RIAU**  
**PEKANBARU**  
**2024**

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SHORT-TERM MEMORY PADA WEBSITE DIREKTORI  
AKADEMIK FAKULTAS SAINS DAN TEKNOLOGI***

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di Pekanbaru, pada tanggal 03 Juli 2024

**Ketua Program Studi**



**Eki Saputra, S.Kom., M.Kom.**  
**NIP. 198307162011011008**

**Pembimbing**



**Mustakim, ST., M.Kom.**  
**NIK. 130517052**

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di Pekanbaru, pada tanggal 25 Juni 2024

Pekanbaru, 25 Juni 2024

Mengesahkan,



**Dr. Hartono, M.Pd.**

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**Ketua Program Studi**

**Eki Saputra, S.Kom., M.Kom.**

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#### **DEWAN PENGUJI:**

**Ketua : Zarnelly, S.Kom., M.Sc.**

**Sekretaris : Mustakim, ST., M.Kom.**

**Anggota 1 : Dr. Rice Novita, S.Kom., M.Kom.**

**Anggota 2 : M. Afdal, ST., M.Kom.**

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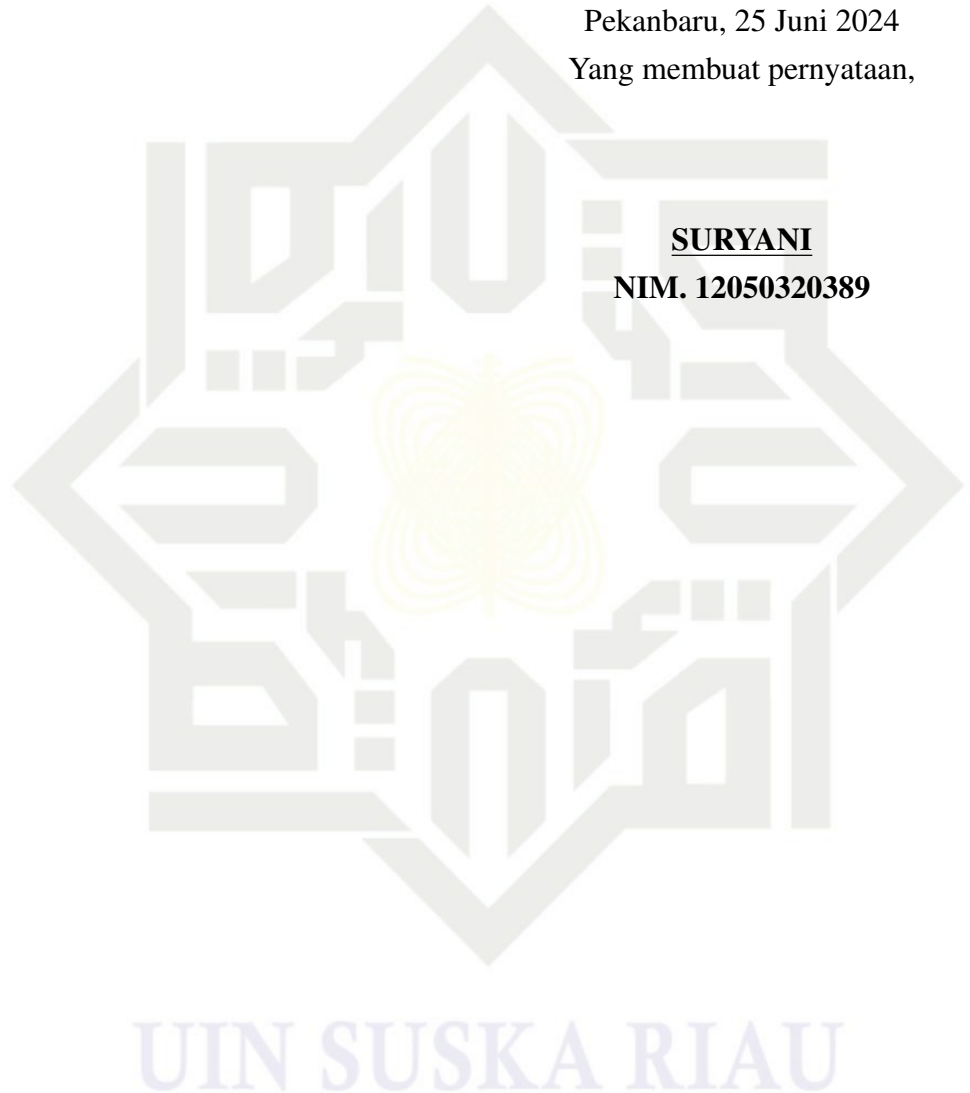
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*Alhamdulillah Rabbil 'Alamin*, maha suci Allah SWT dengan *kun fayakunya* yang telah mengizinkan peneliti menyelesaikan karya tulis ini tepat pada waktunya. *Shalawat* berangkai salam senantiasa tertuju kepada Rasulullah SAW dengan lafadz *Allahumma Shalli 'Ala Sayyidina Muhammad Wa 'Ala Ali Sayyidina Muhammad*. Tiada ungkapan paling jujur selain rasa syukur kepada Allah SWT. Atas kasih sayang-Nya, rahmat-Nya, dan pertolongan-Nya, peneliti dapat menyelesaikan tanggung jawab ini tepat pada waktunya.

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“*Man Jadda Wa Jadda*”



## KATA PENGANTAR

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2. Bapak Dr. Hartono, M.Pd sebagai Dekan Fakultas Sains dan Teknologi.
3. Bapak Eki Saputra, S.Kom., M.Kom sebagai Ketua Program Studi Sistem Informasi.
4. Ibu Siti Monalisa, ST., M.Kom sebagai Sekretaris Program Studi Sistem Informasi.
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6. Bapak Dr. M. Luthfi Hamzah, B.IT., M.Kom selaku Dosen Pembimbing Akademik.
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Peneliti menyadari bahwa dalam penulisan Laporan Tugas Akhir ini terda-pat berbagai celah untuk perbaikan. Maka dari itu, kritik dan saran dari bapak, ibu dan teman-teman pembaca sangat diharapkan. Segala bentuk kritik, dan saran dapat disampaikan melalui 12050320389@students.uin-suska.ac.id atau suryanian-i0602@gmail.com. Akhir kata, *Wassalamualaikum Warahmatullahi Wabarakatuh*.

