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Innovative Approach in Understanding Quranic Linguistics Miracle Using "Methodology of Generative Grammar and Transformational to Develop Model Module AI Didactic "(Mgg&Tf@Llmm-AI-Dc)"

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ABSTRACT

This research aims to develop an example model module fo IPTstudents to learn linguistic model module AI Didactic "(Mgg&Tf@Llmm-AI-Dc)" through the holy verses of the Quran. This research employs Richey and Klein's Design and Development Research Approach (DDR (2007). Three phases based on this method were involved in this study. The first phase involved a needs analysis using the interview method with three lecturers to identify the needs ofIPT students in learning linguistic model modul AI Didactic through the Quran. In this phase, the researcher used the Discrepancy Model by Mckilli (1987) as a guideline for constructing interview questions. This is followed by constructing an example module of the linguistic model module AI Didactic through the Qur'an in the second phase. In this phase, the researcher uses the Fuzzy Delphi method by looking at the agreement of the experts in building the content of the module. Besides, LEXICOLESM Module Development Model (2004-2024) was chosen as a model for developing the module. This phase has resulted in a draft of an example module for learning linguistic model module AI Didactic through the Qur'an that is suitable for IPT students. The third phase involves evaluating the module's suitability and usability. In this phase, the researcher used the semi-structured interview method as an instrument for data collection involving five lecturers Interview questions were built based on the Discrepancy Evaluation Model by Provus (1966). This study is expected to build an example module that is suitable for learning linguistic model module AI Didactic al-Quran for IPT students.

1. Introduction

METODOLOGY OF GENERATIVE GRAMMAR AND TRANSFORMATIONAL to Develop Model module AI Didactic (Mgg&Tf@Llmm-AI-Dc). This paper explores an innovative approach to understanding Quranic linguistics by leveraging the methodology of Generative Grammar and Transformation (GGT) to develop a model module for Artificial Intelligence Didactic (AIDid).

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Quranic language poses one of the greatest challenges for researchers in the fields of linguistics and interpretation. However, leveraging modern technology such as artificial intelligence can aid in better understanding this language. This research aims to explore an innovative approach in understanding Quranic linguistics using the methodology of generative grammar and transformation to develop a model module for artificial intelligence. (Mgg&Tf@Llmm-AI-Dc) is an innovative approach used to teach the Arabic Llmm-AI-Dc linguistic skills to IPT students from non-Arabic speaking background.

2. Statement of problem

Malaysia as a country with Muslim majority, and Islam being practice in daily ibadah using Arabic language. However Arabic linguistic is hard to be inculcated as second language among the Muslim. On top of that, the current Arabic linguistics curriculum in educational institutions are unstandardized and teaching aids are being poorly used. As a result, the students' engagement with the Arabic linguistics courses are in less impact. The worst-case scenario is when students undertaking Arabic language or Islamic Studies courses in IPT are unable to speak the language fluently. This research provides solution by suggesting the use of (Mgg&Tf@Llmm-AI-Dc) for teaching and learning Arabic linguistic in the universities. Moreover, the usage of this method can be applied in schools and religious departments.

The uniqueness of Arabic Phonology, syntax, Semantique and Lixical makes the combination with LPSA and ontology more significant to extract Qura'nic concept. It is because Phonological Semantique and Lexical analysis is a basic step in various applications including text mining, information retrieval (IR), machine translation, automatic summarization, and Arabic learning systems [2,8]. LPSA on the other hand has limitation, such as difficulty in differentiating fine-grained relations between lexical phonology semantics, synonyms, antonyms, and hypernyms.

Due to that limitation, various studies have been carried out to overcome this weakness of LPSA introducing Multi-Associative Latency Phonology Semantic Analysis using synonym, antonym, and hypernym [3,6] but it has not yet been applied on Arabic Text such as al-Quran. Furthermore, Qura'nic ontology studies are lacking accuracy of language because it depends on the translated version of al-Quran and uses aplastic noun [5,9,10]. The existing literature shows that there are still gaps and problems in extracting Qur'anic concept using Mgg&Tf@Llmm-AI-Dc as have been mentioned previously, due to inappropriate approaches that had been used ignoring the importance of Arabic Phonology Semantic Lexicology and LPSA in deriving the meaning of Qur'anic word. Therefore, in order to address the above mentions problem, we propose a new model in extracting Qura'nic concept based on Arabic Phonology Semantic and Multi-Associative Latency Phonology Semantic Lexicology Analysis, using combination of six multiple relations between words, which are synonym, antonym, hypernym, hyponym, homonym and meronym.

