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Implementation of Telegram Chatbot AI with Natural Language Processing (NLP) in Learning Creative Entrepreneurship to Develop Students' Creative and Innovative Competence

Implementation of Telegram Chatbot AI with Natural Language Processing (NLP) in Learning Creative Entrepreneurship to Develop Students' Creative and Innovative Competence

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Abstract

The development of technology in the current era is advancing very rapidly. Along with digital learning materials are considered capable of increasing more not only in verbal communication but also various texts, visual, audio and motion. This study aims to develop students' 4C competencies (Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration) in the 21st century learning context through creative entrepreneurship learning materials of the Telegram Chatbot Artificial Intelligence with Natural Language Processing (NLP) Method. The scope learning materials are focus on Implementation of Telegram Chatbot AI with Natural Language Processing (NLP) in Learning Creative Entrepreneurship to Develop Students' Creative and Innovative Competence as e-learning students material. This research used the Research and Development approach of Borg and Gall (1983). The series of research and development steps were carried out in stages, and each step was taken referring to the results of the previous step until a new development product of learning materials was finally obtained. Product development design of the preliminary stage needed analysis, which was carried out by collecting a number of related data and developing Creative Entrepreneurship learning materials of the Telegram chatbot model. The Creative Entrepreneurship learning program involved 50 students of the English Literature Department, Universitas Negeri Medan filled in the google form to give feedback after implementing the Telegram Chatbot support students' creative and innovative competence. The Findings showed that it can significantly Enhance Students' Creative and Innovative competence prepare students for the complexities of the modern business world.

Keywords: Telegram Chatbot AI; natural language processing (NLP); creative entrepreneurship; creative and innovative competence

Abstrak

Perkembangan teknologi di era saat ini mengalami kemajuan yang sangat pesat. Seiring dengan itu materi pembelajaran digital dinilai mampu meningkatkan lebih banyak tidak hanya pada komunikasi verbal tetapi juga berbagai teks, visual, audio dan gerak. Penelitian ini bertujuan untuk mengembangkan kompetensi 4C (Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration) mahasiswa dalam konteks pembelajaran abad 21 melalui materi pembelajaran kewirausahaan kreatif Kecerdasan Buatan Chatbot Telegram dengan Metode Natural Language Processing (NLP). Ruang lingkup materi pembelajaran difokuskan pada Implementasi Chatbot Chat Telegram AI dengan Natural Language Processing (NLP) dalam Pembelajaran Kewirausahaan Kreatif untuk Mengembangkan Kompetensi Kreatif dan Inovatif Mahasiswa sebagai bahan ajar e- learning. Penelitian ini menggunakan pendekatan Research and Development dari Borg and Gall (1983). Rangkaian langkah penelitian dan pengembangan dilakukan secara bertahap, dan setiap langkah yang dilakukan mengacu pada hasil langkah sebelumnya hingga akhirnya diperoleh produk pengembangan bahan ajar yang baru. Desain pengembangan produk pada tahap pendahuluan diperlukan analisis, yang dilakukan dengan mengumpulkan sejumlah data terkait dan mengembangkan materi pembelajaran Kewirausahaan Kreatif model chatbot Telegram. Program pembelajaran Kewirausahaan Kreatif melibatkan 50 mahasiswa Jurusan Sastra Inggris, Universitas Negeri Medan yang mengisi formulir google untuk memberikan umpan balik setelah mengimplementasikan Chatbot Telegram untuk mendukung kompetensi kreatif dan inovatif mahasiswa. Temuan menunjukkan bahwa hal tersebut dapat secara signifikan meningkatkan kompetensi Kreatif dan Inovatif siswa dalam mempersiapkan siswa untuk menghadapi kompleksitas dunia bisnis modern.

Kata Kunci: Chatbot Telegram AI; natural language processing (NLP); kewirausahaan kreatif; kompetensi kreatif dan inovatif

1. Introduction

21st century learning is learning designed for the 21st century generation to be able to keep up with the flow of technological developments. Therefore, students are required to be able to master four learning skills (4C), namely: Creativity and Innovation, Critical Thinking and Problem Solving, Communication, and Collaboration. This is one of the instruments to be able to achieve the future. Because of its significant influence, students are expected to be able to adapt to the times so that they can compete well in the future (Bialik & Fadel, 2015; Erdogan, 2019; Pardede, 2020).