Pekanbaru, 25 Juni 2024

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UIN SUSKA RIAU

# An Intelligent Chatbot for Faculty Administration Using Bidirectional LSTM and Seq2Seq Architecture

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**Abstract**—Since 2018, the seminar FST website has been in operation and has served as the primary hub for administrative services for faculty of Science and Technology students. This website is a platform for handling requests for official correspondence from students, including requests for documents such as enrollment verification letters, good conduct certificates, and other administrative letters. Since its launch, the website has received a high volume of traffic. In 2023, the site averaged 27,753 clicks per day and 11,648 submissions were successfully processed. Unfortunately, this website still lacks information about administrative procedures. In addition, this website does not have a Frequently Asked Questions (FAQ) page. These issues, need to be resolved immediately. This study aims to develop a chatbot using sequence-to-sequence architecture integrated with the Bi-LSTM network to provide conversations about administrative services for Faculty of Science and Technology students. Several test scenarios were conducted with different parameters to obtain optimal model performance. The tests were conducted using Adam's optimizer with two different learning rates, namely 0.01 and 0.001. The training data was pre-divided with a ratio of 90:10, 80:20, and 70:30, and each training data was tested with different batch size values, namely 8, 16, and 32. The test results show that the best accuracy on training data is 0.9964 and on validation data is 0.8756, using training data with a ratio of 90:10, Adam optimizer with a learning rate of 0.01, and batch size 16. Then, the model performance is calculated using Bilingual Evaluation Understudy (BLEU) with a score of 0.7724 for some tested data. In addition to BLEU metrics, a user satisfaction survey was conducted using the Chatbot Usability Questionnaire (CUQ) to measure user acceptance of the developed chatbot. This survey obtained an average score of 62.2. Based on the SUS rating scale, it was found that the score of 62.2 falls within the "Good" category.

**Keywords**—*Bidirectional LSTM, BLEU Score, Chatbot, Chatbot Usability Questionnaire, Sequence-to-Sequence*

## I. INTRODUCTION

Automation has made life easier for modern humans by replacing certain jobs with Artificial Intelligence machines. One such form of automation is the use of chatter robot (chatbots) in organizations. Chatbots are created using Natural Language Processing (NLP) to emulate the way humans communicate with each other [1]. A chatbot is essentially a software that can have conversations with humans, either through text or voice [2] [3]. Based on how it works, chatbots are categorized into two types – rule-based and data-driven. In

rule-based chatbots, a set of predetermined rules is used to generate responses which can be limited and rigid. On the other hand, data-driven chatbots are more adept at producing natural responses as the undergo a training process using a set of data [2]. Because data can be collected in various ways and can take different structures, such as Comma-Separated Values (CSV) and JavaScript Object Notation (JSON). Based on these data structures, chatbots that are driven by data are divided into two types: retrieval-based and generative-based [4]. Retrieval-based chatbots given respond by matching predefined patterns againts a set of responses, while generative-based chatbots can produce new responses based on previous experiences and large data sets [2] [5].

The application of chatbots has emerged as a powerful tool in various fields such as social marketing, tourism and education [3] [6]. In addition, chatbots are more user-friendly than static Frequently Asked Questions (FAQs) pages, which increasing user satisfaction. Users feel more comfortable communicating with chatbots because they provide natural responses and immediate solutions to problems [7]. In universities, chatbots are commonly used to provide information about administrative services, and created for answering university-related FAQs [8]. However, at the Universitas Islam Negeri Sultan Syarif Kasim Riau, administrative services for students are centralized within their majors and faculties. Students can access information and submit administrative requests online through a website. One of the administrative service websites of Universitas Islam Negeri Sultan Syarif Kasim Riau is the Direktori Akademik Fakultas Sains dan Teknologi (Seminar FST). This website has been operating since 2018, and has served as the primary hub for administrative services for faculty of Science and Technology students. This website is a platform for handling requests for official correspondence from students, including requests for documents such as enrollment verification letters, good conduct certificates, and other administrative letters.

Since its launch, the website has received a high volume of traffic. In 2023, the site averaged 27,753 clicks per day and 11,648 submissions were successfully processed. However, despite the high number of submissions and website traffic, it is unfortunate that the website does not provide complete information about the administrative submission procedures. This website still lacks of information, and in addition, this website does not have a Frequently Asked Questions (FAQ)

page. The administrative officers have limited working hours, requiring students to wait until the next day if they need assistance outside of regular working hours. These findings are also corroborated by a survey carried out among the users of the seminar FST in the period from August to November of 2023. The survey involved 51 respondents selected using the Slovin formula with an assumed margin of error of 10%. Based on the survey, it is known that 80.4% of respondents agreed that the information on seminar FST is too general and causes ambiguity. Then, 84.3% of respondents agreed that the working hours of administrative staff were also an obstacle to accessing information.

Based on the findings of the problem with seminar FST website, a solution is needed to ensure that information about administrative service is easily accessible and not limited to working hours. Therefore, the solution offered by this research is the creation of a generative-based chatbot using a sequence-to-sequence architecture and a Bidirectional Long Short-Term Memory (Bi-LSTM) network. Bi-LSTM can read information from two directions at once by adding a backward layer to the regular LSTM architecture. LSTM is a type of neural network that was developed from the Recurrent Neural Network (RNN) architecture. In RNN, it is prone to exploding gradient problems due to changes in the gradient value of the loss function which becomes larger due to the repetition of the process that occurs [9]. LSTM is designed to overcome the exploding gradient problem by arranging three different gates in its architecture. There is a forget gate, which removes information that is no longer considered important [10]. Then the input gate decides what new information to store in the memory cell, and the output gate makes predictions and generates responses [11].

In previous studies, LSTM networks and sequence-to-sequence architectures have demonstrated optimal performance in chatbot development. For instance, Kashturi et al. (2021) introduced an LSTM-based chatbot to assist students in the laboratory, achieving an accuracy of 85% according to the confusion matrix evaluation [12]. However, there is an opportunity for improvement in evaluating models using additional metrics, such as Bilingual Evaluation Understudy (BLEU) or ROUGE. In a recent study, Tarek Naous et al. (2020) developed an empathic Arabic chatbot using a sequence-to-sequence architecture integrated with an LSTM network and an attention layer [13]. Based on the model evaluation, the chatbot obtained a Perplexity value of 38.6. Additionally, the BLEU test indicated potential for enhancement, retrieved a score of 0.5. In another study, Bachtiar et al. (2023) developed a generative-based chatbot for daily conversation using a sequence-to-sequence model architecture integrated with an LSTM and GRU cell [14]. Based on the model evaluation and BLEU test, LSTM have the ability to generate acceptable response than GRU cell. Results for BLEU LSTM is 0.0588, while result for GRU is lower than LSTM just 0.0028. Furthermore, Pandey and Sharma (2023) compared the performance of retrieval-based and generative-based chatbots on mental health topics [4]. Several algorithms were compared in this research, such as Vanilla RNN, LSTM, Bi-LSTM, GRU, and CNN. Based on this research, it is known that generative-based chatbots are more powerful than retrieval-based chatbots. Then, the results of comparing several algorithms show that Bi-LSTM is the best model, with higher accuracy than Vanilla RNN at 83.22%, LSTM at 89.87%, GRU at 65.57%, CNN at 82.33%, and Bi-LSTM at 91.57%. This research shows good results,

but there is still an opportunity for improvement, especially in evaluating chatbot performance.