3. Objectives of Research

The research is based on analyse and reviewing the methodology of generative grammar and analysing its applicability in understanding Quranic linguistics, and therefore we want investigate how transformation can be used in developing a model module for artificial intelligence to comprehend Quranic language using "Mgg&Tf@Llmm-AI-Dc", and furthermore, we gain insight explore and validate an applied model for developing this model module Method.

4. Methodology

This research is focusing on designing a multi-relational LPSA model in extracting Qura'nic concept based on combination of Arabic Lexicology-Phonology-Semantic and six multiple relations between words, which are synonym, antonym, hypernym, hyponym, homonym and meronym. The researcher will have used text analysis method as follow:

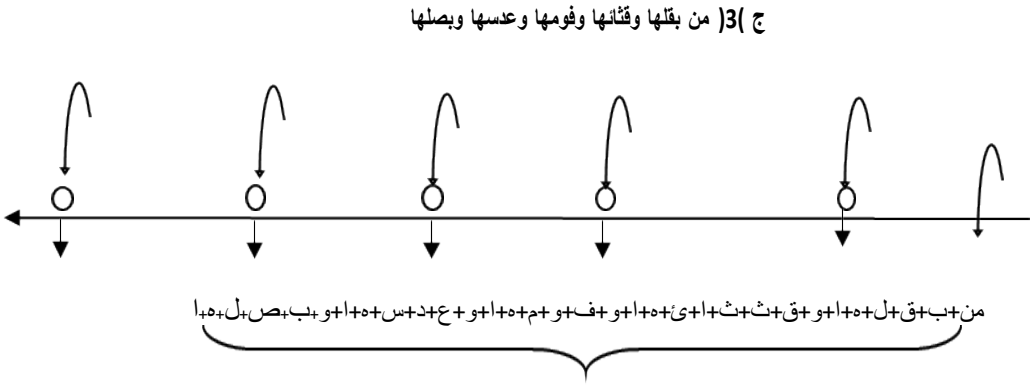
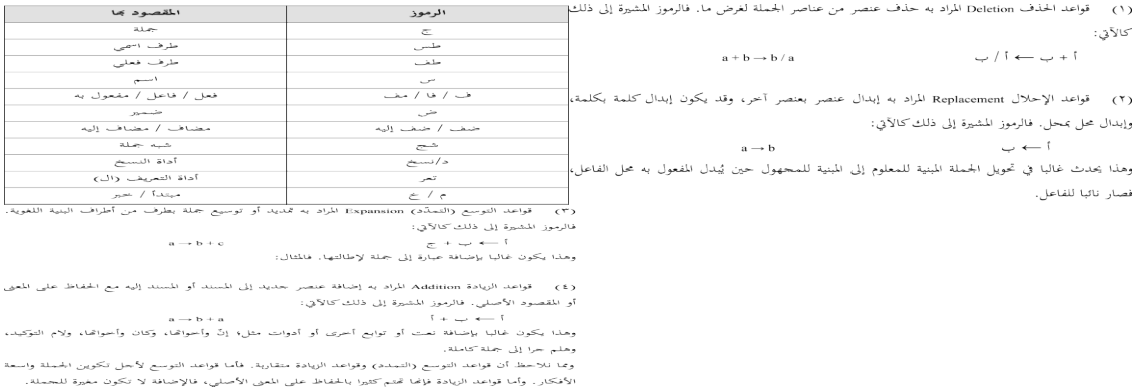


Fig. 1. Multi-Associative Latency Mgg&Tf@LImm-AI-Dc Formula Analysis by Asma Abdul Rahman



الرموز	المقصود بها
ج	جملة
ظ ض	ظرف اسمي
ظ ف	ظرف فعلي
س	اسم
ف / ها / مف	فعل / فاعل / مفعول به
ض	ضمير
ض ف / ض ف إ	مضاف / مضاف إليه
ش ج	شبه جملة
ح/تشبيه	أداة التشبيه
ح ر	أداة التعريف (ال)
م / خ	مبتدأ / خبر

