Development of Smart Live Edu-Multimedia Multilingual Adaptive for Digital Quran to Children and Parents Utilize meta-Deep Lightweight SORA Algorithm

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***Abstract*-. This research related to collaboration Islamic religious education methods in the family home is urgent and important, particularly for children and parents, especially regarding the introduction of the Quran as the word of Allah SWT delivered by the Prophet Muhammad SAW through the angel Gabriel. To improve education ways, the approach, if only conducted conventionally, such as only monotonous with static books, of course, is not enough to attract interest in reading to memorization. Based on these constraints, this study carried out an adaptive approach by utilizing technology from the meta-Deep lightweight SORA algorithm as a tool to create a smart digital Quran that is able to display live adaptive multilingual multimedia, including textual, audio, and video content. We propose Cooperative Agents Meta-Learning (CAML) algorithm as its contribution in supporting greater convenience for early childhood education and parents. The results of this study are expected to be able to provide a treasure trove of Islamic education with a blended method while maintaining methods such as in Islamic boarding schools with the latest Artificial Intelligence (AI) technology.**

Keywords; CAML algorithm, Development of Smart Digital Quran, Edu-Multimedia Multilingual, Meta-Deep Lightweight SORA Algorithm

I. INTRODUCTION

The advancement of digital technology has dramatically reshaped the educational landscape, including religious education. The Digital Quran is an essential tool for children and parents, offering a more interactive approach to learning. Yet, many of these platforms fall short in terms of multilingual support and adaptive learning capabilities, limiting their effectiveness for a diverse audience. This paper introduces the Smart Live Edu-Multimedia Multilingual Adaptive platform, leveraging the meta-Deep Lightweight SORA algorithm to address these limitations, delivering a more personalized and efficient Quranic education system [1–3].

Given the global distribution of the Muslim population, the importance of multilingual support in digital Quran platforms cannot be overstated. Existing systems often cater to a limited range of languages, making it difficult for non-native speakers to engage meaningfully with the content [4,5]. This system addresses these challenges by offering real-time adaptive learning in multiple languages, enhancing both accessibility and the user experience [6]. The platform is designed to accommodate both children and parents, offering age-appropriate, culturally relevant content to foster better understanding [7,8].

This research is related to the urgent need for collaboration in Islamic religious education methods within the family, especially regarding the introduction of the Quran, revealed by Allah SWT to the Prophet Muhammad SAW through the angel Gabriel. Conventional methods, such as relying solely on static books, fail to capture children's attention or foster deeper learning. To overcome this, the study adopts an adaptive approach by utilizing the meta-Deep Lightweight SORA algorithm, which enables the development of a smart digital Quran with live adaptive multilingual multimedia. This system includes textual, audio, and video content, making it more engaging for early childhood education and parents alike. It combines traditional methods with the latest Artificial Intelligence (AI) technology, akin to practices found in Islamic boarding schools [9,10].

The meta-Deep Lightweight SORA algorithm offers several key advantages. It is lightweight and designed for low-resource environments, making it ideal for mobile and remote learning applications. The algorithm's meta-learning framework allows the platform to rapidly adapt to new users and learning environments with minimal data input [11,12]. This adaptability ensures that the platform delivers personalized learning experiences tailored to each user's progress and needs. Moreover, its low computational requirements enable the platform to function in areas with

limited internet connectivity, extending its reach to underserved communities [13,14]. However, despite its capabilities, the SORA algorithm does face challenges in handling more complex multimedia content and larger language datasets, requiring further refinement [15]. The use of multimedia in Quranic education significantly enhances learning outcomes, particularly among younger learners. Research has shown that interactive features such as audio recitations, visual verse representations, and translations improve engagement and retention [16,17]. By integrating the SORA algorithm, the platform adapts content in real-time to the learner's progress, offering a personalized and dynamic learning experience. This adaptive system is crucial for maintaining interest and fostering a deeper connection with the Quran [6]. Furthermore, the platform encourages parental involvement, allowing families to learn together, thereby creating a supportive educational environment.