Based on the main problem that the website seminar FST still lacks information, and referring to previous research, the purpose of this study is to develop a chatbot using sequence-to-sequence architecture integrated with the Bi-LSTM network to provide conversations about administrative services for Faculty of Science and Technology students. In addition, this study aims to address the shortcomings identified in previous research, where the evaluation metrics were limited to the confusion matrix. Therefore, this research proposes to enhance the evaluation process by incorporating BLEU evaluation and the Chatbot Usability Questionnaire (CUQ).

## II. RESEARCH METHODOLOGY

The details of the work carried out in this research begin with the process of data collection, text pre-processing, model training and evaluation. This process is illustrated by a flowchart in Fig. 1.

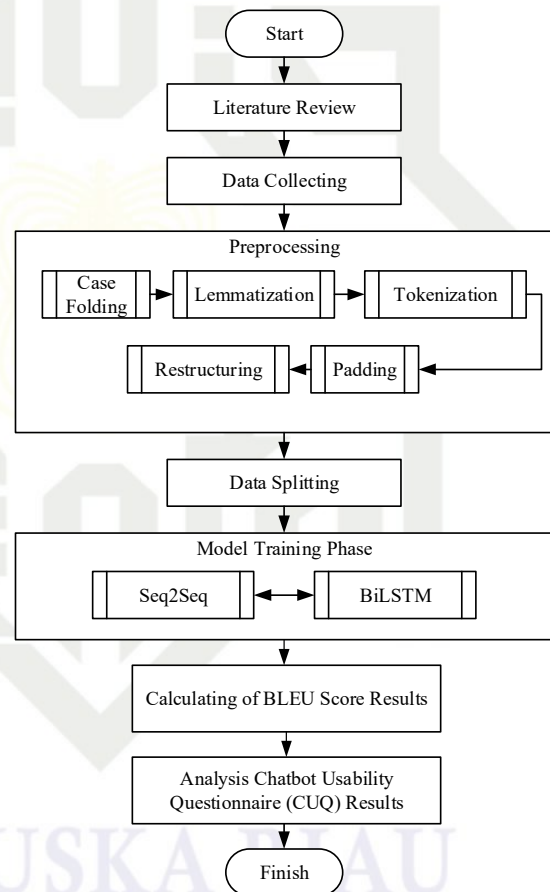


Fig. 1. Research methodology

### A. Data Collecting

The data required for this study consists of pairs of questions and answers in Bahasa Indonesia related to administrative services. The total amount of collected data is 1102 pairs. The data was collected through interviews and document studies of the administrative guidebook. Subsequently, the collected data will be verified by the Vice Dean I of the Faculty of Science and Technology and will



serve as the foundational knowledge for this research. Examples of the data used are shown in Table 1.

TABLE I. SAMPLE DATASET

Questions	Answer
Halo!	Halo! Ini adalah chatbot seminar-fst
Apakah syarat mengajukan surat penunjukkan pembimbing?	Dokumen persyaratan dapat berbeda pada masing-masing program studi di Fakultas Sains dan Teknologi. Silahkan konfirmasi melalui program studi masing-masing
Apakah surat saya sudah selesai?	Silahkan gunakan menu tracking surat, serta periksa pemberitahuan melalui email. Petugas akan mengirimkan email apabila surat sudah selesai

Table 1 contains examples of data used in this research. These datasets include greetings, and questions about how students can submit administrative requests, such as requests for enrollment verification letters, good conduct certificates, seminar proposal registrations, and other administrative letters for Faculty of Science and Technology students.

**B. Preprocessing**

Data preprocessing is the first stage in the whole machine learning process. In this research, data preprocessing is done to ensure that the data format is suitable for the needs of the sequence-to-sequence architecture and the Bi-LSTM network. Based on this purpose, preprocessing in this research includes several different processes, such as:

- Converting text to lower case and correcting misspellings
- Performing lemmatisation to return each word to its base form.
- Splitting the data into tokens and padding so that the data is the same length
- Perform restructuring by adding <start> and <end> tokens, then converting the data into a vector representation as input to the prediction model.

**C. Bidirectional Long Short-Term Memory**

LSTM has a basic structure of memory cells containing a forgetting gate, an input gate and an output gate. Each gate has an additional layer structure and uses different activation functions [15]. The Bi-LSTM model is a combination of the Bi-RNN and LSTM models, offering the advantages of both. In the Bi-LSTM model, there is a backward LSTM layer that processes information from two directions (left to right and right to left) simultaneously. This bidirectional approach allows the model to use information from both the past and the future to make predictions or classifications [3] [15] [16].

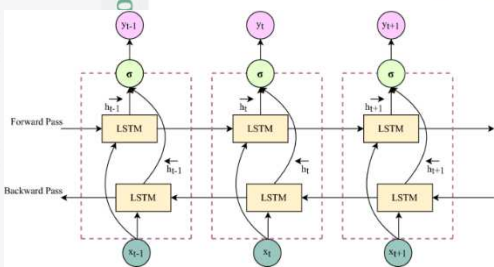


Fig. 2. BiLSTM network architecture [17]

Fig. 2. demonstrates how the forward LSTM takes in information from time step 1 to time step t, and stores the outcome at each step. At the same time, the backward LSTM processes the information in reverse order and stores the outcome at each step. The final output is a combination of the outcomes from both the forward and backward layers of the LSTM at each time point. This process can be represented mathematically by the following equations.

$$s_t = f(Ux_t + Ws_{t-1}) \tag{1}$$

$$s'_t = f(U'x_t + W's'_{t+1}) \tag{2}$$

$$o_t = g(Vs_t + V's_t) \tag{3}$$

Where \$s\_t\$ represents the hidden layer's state variable at time \$t\$, \$o\_t\$ represents the output layer's state variable at time \$t\$, and \$s'\$ represents the state variable of the inverse hidden layer at time \$t\$. \$x\_t\$ denotes the input vector, with \$g\$ and \$f\$ serving as activation functions. Additionally, \$V\$, \$W\$, and \$U\$ denote the weight matrices from the hidden layer to the output layer, from the hidden layer to the input layer, and from the input layer to the hidden layer, respectively. Correspondingly, \$V'\$, \$W'\$, and \$U'\$ represent the inverse weight matrices. The Bi-LSTM output is determined by the combined forward computation (\$s\_t\$) and backward computation (\$s'\_t\$) [18].

**D. Sequence-to-Sequence (Seq2Seq)**

The Sequence-to-Sequence architecture consists of encoder and decoder layers. The encoder is the first layer that receives the input text and converts it into a vector representation. Meanwhile, the decoder is the second layer that receives the context vector and translates it back into output that is understandable to the user [2] [9] [19].

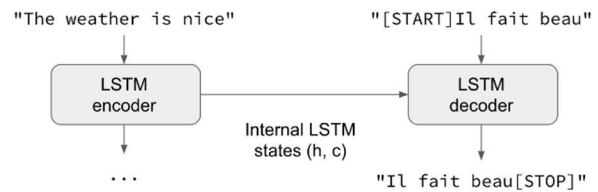


Fig. 3. Seq2Seq architecture [20]

Fig. 3. show the Sequence-to-Sequence architecture consisting of encoder and decoder layers.