(١) قواعد الحذف Deletion المراد به حذف عنصر من عناصر الجملة لغرض ما. فالرموز المشيرة إلى ذلك كالآتي:

أ + ب ⟵ أ / ب a + b → b / a

(٢) قواعد الإحلال Replacement المراد به إبدال عنصر بعنصر آخر، وقد يكون إبدال كلمة بكلمة، وإبدال محل بمحل. فالرموز المشيرة إلى ذلك كالآتي:

أ ⟵ ب a → b

وهذا يحدث غالبا في تحويل الجملة المبنية للمعلوم إلى المبنية للمجهول حين يُبدل المفعول به محل الفاعل، فصار نائبا للفاعل.

(٣) قواعد التوسيع (التمدد) Expansion المراد به تمديد أو توسيع جملة بطرف من أطراف البنية اللغوية. فالرموز المشيرة إلى ذلك كالآتي:

أ ⟵ ب + ج a → b + c

وهذا يكون غالبا بإضافة عبارة إلى جملة لإطالتها. فالمثال:

(٤) قواعد الزيادة Addition المراد به إضافة عنصر جديد إلى المسند أو المسند إليه مع الحفاظ على المعنى أو المقصود الأصلي. فالرموز المشيرة إلى ذلك كالآتي:

أ ⟵ ب + أ a → b + a

وهذا يكون غالبا بإضافة نعت أو توابع أخرى أو أدوات مثل: إنّ وأخواتها، وكان وأخواتها، ولام التوكيد، وهلم جرا إلى جملة كاملة.

وهنا نلاحظ أن قواعد التوسع (التمدد) وقواعد الزيادة متقاربة. فأما قواعد التوسع لأجل تكوين الجملة واسعة الأفكار. وأما قواعد الزيادة فإنها تقدم كثيرا بالحفاظ على المعنى الأصلي، فالإضافة لا تكون مغيرة للجملة.

Fig. 2. The model encodes the raw data (a) in a three 3-ways tensor to encode multiple (b) word relations

For more specifically, this approach will be conducted in the following techniques as follows:

4.1 Phonological Root Analysis

This phase was conducted in following steps:

1. The researcher will identify digital document file of Qur'anic text. The text's authentication will be verified by expert.
2. The digital document will be analyzed using corpus analysis using Wordsmith version 2.1, 3. Each word in text will be categorized into two families of verb and noun, excluding particles.
3. The researcher will identify root of each word in these two categories, then categorize the words belong to similar root in another sub-family.
4. To enhance the confidence of investigation, the result then will be triangulated with three Arabic referred dictionaries:
   i. Lisan Al-Arab by Ibn Manzuur,
   ii. Mu'jaam Al Waseet by Majma' Luhghah al-Arabiyyah in Cairo, and

iii. al-Mu'jam Al-Asasi by al-Munazzamah al-Arabiyyah lil Tarbiyyah wa Thaqafah wal 'Ulum

4.2 To Propose a New Model for Extracting Qura'nic Concept

Based on previous 1st phase result, the researcher was followed the next steps:

1. Create and propose a model using six multiple relations between words in Latent Lexicology-Phonology- Semantic Analysis as follow:
   i. Synonym: a word or phrase that means exactly or nearly the same as another word or phrase in the same language
   ii. Antonym: a word opposite in meaning to another
   iii. Hypernym: a word with a broad meaning constituting a category into which words with more specific meanings fall
   iv. Hyponym: a word of more specific meaning than a general or super ordinate term applicable to it.
   v. Homonym: A concept of which this concept forms a part
   vi. Meronym: A term that denotes part of something
2. Related connections of word to conceptual meaning then will be identified.
3. Linking the related connections to key concept in tree-form drawing.
4. Describing the design of extracting Qura'nic concept based on ontological approach in Latent Lexicology-Phonology Semantic Analysis.

4.3 Investigating Lexicology-Phonology-Semantic Relationships between Qura'nic Words

The proposed model was validated by testing a concept of "Sight" in Quran as a sample. (An expected analysis is shown as below):
Generative grammar theory provides a comprehensive framework for understanding language production and comprehension. In this analysis, we will apply the principles of this theory to the Arabic word "بصر" (basar), unveiling its internal structure and generative rules.