In this 21st century learning, it is very necessary to master technology, especially in the application of Artificial Intelligence (AI). AI aims to expand humanity's capacity in the task of organizing society through intelligent machines, with the aim of realizing humans and machines coexist. Many learning media utilize AI, one of which is hybrid media. The combination of online activities with traditional classroom instruction is commonly referred to as web- enhancement. A chatbot is a computer program simulating communication. The program answers questions posed by the user. This tool is equipped with artificial intelligence (AI) technology and is very commonly used in various e- commerce platforms where these designed automated messages can increase sales or service productivity, using chatbots can also save time.

Based on the phenomenon and explanation above, the author wants to conduct research related to how the Telegram Chatbot Application development model in Creative Entrepreneurship learning through the Natural Language Processing (NLP) method in the context of 21st century learning which is learning designed for the 21st century generation to be able to keep up with the flow of technological developments. This research is important because now students are becoming less creative and innovative, therefore learning by utilizing AI such as Chatbots is carried out. The system integratedly helps the teaching process from various fields of science.

2. Literature Review

2.1. Telegram Artificial Intelligence Chatbot App

Research on designing Chatbot as a virtual assistant at Raharja University (Sudaryono et all: 2020) uses agile software development methodology, namely by using the scrum framework, the development is very complex and unpredictable so scrum is used. The Agile concept is also applied so that new technologies that develop can be done quickly. And the findings are that this design produces a chatbot prototype using AIML (Artificial Intelligence Markup Language) which is translated by ALICE (Artificial Linguistic Internet Computer Entity) and the system is able to motivate entrepreneurs, get information from entrepreneur forums, and other tutorials on entrepreneurship. This research starts with analysis, design, implementation, testing, deployment, and maintenance.

Research related to the application of chatbot using Natural Language Processing (NLP) as an effort to learn English based on Android (Tifanny Martavia et all: 2022). Library research and questionnaires as well as pre-test and post-test are the methodologies used. It was found that NLP in chatbot design is an alternative method in learning English, which provides explanations of 16 tenses. Chatbot users can ask questions related to 16 tenses in English, such as understanding in English and Indonesian.

Chatbot Design Using Natural Language Processing (NLP) was again carried out, but was built by utilizing Dialogflow tools from Google for the Ordering System at Coffee Shop (Chandra et all: 2020). Using a qualitative descriptive approach method that uses a natural setting with the intention of understanding the phenomenon of what is experienced by the research subject as a whole, by describing data in the form of words and language, and by utilizing various natural methods. It was found that this chatbot can serve transactions and display menu options at the Coffee Shop.

(Wijaya et all: 2019) conducted research on making Web-Based Chatbot Applications at CV. Unomax Indonesia. The method used in this research is a prototype method based on Hypertext Preprocessor (PHP) programming and My Structure Query Language (MySQL) Database. The results showed that the web-based chatbot runs well, and is able to answer questions as expected. The chatbot has been declared ready to be implemented by CV Unomax Indonesia.

Other research related to chatbot design (Lukman Hakim et all: 2020) was conducted to improve the efficiency and effectiveness of Customer Support work at Proklamasi 45 University for prospective students. This research develops a chatbot using Machine Learning techniques and also uses the waterfall method. And the system will be tested by the Black-box method, namely by entering input and then evaluating the output generated when the program runs. The test results will be analyzed using quantitative data analysis techniques, namely by calculating the percentage of correct answers generated by Chatbot. It was found that Chatbot can be used to automate the work of Customer Support, because the resulting accuracy reached 97.75% and the response time was quite fast. Chatbot that is built is very dependent on the amount of training data, therefore the amount of training data must be increased so that the resulting accuracy is better.

The article entitled Implementation of English Learning Chatbot using Social Media (Moechammad Sarosa et all: 2020) develops a chatbot application for learning English structures, the chatbot application is integrated with Facebook social media called ELA-bot using the Chatfuel framework. NLP (Natural Language Processing) is the method used, the method was also used

in previous studies. The results showed that 97.5% stated that the chatbot had helped them learn English, 90% said that the material presented was quite interesting and 72.5% that the chatbot application did not burden their mobile phone performance.