**E. Bilingual Evaluation Understudy (BLEU)**

In this study, evaluation aims to measure the performance of the model in predicting a new dataset. Performance is measured in terms of accuracy, BLEU metrics, and involves human evaluation using CUQ. Accuracy is the ratio of correct predictions (positive and negative) to all predictions made [21]. BLEU is now the most popular evaluation method for measuring the quality of machine translation results. BLEU has become one of the most popular evaluation metrics to measure the quality of machine translation. A study conducted by [22] tested the effectiveness of chatbots using the BLEU and ROUGE matrices. The result of the test, BLEU gave a result of 0.8 while ROUGE was only 0.7. Based on the

study, it is concluded that these two metrics have a good ability to understand human dialog.

The BLEU method uses an n-gram comparison to measure the degree of accuracy between machine translation results and human translations. The result of the calculation is a number between 0 and 1. A value of 1 indicates that the translation result matches the reference, while a value of 0 indicates that the translation result is very different from the human translation reference [23] [24]. The BLEU score can be calculated using the following equation:

$$BLEU = BP * \exp \left[ \sum_{n=1}^N \left\{ \left( \frac{1}{N} \right) * \log(p_n) \right\} \right] \quad (4)$$

Based on the (4), the value of N represents the maximum size of the phrase sequence to be analysed. The value of n varies from 1 to N. The more n-grams that match the reference translation, the higher the accuracy [21].

#### F. Chatbot Usability Questionnaire (CUQ)

There are many approaches that can be used to measure the level of human satisfaction when interacting with a system, for example the System Usability Scale (SUS), or a more common approach, the User Experience Questionnaire (UEQ) [25]. While in measuring user satisfaction when interacting with a chatbot, a different approach is used, namely the Chatbot Usability Questionnaire (CUQ). In the CUQ approach, there are 16 instruments that are assessed. The instruments consist of 8 positive assessments, and 8 negative assessments. Each assessment uses a 5-point Likert scale ranging from strongly disagree to strongly agree, and will result in a maximum score of 160 using formula in equation 5, which is then normalized to 100 to be compared with SUS [25] [26]. The CUQ can be calculated with this following equation:

$$CUQ = \frac{((\sum_{n=1}^m 2n - 1) - 5) + (25 - (\sum_{n=1}^m 2n)) \times 1.6}{160} \quad (5)$$

Where m is the number of questions, and n is the individual question score per participant. The questions list of the original version of CUQ can be seen in Table 2.

TABLE II. CUQ INSTRUMENT

No	Questions
1	The chatbot's personality was realistic and engaging
2	The chatbot seemed too robotic
3	The chatbot was welcoming during initial setup
4	The chatbot seemed very unfriendly
5	The chatbot explained its scope and purpose well
6	The chatbot gave no indication as to its purpose
7	The chatbot was easy to navigate
8	It would be easy to get confused when using the chatbot
9	The chatbot understood me well
10	The chatbot failed to recognize a lot of my inputs
11	Chatbot responses were useful, appropriate and informative
12	Chatbot responses were not relevant
13	The chatbot coped well with any errors or mistakes
14	The chatbot seemed unable to handle any errors
15	The chatbot was very easy to use
16	The chatbot was very complex

The CUQ approach is employed to assess the personality, orientation, navigation, understanding, responsiveness, error handling, and intelligence of the chatbot [26] [27].

### III. RESULT AND DISCUSSION

The collected dataset consisted of 1102 pairs of questions and answers. Then, the preprocessing was performed, which consisted of several different stages, namely, conversion to lower case letters, lemmatization, restructuring, and conversion to vector representations. The results of the preprocessing are shown in the Table 2.

TABLE III. PREPROCESSING RESULT

Questions	Vector Representation
Pagi	[205 0 0 0 0 0 ... 0 0 0 0]
Apa syarat mengajukan surat penunjukkan pembimbing?	[45 53 237 4 39 8 ... 0 0 0 0]
Apakah surat saya sudah selesai?	[79 72 236 80 46 0 ... 0 0 0 0]

The modeling using sequence-to-sequence architecture and Bi-LSTM was performed using the Python programming language, and several tests were conducted with different scenarios. The training data was first divided into 90:10, 80:20, and 70:30. Each of these comparisons is trained using the Adam optimizer with different learning rate values, namely 0.01 and 0.001, and different values of batch sizes. This different test aims to find the model with the most optimal performance. The results of the tests are shown in the Table 3.

TABLE IV. PREDICTING RESULT

Learning Rate	Batch Size	Hold Out	Accuracy	Loss
0.01	8	90:10	0.9801	0.0645
		80:20	0.9511	0.1611
		70:30	0.9902	0.0324
	16	90:10	<b>0.9964</b>	<b>0.0120</b>
		80:20	0.9956	0.0135
		70:30	0.9945	0.0174
	32	90:10	0.9792	0.0712
		80:20	0.9945	0.0229
		70:30	0.9915	0.0354
0.001	8	90:10	<b>0.9850</b>	<b>0.0806</b>
		80:20	0.9768	0.1168
		70:30	0.9781	0.1225
	16	90:10	0.9614	0.2062
		80:20	0.9413	0.3050
		70:30	0.9373	0.3304
	32	90:10	0.8982	0.5282
		80:20	0.8850	0.5994
		70:30	0.8269	0.8576

Based on the test results shown in Table 3, it can be concluded that each test scenario with different parameters provides optimal performance with accuracy in the range of 80 to 90 percent. When testing with a learning rate of 0.01, it was found that the highest accuracy was obtained with a training data division of 90:10 and a batch size value of 16, where the accuracy reached 0.9964 and the loss value was 0.0120. While testing with a learning rate of 0.001, the highest accuracy was obtained with a training data division of 90:10 and a batch size value of 8, with an accuracy of 0.9850 and a loss of 0.0806

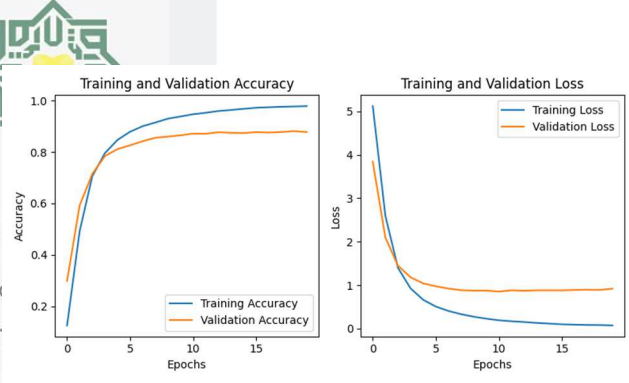


Fig. 4. The comparison between accuracy and loss function on the training and validation data

Fig. 4 is a comparison between accuracy and loss function on the training and validation data. The purpose of this monitoring is to ensure that the model does not experience underfitting or overfitting, which can affect the performance of the model on the new training data set. Based on Fig. 4, it can be concluded that the accuracy curves on the training and validation data move quite close to each other, and then the loss function curves on both data show similar trends. The results demonstrate that the model achieves a good balance between training and validation data. In addition to evaluating chatbot performance, other metrics such as BLEU and CUQ are used. Table 4 shows the details of the BLEU results.