1. Essential Components of the Word "بصر" (basar)
The word "بصر" (basar) consists of three fundamental components:
2. Root: "ب ص ر" (b-ṣ-r) - The root comprises three distinct consonants: ba' (ب), ṣād (ص), and rā' (ر).
3. Pattern: "فَعْلٌ" (faʿlun) - The pattern indicates the word's morphological structure, composed of three syllables: open, closed, open.
4. I'rāb: "مرفوع" (marfūʿ) - The i'rāb signifies the word's function within a sentence, indicating its grammatical case (nominative).

Generative Rules for Forming "بصر" (basar)
According to Chomsky's generative grammar, the word "بصر" (basar) can be generated through the following steps:
1. Root Selection: The root "ب ص ر" (b-ṣ-r) is chosen from the inventory of permissible Arabic roots.

2. Pattern Application: The pattern "فَعْلٌ" (faʿlun) is applied to the root, resulting in "بَصَرَ" (baṣara).
3. I'rāb Addition: The i'rāb "مرفوع" (marfūʿ) is added to the word, yielding "بَصَرٌ" (baṣarun).

i. Morphological Analysis of "بصر" (basar)

From a morphological standpoint, the word "بصر" (basar) is categorized as a triliteral verb (فعل ثلاثي مجرد, fiʿl ṯulāṯī mujrad). This type of verb is characterized by its three-consonant structure and the absence of any additional letters or vowels.

ii. Semantic Analysis of "بصر" (basar)

The word "بصر" (basar) carries the meaning of "sight" or "the ability to see." It can also be used to denote "understanding" or "comprehension."

iii. Linguistic Uses of "بصر" (basar)

The word "بصر" (basar) finds diverse applications in the Arabic language, including:

Describing the act of seeing: "بَصَرَ الرجلُ الشيءَ" (baṣara al-rağulu al-šaiʾa) - "The man saw the thing."

Referring to the ability to see: "لَهُ بَصَرٌ حَادٌّ" (lahu baṣarun ḥāddun) - "He has sharp eyesight."

Conveying understanding or comprehension: "أَبْصَرَ بِالحَقِيقَةِ" (abṣara bi-l-ḥaqīqah) - "He grasped the truth."

Describing knowledge or awareness: "عِنْدَهُ بَصَرٌ بِالأُمُورِ" (ʿinda-hu baṣarun bi-l-ʾumūr) - "He has knowledge about matters."

4.4 Validating the Proposed Model

The result was evaluated by two groups of experts:

1. An Arabic linguist who will examine Lexicological- Phonological Root Analysis and the merging process with multi-Associative Latency phonology- semantic analysis, and
2. Qura'nic experts who examine holistically the concept of Sight in al-Quran, according to Islamic perspective the evaluation will be conducted in focus group interview. Any suggestion or feedbacks will be taken into consideration to improve the model.

Part One: Generative Grammar Methodology in Understanding Quranic Linguistics:

i. Reviewing the methodology of generative grammar and its theoretical foundations.
ii.- Analyzing how this methodology can be applied in understanding Quranic linguistics.
iii. Reviewing previous research that has utilized this methodology in studying Quranic language.

Part Two: Utilizing Transformation in Developing a Model Module for Artificial Intelligence:

i. Explaining the concept of transformation and its application in developing artificial intelligence.
ii. Analyzing how transformation can be used in understanding and analyzing Quranic language.
iii. Reviewing previous research that has used transformation in developing artificial Intelligence for understanding natural languages.

Part Three: Applied Model for Developing a Model Module for Artificial Intelligence:

i. Introducing an applied model for developing a model module for artificial intelligence to understand Quranic language.
ii. Describing the design details and necessary stages for developing the model.
iii. Presenting a case study for using this model in understanding specific Quranic texts and analyzing the results.