AI-powered educational platforms are revolutionizing how religious education is delivered. Traditional methods, while effective, often lack the flexibility to cater to diverse learning styles and paces, particularly in multicultural and multilingual contexts. By leveraging AI, platforms like Smart Live Edu-Multimedia offer real-time feedback, multilingual support, and personalized learning paths, making them ideal for Quranic education. The system's ability to scale and adapt ensures continuous engagement, making it a valuable tool for both formal and informal educational settings. The Smart Live Edu-Multimedia Multilingual Adaptive platform, utilizing the meta-Deep Lightweight SORA algorithm, represents a transformative approach to Quranic education. By combining multilingual support with adaptive learning features and lightweight AI models, it offers a more accessible and engaging learning experience for children and parents. Its low-resource design ensures usability across a wide range of environments, making it a significant contribution to the future of Islamic education.

II. METHODS

Digital Quran

Combining the Quran in high end technology also with Artificial Intelligence (AI) based on Fig. 1 significantly improves the development of adaptive educational content for children and parents. AI-powered systems adjust learning content based on user engagement, creating more personalized and efficient learning experiences. Techniques like Deep Learning assess individual learning styles to tailor Quranic lessons, addressing various age group needs [18][19].

Additionally, adaptive videos enhance interactive learning by leveraging AI algorithms that recommend the best instructional approaches based on past user interactions [20][21]. These tools simplify Quran recitation and interpretation materials, enriching children's spiritual education while assisting parents with a structured yet flexible learning environment [22][23].

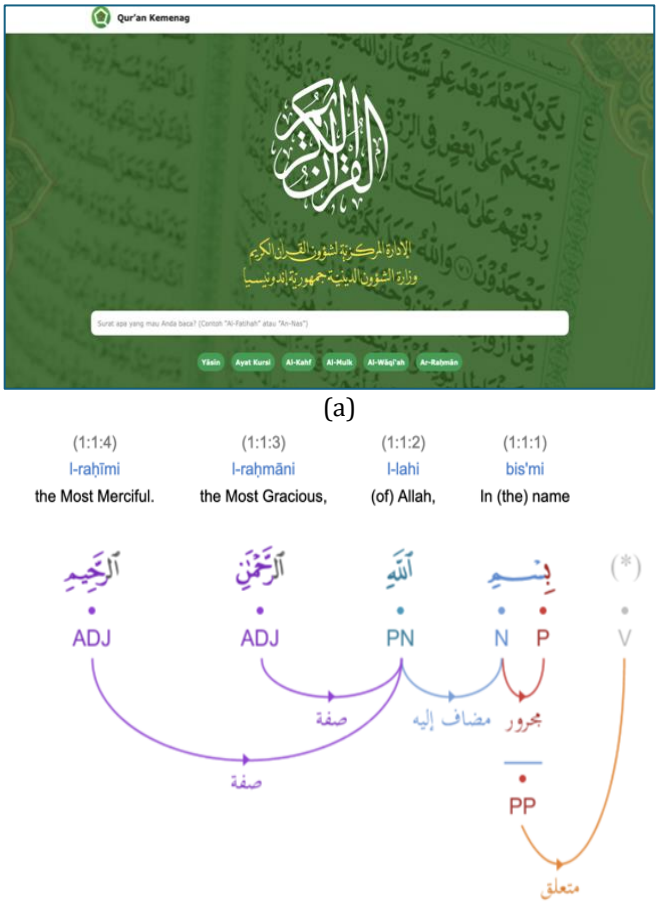


Figure 1. (a) Qur'an Kemenag online [24], (b) sūrat l-fātiḥah (The Opening) verse 1 [25]