TABLE V. BLEU SCORE RESULTS

Input	Expected Answer	Chatbot Responses	BLEU Score
Jelaskan pengertian seminar hasil	Seminar hasil adalah tahapan uji laporan tugas akhir yang disusun oleh mahasiswa untuk menilai kelayakan laporan tugas akhir	Seminar hasil adalah tahapan uji laporan tugas akhir yang disusun oleh mahasiswa untuk menilai kelayakan laporan tugas akhir	0.8948
Bagaimana prosedur jika salah satu Dosen Penguji tidak dapat hadir pada pelaksanaan Sidang TA?	Jika salah satu Dosen Penguji tidak dapat hadir, maka Sidang Tugas akhir dijadwalkan ulang dengan cara mengulangi tahapan Pendaftaran Sidang Akhir dan melengkapi persyaratan.	Jika salah satu dosen penguji tidak dapat hadir maka sidang tugas akhir dijadwalkan ulang dengan cara mengulangi tahapan pendaftaran sidang akhir dan melengkapi persyaratan	0.7724
Apakah TA berbasis? Apa itu TA berbasis?	Tugas akhir paper based adalah bentuk tugas akhir yang bukan skripsi. Ini merupakan karya ilmiah tertulis berbentuk artikel yang telah dipublikasikan pada jurnal, proceeding atau book chapter	Tugas akhir paper based adalah bentuk tugas akhir yang bukan skripsi. Ini merupakan karya ilmiah tertulis berbentuk artikel yang telah dipublikasikan pada jurnal proceeding atau book chapter	0.7370
Apakah yang harus saya lakukan untuk mengetahui status terkini dari surat yang diajukan?	Salah satu cara adalah dengan menggunakan menu Tracking Surat di website seminar-fst.uin-suska.ac.id. Selain itu, pastikan email yang telah diinputkan sebelumnya pada proses pengajuan	Salah satu cara adalah dengan menggunakan menu tracking surat di website seminar-fst.uin.suska.ac.id, selain itu pastikan email yang telah diinputkan sebelumnya pada proses pengajuan	0.6471

Input	Expected Answer	Chatbot Responses	BLEU Score
	untuk menerima pemberitahuan.	untuk menerima pemberitahuan	

The BLEU calculation result is a number between 0 and 1, where a value of 0 indicates a machine translation result that is very different from the reference, while a value of 1 indicates a perfect match between the translation result and the reference. Based on Table 4, it can be concluded that the BLEU calculation results for some of the tested data are close to the value of 1. This indicates that the machine translation results have reached the expected level of agreement with the reference.

Furthermore, the chatbot performance evaluation is done by analyzing the CUQ. Table 6 shows the CUQ value for each respondents.

TABLE VI. CUQ VALUE FOR EACH RESPONDENT

No	Respondents	CUQ Score
1	P1	45.3
2	P2	81.3
3	P3	51.6
4	P4	67.2
5	P5	70.3
6	P6	73.4
7	P7	45.3
8	P8	39.1
9	P9	59.4
10	P10	68.8
11	P11	68.8
12	P12	76.6

The CUQ value assessment is carried out on each respondent, and then the average value is calculated by summing up all the CUQ values obtained and dividing it by the number of respondents. This survey involved 12 respondents. The result of this calculation is 62.2. Regarding the SUS rating scale, the value of 62.2 falls within the Good category, which has a range of values between 62.7 and 72.5. Therefore, it can be concluded that 62% of users consider the chatbot to provide useful, informative, and friendly responses.

IV. CONCLUSION

Based on the identified issues on the FST seminar website, which lacks a FAQs page and has limited information on administrative procedures. This study aimed to develop a chatbot using sequence-to-sequence and Bi-LSTM models. Several tests were conducted with different parameters to obtain the best-performing Bi-LSTM model. It was found that testing with a 90:10 training data split, a learning rate of 0.01, and a batch size of 16 gave the most optimal results, with an accuracy of 0.9964 on training data and 0.8756 on validation data.

Furthermore, an evaluation was carried out using BLEU metrics to measure the similarity of the chatbot's responses to actual responses. The BLEU score evaluation resulted in an average score of 0.7724 on test data. In addition to BLEU metrics, a user satisfaction survey was conducted using the Chatbot Usability Questionnaire (CUQ) to measure user acceptance of the developed chatbot. This survey involved 12 respondents and obtained an average score of 62.2. Based on the SUS rating scale, it was found that the score of 62.2 falls within the "Good" category with a range of values between 62.7 and 72.5.

Based on these findings, it can be concluded that this study successfully developed a chatbot that was well-received by users. The chatbot demonstrated its ability to provide useful, informative, and friendly responses. However, there are some areas for further improvement in future research. One aspect to consider is increasing the size of the dataset. The model should be trained on a larger dataset. If possible, the chatbot could also be developed using transformer models.