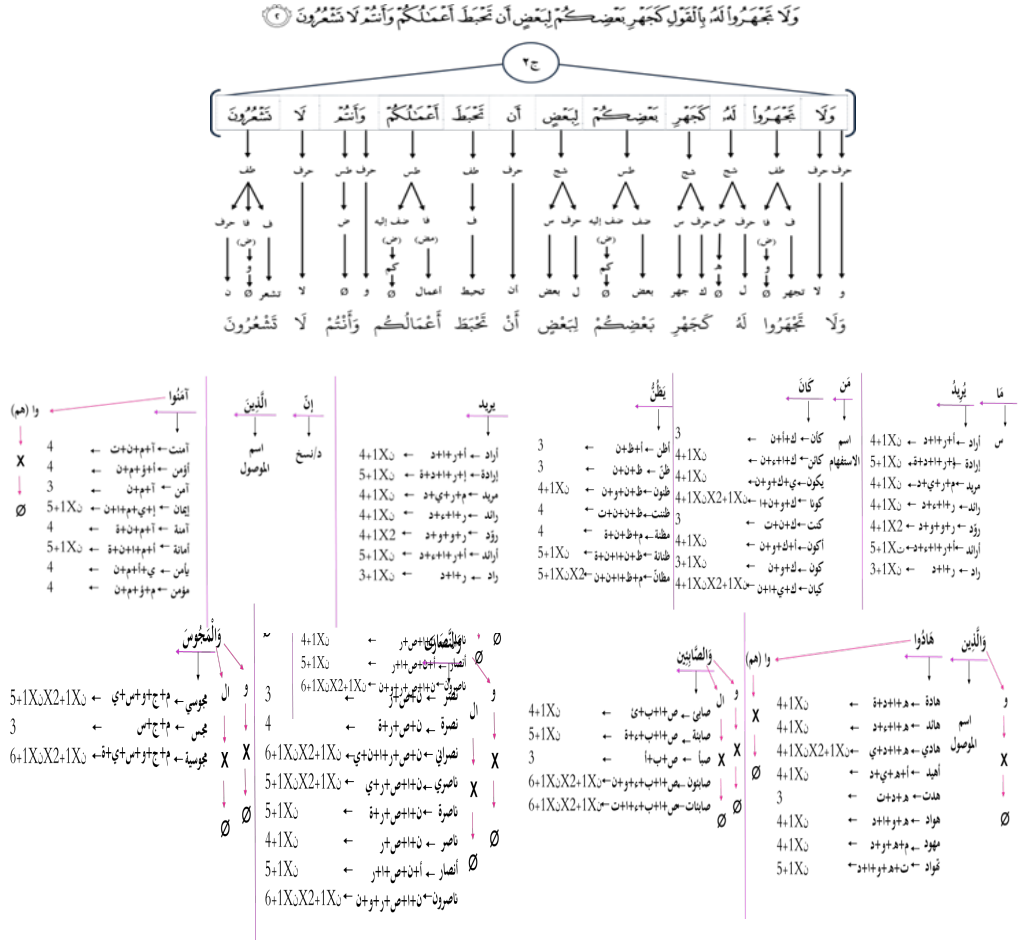


Fig. 3. Model of Mgg&Tf@Llmm-AI-Dc in Qur'anic Ontology by Asma Abdul Rahman

In the above model, lexicology- phonology- semantic dimensions need to be determined, and then words will be organized into a hierarchical classification with general concepts at the top, and specific at the bottom. Words in the hierarchy are associated with components via ontological relations. This classification structure of the ontology implies that the deeper word moves into the hierarchy, the more arguments the componential formula will have, and therefore the meaning narrows. In contrast, words at higher levels have fewer arguments in their componential formula, and therefore the meaning broadens. This model however did not include the root of words which is the appropriate to Arabic language.

The existing literature shows that there are still gaps in extracting Qur'anic concept because the aspect of Arabic Lexical- Phonology-Semantic and LPSA does not fully utilize. Therefore, in order to address the above mentions problem, we propose a new model in extracting Qur'anic concept based on Arabic Lexicology-Phonology-Semantic and Multi-Associative Latency Phonology- Semantic Analysis, using combination of six multiple relations between words, which are synonym, antonym, hypernym, hyponym, homonym and meronym.

5. Finding and Effects

Policies for government agencies to help them curb and solve the educational system in teaching and learning Arabic linguistics training and practices in tricking consumers into thinking that product by apply a new innovative method for whole level of students and society. This is a new invention; thus, no comparable product existed in the market. Impact on human being and socio economic. The "(Mgg&Tf@Llmm-AI-Dc)" have improved knowledge and linguistic skills in the production of higher quality of human capital. Furthermore, the researcher was sales from text and reference, more formula books, CDs and Courses, training, workshop generate additional income for.