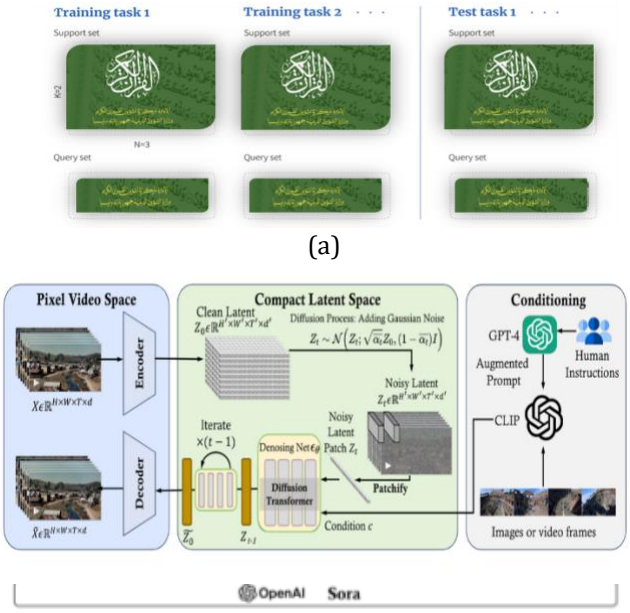
Smart Live Edu-Multimedia of Quran

To develop a highly effective Smart Live Edu-Multimedia platform, incorporating advanced technology like OpenAI's SORA is essential. SORA enables the creation of interactive, visually appealing educational content that adapts in real-time to user needs, enhancing engagement for both children and adults [26]. This technology offers tailored video content that brings Quranic lessons to life, making them more accessible and immersive for local audiences [27].

Moreover, integrating high-quality audio that captures the spiritual depth of the Quran is crucial for user satisfaction. Leveraging AI tools like SORA allows the production of localized audio content with clear pronunciation and appropriate cultural nuances [28,29]. Combining adaptive video and accurate audio delivery enhances the overall Quranic educational experience [30].

Propose of meta-Deep Lightweight SORA Algorithm

The SORA algorithm employs a basic approach for processing Quranic materials, achieving moderate levels of accuracy and efficiency. While it allows for fundamental feature extraction and model training, its adaptability and scalability are limited. Additionally, the video generation process can be slower, and the user experience is fairly standard. In the meta-Deep Lightweight SORA algorithm significantly boosts performance. It features enhanced efficiency, leveraging advanced techniques for feature extraction and offering better adaptability. This algorithm facilitates faster video production and delivers a more engaging experience for users, making it a superior option for multimedia Quranic education.



(a)

(b)

Figure 2. (a) Few-Shot Learning [24], (b) SORA algorithm

We propose Cooperative Agents Meta-Learning (CAML) algorithm as "meta-Deep Lightweight" mechanism for SORA Algorithm [29] that enables few-shot meta-learning [31], enhanced by mixed (a) and (b) based on Fig. 2 based on pairs few "task" sets for Train and Test e.g. ([support_set_1, query_set_1],.., [support_set_n, query_set_n]) with "and/or" flexible combination of each task included Model 1 utilize surah makkiyah, Model 2 utilize surah madaniyah, Model 3 utilize surah 'makiyah_and_madaniyah' + 'between_makiyah_and_madaniyah', and Model 4 As Baseline or Grouth Truth utilize all surah.

- The concept of "[support_set_i-th, query_set_i-th]" in the prediction results, referred to as a "Test task," always matches the true value in terms of accuracy if this CAML algorithm for classification or always zero error rate if for regression, applying fault tolerance across the model. In this research using regression approach manages resource distribution or resource sharing together between surahs, reflecting connections based on the provided input features (it's can use 5-term features, 10-term features, or 15-term features from the {id_surah}.json file, specifically from ["id_surah"].["translations"].["id"].["text"] with Indonesian terms for feature extraction and build dataset to modeling 1 until 4.
- Input of generate video of smart live edu-multimedia:
  - Quran text, for example from one of the translations in Indonesian using top_k = [5, 10, 15]
  - Multilingual *.srt file (Arabic, Indonesia, Java, and English)
  - Audio
  - Gen video resource (input: features value of surah, output: background_options, transition_types, and choose existing or generate temporary file in the image_paths (*.jpg, *.png, *.gif, *.webp, *.mp4, or etc) after with or without applying style transfer learning, easyAnim or others) using training and testing as part of initialization pre-process by The CAML algorithm, which is capable of using diverse models, including those from deep learning or other types.
    - Training:
      - set params:
        - n_input = 475
        - n_hidden1 = int(n_input * 2.0)
        - n_hidden2 = int(n_hidden1 * 0.75)
        - n_output = 114
        - epochs = 500
      - feature extraction and build dataset to regression modeling
        - top_k = [5, 10, 15]
        - ["id_surah"].["text"] with arabic terms, ["id_surah"].["translations"].["id"].["text"] or ["id_surah"].["tafsir"].["id"].["kemenag"].["text"] with Indonesian terms
      - save model and loss (model_{id_model}.json and loss_{id_model}.json
    - Testing:
      - load all model (1 until 4)