## REFERENCES

- [1] M. Dhyan and R. Kumar, "An Intelligent Chatbot using Deep Learning with Bidirectional RNN and Attention Model," *Materials Today: Proceedings*, vol. 34, pp. 817–824, Jun. 2020, doi: 10.1016/j.matpr.2020.05.450.
- [2] V. Scotti, L. Sbatella, and R. Tedesco, "A Primer on SEQ2SEQ Models for Generative Chatbots," *ACM Comput. Surv.*, p. 3604281, Jun. 2023, doi: 10.1145/3604281.
- [3] P. Anka, A. Bustamam, H. S. Al-Ash, and D. Sarwinda, "High Accuracy Conversational AI Chatbot Using Deep Recurrent Neural Networks Based on BiLSTM Model," in *2020 3rd International Conference on Information and Communications Technology (ICOIACT)*, Yogyakarta, Indonesia: IEEE, Nov. 2020, pp. 382–387, doi: 10.1109/ICOIACT50329.2020.9332074.
- [4] S. Pandey and S. Sharma, "A comparative Study of Retrieval-based and Generative-based Chatbots using Deep Learning and Machine Learning," *Healthcare Analytics*, vol. 3, p. 100198, Nov. 2023, doi: 10.1016/j.health.2023.100198.
- [5] A. Toprak, M. Turan, and F. S. Toprak, "Deep Learning Based Chatbot Adapted to the Electronic Funds Transfer Process of Turkish Banking," *International Journal of Intelligent Systems and Applications in Engineering*, vol. 11, no. 1, pp. 356–362, Apr. 2023.
- [6] R. Anhar, T. B. Adji, and N. Akhmad Setiawan, "Question Classification on Question-Answer System using Bidirectional-LSTM," in *2019 5th International Conference on Science and Technology (ICST)*, Yogyakarta, Indonesia: IEEE, Jul. 2019, pp. 1–5, doi: 10.1109/ICST47872.2019.9166190.
- [7] E. Adamopoulou and L. Moussiades, "Chatbots: History, Technology, and Applications," *Machine Learning with Applications*, vol. 2, p. 100006, Dec. 2020, doi: 10.1016/j.mlwa.2020.100006.
- [8] W. Maroengsit, T. Piyakulpinyo, K. Phonyiam, S. Pongnumkul, P. Chaovalit, and T. Theeramunkong, "A Survey on Evaluation Methods for Chatbots," in *Proceedings of the 2019 7th International Conference on Information and Education Technology*, Aizu-Wakamatsu Japan: ACM, Mar. 2019, pp. 111–119, doi: 10.1145/3323771.3323824.
- [9] P. Choudhary and S. Chauhan, "An intelligent Chatbot Design and Implementation Model using Long Short-Term Memory with recurrent Neural Networks and Attention Mechanism," *Decision Analytics Journal*, vol. 9, p. 100359, Dec. 2023, doi: 10.1016/j.dajour.2023.100359.
- [10] R. Huang et al., "Well Performance Prediction Based on Long Short-Term Memory (LSTM) Neural Network," *Journal of Petroleum Science and Engineering*, vol. 208, p. 109686, Jan. 2022, doi: 10.1016/j.petrol.2021.109686.
- [11] P. Chhajer, M. Shah, and A. Kshirsagar, "The Applications of Artificial Neural Networks, Support Vector Machines, and Long-Short Term Memory for Stock Market Prediction," *Decision Analytics Journal*, vol. 2, p. 100015, Mar. 2022, doi: 10.1016/j.dajour.2021.100015.
- [12] E. Kasthuri and S. Balaji, "Natural language Processing and Deep Learning Chatbot using Long Short Term Memory Algorithm," *Materials Today: Proceedings*, vol. 81, pp. 690–693, 2023, doi: 10.1016/j.matpr.2021.04.154.
- [13] T. Naous, C. Hokayem, and H. Hajj, "Empathy-driven Arabic Conversational Chatbot," *Proceedings of the Fifth Arabic Natural Language Processing Workshop*, pp. 58–68, Dec. 2020.
- [14] F. A. Bachtiar, A. D. Fauzulhaq, M. T. R. Manullang, F. R. Pontoh, K. S. Nugroho, and N. Yulistira, "A Generative-Based Chatbot for Daily Conversation: A Preliminary Study," in *Proceedings of the 7th International Conference on Sustainable Information Engineering and Technology*, in SIET '22. New York, NY, USA: Association for Computing Machinery, Jan. 2023, pp. 8–12, doi: 10.1145/3568231.3568234.
- [15] P. L. Seabe, C. R. B. Moutsinga, and E. Pindza, "Forecasting Cryptocurrency Prices Using LSTM, GRU, and Bi-Directional LSTM: A Deep Learning Approach," *Fractal Fract*, vol. 7, no. 2, p. 203, Feb. 2023, doi: 10.3390/fractalfract7020203.
- [16] Y. Imrana, Y. Xiang, L. Ali, and Z. Abdul-Rauf, "A Bidirectional LSTM Deep Learning Approach for Intrusion Detection," *Expert Systems with Applications*, vol. 185, p. 115524, Dec. 2021, doi: 10.1016/j.eswa.2021.115524.
- [17] D. Naik and C. D. Jaidhar, "A Novel Multi-Layer Attention Framework for Visual Description Prediction using Bidirectional LSTM," *J Big Data*, vol. 9, no. 1, p. 104, Nov. 2022, doi: 10.1186/s40537-022-00664-6.
- [18] C. Cai, Y. Tao, T. Zhu, and Z. Deng, "Short-Term Load Forecasting Based on Deep Learning Bidirectional LSTM Neural Network," *Applied Sciences*, vol. 11, no. 17, p. 8129, Sep. 2021, doi: 10.3390/app11178129.
- [19] X. Li, H. Zhong, B. Zhang, and J. Zhang, "A General Chinese Chatbot Based on Deep Learning and Its' Application for Children with ASD," *IJMLC*, vol. 10, no. 4, pp. 519–526, Jul. 2020, doi: 10.18178/ijmlc.2020.10.4.967.
- [20] "A Ten-Minute Introduction to Sequence-to-Sequence Learning in Keras," Accessed: Apr. 28, 2024. [Online]. Available: <https://blog.keras.io/a-ten-minute-introduction-to-sequence-learning-in-keras.html>
- [21] I. Jeena Jacob, S. Kolandapalayam Shanmugam, S. Piramuthu, and P. Falkowski-Gilski, Eds., *Data Intelligence and Cognitive Informatics: Proceedings of ICDICI 2020*. in Algorithms for Intelligent Systems. Singapore: Springer Singapore, 2021, doi: 10.1007/978-981-15-8530-2.
- [22] H. Chatoui and O. Ata, "Automated Evaluation of the Virtual Assistant in BLEU and ROUGE Scores," in *2021 3rd International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA)*, Jun. 2021, pp. 1–6, doi: 10.1109/HORA52670.2021.9461351.
- [23] H. Mohammed Lateef, A. Muter Awaad, D. Ali Hameed, G. Thiab Hasa, and T. Ameen Faisal, "Evaluation of Domain Sulfur Industry for DIA Translator Using Bilingual Evaluation Understudy Method," *Bulletin EEI*, vol. 13, no. 1, pp. 370–376, Feb. 2024, doi: 10.11591/eei.v13i1.4489.
- [24] Y. Heryanto and A. Triayudi, "Evaluating Text Quality of GPT Engine Davinci-003 and GPT Engine Davinci Generation Using BLEU Score," *SAGA*, vol. 1, no. 4, pp. 121–129, Dec. 2023, doi: 10.58905/saga.v1i4.213.
- [25] S. Alzughaihi, J. Luo, D. Nazareth, M. Wu, and J. T. Fink, "Development, Implementation, and Usability Evaluation of a Chatbot to Effectively Provide Information on the Human Papillomavirus Vaccine." Apr. 07, 2023, doi: 10.21203/rs.3.rs-2769833/v1.
- [26] C. E. Noviyanti, H. B. Santoso, and P. O. Hadi Putra, "A Cross-Cultural Adaptation of Chatbot Usability Questionnaire (CUQ): Indonesian Version," in *2021 4th International Conference on Information and Communications Technology (ICOIACT)*, Yogyakarta, Indonesia: IEEE, Aug. 2021, pp. 248–251, doi: 10.1109/ICOIACT53268.2021.9563926.
- [27] S. Holmes, A. Moorhead, R. Bond, H. Zheng, V. Coates, and M. Mctear, "Usability Testing of a Healthcare Chatbot: Can we use Conventional Methods to Assess Conversational User Interfaces?," in *Proceedings of the 31st European Conference on Cognitive Ergonomics*, BELFAST United Kingdom: ACM, Sep. 2019, pp. 207–214, doi: 10.1145/3335082.3335094.