The use of digital learning media has a wide and significant influence on the course of education today. Every teacher must create creative and innovative learning media that can be used in delivering learning materials. Having the right learning media can increase interaction between the two parties concerned so that they are not bored following the learning. The right digital learning media in the teaching and learning process will produce satisfactory output. Using the right media in delivering material will give good results. In the digital era, teachers must have creative ideas related to learning media. One of the learning materials that utilize digital media is Creative Entrepreneurship. The design of chatbot through Telegram application is done in this research. Chatbot in this research has a function as a material provider in the form of text and audio. This tool delivers material in accordance with the procedures in the program. Especially in the discussion of Creative Entrepreneurship, the delivery of material using audio is deliberately made, so that chatbot users can learn, understand, or model how to convey entrepreneurship material clearly and integrated.

2.2. NLP (Natural Language Processing) Method

Natural Language Processing (NLP) enables machine to machine or human to machine interaction using human- related Natural Language. Natural Language Processing is a set of theoretically motivated computational techniques for analyzing and representing naturally occurring text at one or more levels of linguistic analysis for the purpose of achieving human-like language processing for various tasks or applications. The use of Natural Language Processing (NLP) methods is very common in the creation of Telegram chatbots. This method is considered a simple method because it only involves a few tools.
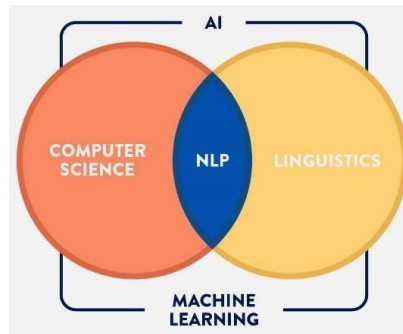

Fig. 1. Natural Language Processing (NLP) methods.

NLP methods work by retrieving queries or information from databases and software that users use to make information requests. The bot takes simple queries, analyzes them as input and classifies the data into text for the simple response required. The system will automatically redirect the conversation to the actual user if it is found to require a complex response.

Research on Natural Language Processing in the journal An Automated Conversation System Using Natural Language Processing (NLP) Chatbot in Python shows the use of the NPL method is very suitable for creating a simple chatbot because it does not require a difficult and high computer system for its application. NPL provides various methods, functions, and pre-made models that can be used for various text and language analysis operations. Although categorized as relatively simple, it is so flexible that it can be easily customized for any scenario, as per the user's command.
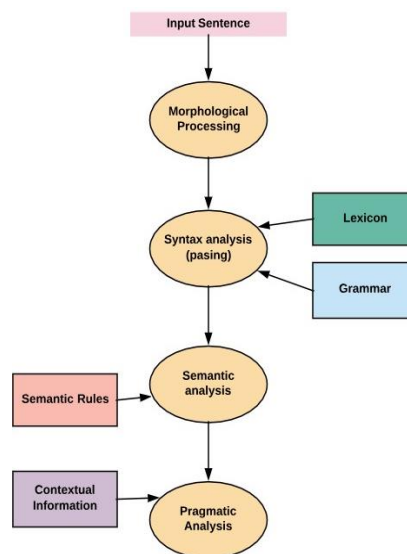
Fig. 2. Methods, functions, and pre-made models of NLP.

2.3. Creative Innovative Entrepreneurship

A Telegram chatbot AI can support students' creative and innovative entrepreneurship in various ways:

1. Idea Generation and Validation: The chatbot can help students brainstorm ideas for their entrepreneurial ventures by asking probing questions and providing prompts. It can then guide them through the process of validating these ideas by conducting market research and assessing their viability.
2. Business Planning Assistance: The chatbot can assist students in creating business plans. It can help them define their target audience, value proposition, revenue model, and marketing strategy.
3. Skill Development: The chatbot can offer mini-courses, tutorials, and quizzes on various aspects of entrepreneurship. This can help students acquire essential skills such as marketing, financial management, and communication.
4. Feedback and Iteration: Students can present their ideas or prototypes to the chatbot, which can provide preliminary feedback.
5. Market Research: The chatbot can guide students through conducting market research, helping them understand their target audience's needs, preferences, and pain points.
6. Networking and Collaboration: The chatbot can connect students who have similar interests or complementary skills, fostering collaboration and potentially leading to partnerships.
7. Problem-Solving and Decision-Making: Students can consult the chatbot when facing challenges or making decisions. The chatbot can provide insights based on established business principles and help students consider various options.
8. Inspiration and Motivation: The chatbot can share success stories of innovative entrepreneurs, inspiring students to persevere and think outside the box.
9. Time Flexibility: Students can access its support whenever they have the time or need, accommodating different schedules.
10. Privacy and Confidentiality: If designed with security in mind, the chatbot can provide a safe environment for students to discuss and develop their business ideas.
11. Tracking Progress: The chatbot can maintain a record of a student's progress, providing a sense of achievement and enabling them to reflect on their journey.