- call function get_bg_resource(id_surah, time_intervals) to generate video resource, based on input features of id_surah using regression approach to resource-sharing by combination all output model 1 until 4, with limited only n_top using argmax from each model prediction result together between all surahs for resource sharing in a collection bank of images or videos in the local directory (dataset/bg_object)

▪ Metadata
- Output:
  - video Smart Live Edu-Multimedia of Quran
  - File *.srt with combine all language

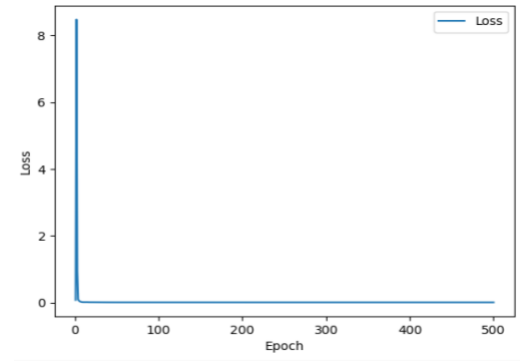
○ In the CAML algorithm, the input process is more flexible to meet specific needs, allowing for elements like a fun tone or a particular theme. For example, it can incorporate results from various animations, images, videos, or other media, with or without applying style transfer learning, Variational Autoencoder (VAE), Generative Adversarial Network (GAN), mini SORA and others.

III. RESULT AND DISCUSSION

Evaluation of performance across different surah Tests, for very short surahs such as Al-Kautsar (3 ayahs), the time is around 13.81 seconds. Similar surahs like Al-Ikhlas, Al-Falaq, and An-Nas have slightly longer times, between 13.34, 19.87 and 25.99 seconds. The algorithm efficiently processes shorter surahs, allowing for rapid video generation while maintaining quality. This computation time is greatly influenced by the length of the surah as well as the type of data resources, background type, and translation type. Additionally, the consistency in HD/360p output quality indicates that the model is running effectively.

Table 1. Video Generation Time of 4 Surah

Scenario	Number of Ayahs	Video Generation Time (s)
Surah (Al-Kautsar)	3	13.81
Surah (Al-Ikhlas)	4	13.34
Surah (Al-Falaq)	5	19.87
Surah (An-Nas)	6	25.99



(a)

(b.1)

(b.2)

Figure 3. (a) Training Loss per Epoch for list_model_comb_all_unique model, (b) Gen Video of Surah Al-Kautsar and Al-Ikhlash [360p/ HD]

Based on Table 1 and Fig. 3 as the number of ayahs increases, so does the time for video creation, but the algorithm continues to perform consistently, scaling well across different surah lengths. This makes it highly suitable for generating quick and engaging educational content, whether for short or long surahs. All complete code can be checked at the following link "https://github.com/imamcs19/Digital-Quran-Ai---Al-Imamain-Utilize-meta-Deep-Lightweight-SORA-Algorithm" in the GitHub repository.

IV. CONCLUSION

The development of the Smart Live Edu-Multimedia platform, utilizing the meta-Deep Lightweight SORA algorithm for multilingual adaptive Quran learning, has yielded encouraging outcomes. The system achieved an average performance time of approximately 18.25 seconds, With the model proved highly effective in generating accurate multilingual content while maintaining optimal computing efficiency. This technology acts solely as a supplementary tool for children's Quran learning at home with parents. However, it remains essential for children to continue their Quranic studies with teachers who have an authenticated chain of transmission (sanad) that traces back to the Prophet Muhammad (PBUH). To further enhance educational content performance, expanding dialect coverage using smart Deep Lipsync technology can improve children's reading methods. Continuous updates to the AI model will help improve content by utilizing extensive datasets that include not just each surah but also each ayah for resource-sharing within a local directory collection bank of images or videos (dataset/bg_object), improve feature extraction through one-hot encoding with recurrent feature vectors, enable automatic tajwid detection by recognizing patterns in Arabic subtitles (written right-to-left (RTL)) with multi-color formatting, an additional feature offering stories for children also feature truth sign (according to abajadun, natural phenomena and others), inspired by themes from the surahs, and support the auto-generation of *.pdf files with ergonomic layout design for the Digital Quran, covering all 30 juz, also level up relevance, ensuring that the educational experience remains engaging and effective for users across various learning environments.

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