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## LAMPIRAN A

### CERTIFICATION FOR PRESENTER



## Certificate

Awarded to

**Suryani**

has **presented** the paper titled

**An Intelligent Chatbot For Faculty Administration Using Bidirectional LSTM And Seq2Seq Architecture**

at the *International Conference on Smart Computing, IoT, and Machine Learning (SIML) 2024*

Surakarta, 6-7 June 2024



Dr. Gunawan Ariyanto  
General Chair of SIML 2024

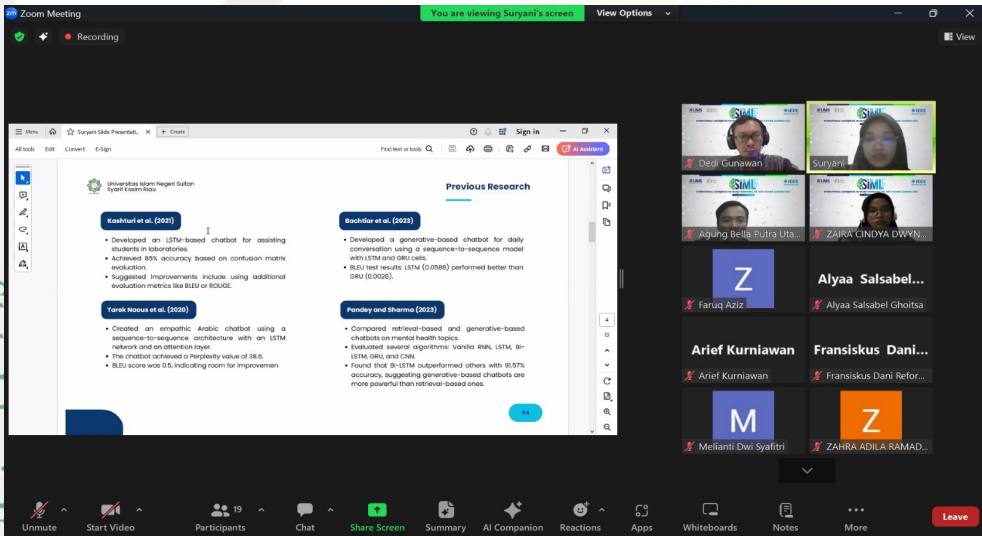
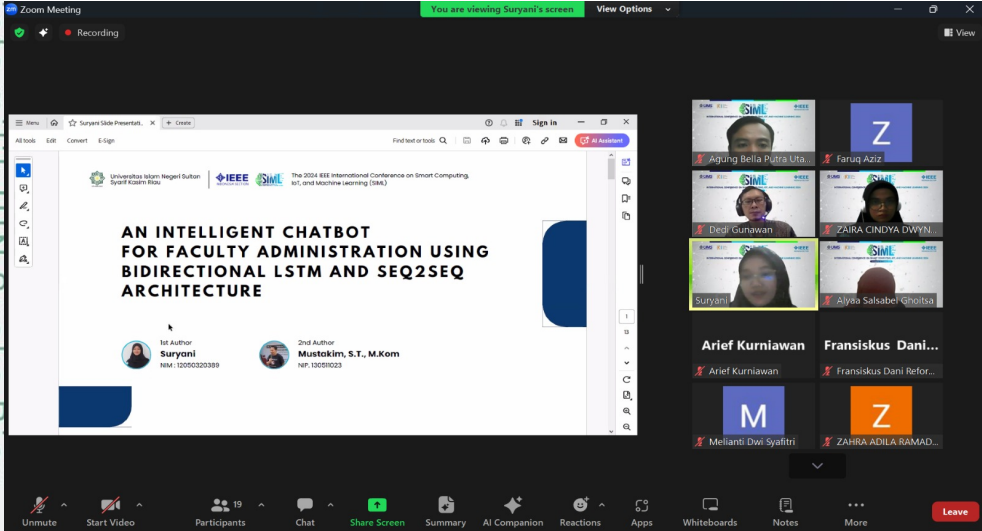


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### DOKUMENTASI KEGIATAN

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## LAMPIRAN C

**NOTIFICATION OF ACCEPTANCE EMAIL**

6/23/24, 10:43 PM

Email Universitas Islam Negeri Sultan Syarif Kasim Riau - SIML 2024 Notification for Paper 1571009319



Suryani Sistem Informasi &lt;12050320389@students.uin-suska.ac.id&gt;

**SIML 2024 Notification for Paper 1571009319**

siml2024-chairs@edas.info &lt;siml2024-chairs@edas.info&gt;

26 April 2024 pukul 15.41

Kepada: Suryani Suryani &lt;12050320389@students.uin-suska.ac.id&gt;, Mustakim Mustakim &lt;mustakim@uin-suska.ac.id&gt;

Dear Ms. Suryani Suryani:

We are pleased to inform you that your paper #1571009319 titled 'An Intelligent Chatbot For Faculty Administration Using Bidirectional LSTM And Seq2Seq Architecture' has been accepted for presentation at the 2024 International Conference on Smart Computing, IoT and Machine Learning (SIML).

Your submission has met the high standards required by our review committee and promises to contribute valuable insights to the field of smart computing, IoT, and machine learning. We are excited about the potential impact of your work and look forward to your presentation at the conference.

For the next step, please follow the below instructions:

1. Revise your paper(s) according to the reviewers' comments. The detailed review is listed below this email. Please be advised that failure to make the required revisions will result in the rejection of your paper and exclusion from the conference proceedings.
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Please be reminded that the camera-ready deadline is on 3 May 2024, and the registration deadline is on 10 May 2024. Please ensure that you adhere to these deadlines to facilitate the smooth organization of the conference.

The conference will take place by Hybrid from June 6-7, 2024 in Surakarta, Indonesia. The schedule will be posted on the conference website as soon as it is completed.

We look forward to your participation in SIML 2024 and are excited to see how your research contributes to our discussions. Should you have any questions or require further information, please do not hesitate to contact us at [siml@ums.ac.id](mailto:siml@ums.ac.id).

Warm Regards,  
SIML 2024 Organizers

The reviews are below or can be found at <https://edas.info/showPaper.php?m=1571009319>.

===== Review 1 =====

> \*\*\* Detailed Comments: Please justify your recommendation and suggest improvements in technical content or presentation.

Title:

The author has written the title well; it contains methods and solutions representing the contents.

Abstract:

1. Sentence 1: "Since 2018, the academic directory website(Seminar FST) has been operational and has become the center of administrative services for students of Fakultas Sains dan Teknologi". Your sentence may be unclear or hard to follow. Consider rephrasing. The author should explain what the word "Seminar FST" means. The word "Fakultas Sains dan Teknologi" is in Indonesian term. The author should explain this word first. The word "...for students of Fakultas Sains dan Teknologi." Should be "Fakultas Sains dan Teknologi students".