2.4. 21st Century Learning

21st century learning is learning designed for the 21st century generation to be able to keep up with the latest technological developments. Especially in the realm of communication that has entered the joints of life, therefore students are required to be able to master four learning skills (4C) namely: creativity and innovation, critical thinking and problem solving, communication and collaboration. When drawn from humans, 21st century learning aims to make humans relevant to their times, especially Indonesian humans, so the initiation of 21st century learning is formed. This is one of the instruments to buy the future. Because of its significant influence, students are expected to be able to adapt to the times so that later they can compete well in the future.

The 21st century is also known as the knowledge age, in this era, all alternative efforts to fulfill life needs in various contexts are more knowledge-based. Efforts to meet the needs of knowledge-based education, knowledge- based economic development, knowledge-based community development and empowerment, and development in the field of knowledge-based industry (Mukhadis, 2013: 115).

Kemdikbud formulates that the 21st century learning paradigm emphasizes the ability of students to find out from various sources, formulate problems, think analytically and cooperate and collaborate in solving problems (Litbang Kemdikbud, 2013). 21st century learning includes many things. Skills that are classified as 21st century competencies include: Critical thinking, Creativity, Collaboration, Communication, Information literacy, Media literacy, Technology literacy, Flexibility, Leadership, Initiative, Productivity, and Social skills (https://www.ruangkerja.id/blog/kompetensi-pembelajaran-abad-21).

The skills that are the focus of learning in the 21st Century are skills in mastering information media and technology. Today, Indonesian people no longer create or search for information only with books, but the internet almost dominates all aspects of life in order to improve skills, and develop abilities. Technological literacy is required in 21st century learning to be responsive in accessing information effectively and efficiently, competent and criticizing information and the ability to use information accurately and creatively.

3. Research Method

The research and learning approach in this research is utilized to produce a Digital Learning Model with the Telegram Chatbot application as an effective and integrated learning to improve the learning competencies of Creative Entrepreneurship and the implementation of 21st Century Learning.

Here's a more detailed breakdown of how it functions:

a. User Input

Users send their questions or statements about Creative Entrepreneurship to the chatbot through the Telegram platform. These can cover a wide range of topics, including starting a creative business, marketing strategies, product development, innovation, and more.

b. Text Preprocessing

The chatbot starts by preprocessing the user's input text. This involves tasks like tokenization (breaking the text into individual words or tokens), removing punctuation, and converting words to lowercase. Preprocessing helps standardize the text and make it easier for the subsequent NLP tasks.

c. Intent Recognition:

Using NLP techniques, the chatbot tries to determine the user's intent or the main topic of the question. This is often done through methods like keyword extraction, pattern matching, or more advanced techniques like intent classification using machine learning models. For instance, if the user asks, "What are some creative marketing strategies?" the chatbot should recognize the intent as seeking information about marketing strategies in the context of creative entrepreneurship.

d. Entity Recognition

In addition to understanding the intent, the chatbot may also need to identify specific entities or key terms in the user's question. These entities could be relevant keywords such as "innovation," "business plan," "product design," etc. Recognizing these entities helps the chatbot provide more accurate and contextually relevant answers

e. Information Retrieval

Once the intent and entities are identified, the chatbot retrieves information from its knowledge base. This knowledge base can consist of curated content related to Creative Entrepreneurship, such as articles, guides, case studies, and best practices. The chatbot searches for relevant information based on the user's intent and entities.

f. Answer Generation

With the retrieved information, the chatbot generates a response to the user's question. The response should be concise, informative, and tailored to the user's intent. NLP techniques are used to construct coherent and human- like sentences. The response could include explanations, examples, step-by-step instructions, and references to external sources.

g. Context Management

The chatbot maintains the context of the conversation to provide coherent responses. It remembers the user's previous queries and responses to ensure that the conversation flows smoothly. This is particularly important when the user asks follow-up questions or seeks clarifications.

h. User Interaction

The chatbot sends its response back to the user via Telegram. The user can further engage with the chatbot by asking more questions or seeking additional information. The chatbot must handle these interactions effectively, maintaining context and providing accurate answers.

i. Continuous Learning and Improvement

Chatbots can be improved over time through continuous learning. Feedback from users, as well as regular updates to the NLP model and the knowledge base, can enhance the chatbot's ability to provide accurate and relevant answers.

Overall, the effectiveness of the Telegram chatbot in answering Creative Entrepreneurship questions relies on the quality of its NLP algorithms, the comprehensiveness of its knowledge base, and   its adaptability to user interactions.

4. Results and Discussion

Based on the results of participant responses regarding the use and use of chatbots in Creative Entrepreneurship, they will be displayed based on the Pie Chart below.
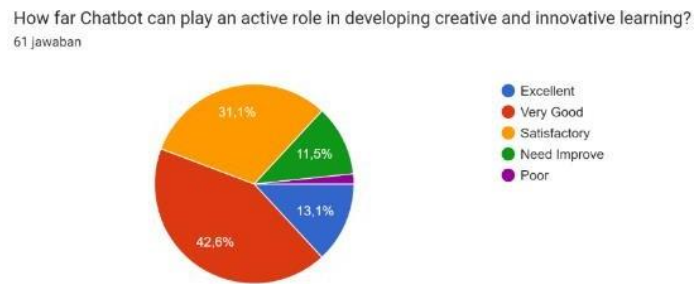

Fig. 2. Participants' responses regarding the use of chatbots in Creative Entrepreneurship.

Most of the participants, that is 46.2%, strongly agree that Chatbots can play an active role in developing creative and innovative learning in several ways namely Accessible Guidance, Idea generation, learning Platform, market insight, feedback and improvement, motivation and Inspiration even connect students' with mentors or networking opportunity.
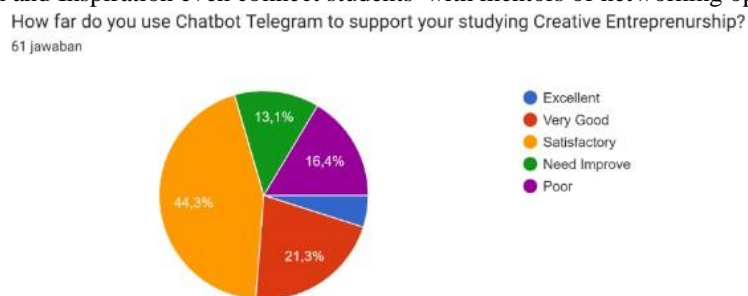

Fig. 2. Participants' responses regarding the support of chatbots in Creative Entrepreneurship learning.

Most of 49,2% participants agree that chatbot is very good useful in supporting Creative Entrepreneurship learning namely, developing Creative thinking, Innovative problem-solving skills, interdisciplinary collaboration and a holistic approach that prepare students for complexities of the modern business world.

Table 1. The role of chatbot in developing creative and innovative learning

How far Chatbot can play an active role in developing creative and innovative learning?	Mean
Excellent	
Very good	
Satisfactory	3.4
Need improve	
Poor	
How far do you use Chatbot Telegram to support your studying Creative Entrepreneurship?	Mean
Excellent	
Very good	
Satisfactory	2.8
Need improve	
Poor	

According to the mean evaluations (Mean = 3.4), respondents generally regard the chatbot's contribution to the development of creative and innovative learning to be adequate. But when it comes to using a Telegram chatbot to learn about creative entrepreneurship, the mean shows a lower degree of satisfaction (2.8).

Users' perceptions of chatbots' effectiveness in promoting creativity and innovation may be supported by their higher mean for the general role of chatbots in learning. However, the lower mean for the study of creative entrepreneurship in particular can draw attention to areas that require improvement, indicating that the Telegram chatbot may not be fulfilling users' requirements or expectations in that particular scenario. It would be beneficial to investigate user comments or carry out additional surveys in order to pinpoint particular elements that influence these ratings and to provide guidance for future improvements or modifications to the chatbot's Creative Entrepreneurship features.

5. Conclusions

Based on the data from google form as Findings, we conclude:

1. Creating a Telegram Chatbot support students' creative and innovative entrepreneurship. It could provide resources, guidance, and inspiration for budding entrepreneur.
2. A Telegram Chatbot can significantly enhance students' creative entrepreneurship in several ways namely Accessible Guidance, Idea Generation, Learning Flatform, Market Insight, Feedback and Improvement, Motivation and Inspiration even help connect students with mentors or networking opportunity.
3. Studying Creative Entrepreneurship in the 21st-century learning context goes beyond focuses on developing creative thinking, innovative problem-solving skills, and entrepreneurial acumen through experiential learning, interdisciplinary collaboration, and a holistic approach that prepares students for the complexities of the modern business world.

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