2. Sentence 5: "This is an issue that needs to be addressed immediately.". It may be unclear who or what This

6/23/24, 10:43 PM

Email Universitas Islam Negeri Sultan Syarif Kasim Riau - SIML 2024 Notification for Paper 1571009319

refers to. Consider rewriting the sentence to remove the unclear reference.

3. Sentence 7: "The purpose of this research is to develop a chatbot model using...". Consider rephrasing. Even if a sentence is grammatically correct, it still might be unclear or hard to follow. Very long or over-complicated sentences can lead to the same problem. Cutting extra words, tightening up awkward phrasing, and make sure your sentence isn't too long are good ways to make your writing clearer.

Introduction:

1. The author needs to link previous research to find the problem formulation and research background clearly. Previous research needs to be criticized to find weaknesses and then provide solutions. Not just implementing the method.
2. The problem boundaries need to be explained.

Method:

1. Table Fig. 1. Research Methodology needs an explanation. How does the research process flow from start to finish, and what is the output at each stage?
2. Because Table 1 contains information in Indonesian, the author needs to explain it in English to readers so that it can reach all readers, both local and international, regarding the simple dataset used.
3. Need an explanation of each notation in formulas (1), (2), (3), (4). for example, st is....., Uxt is....., WSt-1 is....

Result and Discussion:

The sentence "The results of the BLEU score calculation are close to the value of 1, which indicates that the model can provide a translation that matches the reference" is needed. Based on Table IV, the BLEU score in the first row is 0.5642, not close to 1. Please give a reasonable answer about this. An explanation of the BLEU score is needed.

Conclusion:

The author should mention all components in the conclusion, namely, restate the proposed method, main finding, and future work. There is no future work in this manuscript; it should be added.

References:

1. The author should improve the references section based on the journal's reference style.
2. Reference numbers 1, 11, 14, and 19 should be improved. Use an English article with high-quality paper and update for reference to help foreign readers understand the paper.

==== Review 2 =====

> \*\*\* Detailed Comments: Please justify your recommendation and suggest improvements in technical content or presentation.

The paper proposed a chatbot for faculty administration FAQs. It shows the need for this chatbot by gathering surveys among stakeholders in the Faculty of Science and Technology. However, several areas required further revisions.

1. The authors should mention the number of datasets collected and used in this research.
2. The authors need to show the Seq2seq architecture used in this research as well as the bi-LSTM layer.
3. It would be more helpful if the authors explained why the BLEU score is used to measure performance and how to calculate it.
4. The authors should compare Bi-LSTM to related architectures such as vanilla RNN, LSTM, and GRU to enhance the reader's understanding of why it is used.
5. In Table IV, please provide the answer generated by the chatbot. This can provide more understanding regarding the results of the chatbot and what the answers should be.
6. The authors should add additional evaluation using human evaluators to measure the chatbot's performance. In generative chatbots, quantitative measurement usually cannot be used alone to judge the chatbot's quality.

==== Review 3 =====

> \*\*\* Detailed Comments: Please justify your recommendation and suggest improvements in technical content or presentation.

1. The problem and contribution are not stated clearly in the abstract of this manuscript.
2. There is no reason why the method (Bi-LSTM) was chosen regarding the problem.
3. There is no information about the number of datasets that have been collected.
4. Please provide a comparison of your work with the baseline on previous works.

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## LAMPIRAN D

### SURAT PERNYATAAN PAKAR

#### SURAT PERNYATAAN

Saya yang bertanda tangan di bawah ini:

Nama : Prof. Fitra Lestari, ST, Meng, PhD, IPM, AER  
NIP : 198506162011011016  
Pekerjaan : Wakil Dekan I Fakultas Sains dan Teknologi  
Alamat : Jl. H.R Soebrantas No.155 KM.15, Pekanbaru

Menyatakan dengan sesungguhnya bahwa telah melakukan validasi kamus data pada topik penelitian tugas akhir dari mahasiswa:

Nama : Suryani  
NIM : 12050320389  
Program Studi : Sistem Informasi  
Judul Tugas Akhir : *Generative-based Chatbot Menggunakan Long Short-Term Memory*  
Pada Website Direktori Akademik Fakultas Sains dan Teknologi

Demikian surat pernyataan ini saya buat dengan sesungguhnya tanpa paksaan dari pihak manapun. Atas perhatiannya saya ucapkan terima kasih

Pekanbaru, 15 Mei 2024

Yang membuat pernyataan

Prof. Fitra Lestari, ST, Meng, PhD, IPM, AER



## DAFTAR RIWAYAT HIDUP



Peneliti bernama Suryani, lahir di Karya Tunas Jaya, Kecamatan Tempuling, Kabupaten Indragiri Hilir, pada tanggal 6 Juni 2002, merupakan putri sulung dari Bapak Supiyan dan Ibu Jumriah. Peneliti memulai pendidikan Sekolah Dasar di SDN 019 Tempuling pada tahun 2008-2014, kemudian melanjutkan pendidikan Sekolah Menengah Pertama di SMPN 3 Tempuling pada tahun 2014-2017, dan melanjutkan pendidikan Sekolah Menengah Kejuruan di SMKN 5 Pekanbaru dengan Program Keahlian Multimedia pada tahun 2017-2020. Pada tahun 2020, peneliti secara resmi memulai perjalanan perkuliahan Strata 1 (S1) di Universitas Islam Negeri Sultan Syarif Kasim Riau pada Program Studi Sistem Informasi, Fakultas Sains dan Teknologi. Selama menempuh pendidikan di Universitas Islam Negeri Sultan Syarif Kasim Riau, peneliti terlibat aktif dalam organisasi riset bernama *Puzzle Research Data Technology* (PREDATECH) sebagai Koordinator Divisi Media Spesialis pada tahun 2023-2024. Peneliti juga pernah mengikuti program Magang dan Studi Independen Bersertifikat (MSIB) *Bangkit Academy* yang diselenggarakan oleh Google, GoTo, dan Traveloka pada paruh pertama tahun 2023. Dalam program MSIB tersebut, peneliti tergabung dalam *learning path Machine Learning*. Peneliti telah menyelesaikan pendidikan S1 pada tahun 2024 dengan judul penelitian tugas akhir "*Generative-based Chatbot Menggunakan Long Short-Term Memory pada Website Direktori Akademik Fakultas Sains dan Teknologi*."

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Lampiran Surat :  
Nomor : Nomor 25/2021  
Tanggal : 10 September 2021

## SURAT PERNYATAAN

Saya yang bertandatangan di bawah ini:


Nama : SURYANI  
NIM : 12050320389  
Tempat/Tgl. Lahir : KARYA TUNAS JAYA, 06 JUNI 2002  
Fakultas/Pascasarjana : SAINS DAN TEKNOLOGI  
Prodi : SISTEM INFORMASI  
Judul Disertasi/Thesis/Skripsi/Karya Ilmiah lainnya\*:  
GENERATIVE - BASED CHATBOT MENGGUNAKAN LONG SHORT -  
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Pekanbaru, 10 Juli 2021  
Yang membuat pernyataan

  
SURYANI  
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