Harmonized society and community where Muslim and non-Muslim can seat together enjoying their communication with multiple lingual; that Muslim be it Malaysian or international could be unity of the nation local or foreign without any doubt or miscommunication. Academically closing the gap on communication between society and community related research, providing the aspect of language, culture, and society perspective.

5.1 Findings

The data was analyzed by using the Statistical Package for Social Science (SPSS) version 17. The statistical procedure used in this study was the tabulation for descriptive data for Methodology of Generative Grammar and Transformational (learning module model method "Mgg&Tf@Llmm-AI-Dc"), Arabic Listening Skills, Arabic Speaking Skills, Arabic Reading Skills, Arabic Writing Skills and summary of mean score.

5.2 Reliability of the Research Instruments

This questionnaire was developed based on theoretical Foundation of Cooperative Learning or Generative Grammar and Transformational module model method "Mgg&Tf@Llmm-AI-Dc" in Arabic. The Arabic Learning Scales for Malaysian National Universities was used for the first time in this study. In order to evaluate and examine the reliability of Learning Scales for Malaysian National Universities, researcher used the Alpha Cronbach module model method.

The result shows that Learning Scales for Malaysian National Universities has good value of reliability which the value of Cronbach's Alpha is high, .99. Meanwhile the reliability value for the five subscales of Learning Scales for Malaysian National Universities is as showed in the table below:

Table 1
Cronbach's Alpha for each subscale of "Mgg&Tf@Llmm-AI-Dc"

Subscale	Number of Item	Cronbach's Alpha
Scales for Arabic Learning Methods (Mgg&Tf@Llmm-AI-Dc)	86	.97
Scales for Arabic Listening Skills (ALS- Mgg&Tf@Llmm-AI-Dc)	31	.97
Scales for Arabic Speaking Skills (ASS- Mgg&Tf@Llmm-AI-Dc)	20	.96

Scales for Arabic Reading Skills (ARS- Mgg&Tf@Llmm-AI-Dc)	85	.99
Scales for Arabic Writing Skills (AWS- Mgg&Tf@Llmm-AI-Dc)	97	.99

5.3 Demography

The respondents of this research were from four universities between University Malaya (UM), University Putra Malaysia (UPM), University Kebangsaan Malaysia (UKM) and University Islam Antarabangsa Malaysia (UIAM). The result in table 2 demonstrates the distribution of the respondents.

Table 2
Distribution of respondents according to Universities

University	Total
Universiti Malaya (UM)	50
Universiti Putra Malaysia (UPM)	50
Universiti Kebangsaan Malaysia (UKM)	50
University Islam Antarabangsa Malaysia (UIAM)	50

5.4 Descriptive Analysis

Mean score of sub-scale of method “Mgg&Tf@Llmm-AI-Dc”.

Table 3
Mean Score of Subscale of “Mgg&Tf@Llmm-AI-Dc”.

SubScale	No. of Item	N	Mean	Std. Deviation
ALMAI-Mgg&Tf@Llmm-AI-Dc	86	200	229.79	47.68
ASSAI-Mgg&Tf@Llmm-AI-Dc	31	200	49.70	13.29
ALSAI-Mgg&Tf@Llmm-AI-Dc	20	200	79.63	19.34
ARSA-Mgg&Tf@Llmm-AI-Dc I	85	200	221.17	49.26
AWSAI-Mgg&Tf@Llmm-AI-Dc	97	200	248.44	60.04

6. Results

6.1 Novelty Item via a New Model (AIDid)

This paper explores an innovative approach to understanding Quranic linguistics by leveraging the methodology of Generative Grammar and Transformation (GGT) to develop a model module for Artificial Intelligence Didactic (AIDid).

6.1.1 Quranic Linguistics: A unique field for a model module for artificial intelligence to understand Quranic language

Quranic linguistics is a specialized field of study that focuses on the unique linguistic features of the Quran, the holy book of Islam. It delves into the language's grammar, syntax, morphology, and semantics to unlock deeper meanings and interpretations.

6.1.2 Generative Grammar and Transformation a model module for artificial intelligence to understand Quranic language (GGT- AIDid)

6.1.3 GGT-AIDid, developed by Noam Chomsky, is a linguistic theory that proposes a set of universal grammatical rules underlying all human languages. It posits a deep structure, representing core meaning, and a surface structure, reflecting the actual sentence form. Transformations act upon the deep structure to generate the surface structure

6.1.4 Applying GGT- AIDid to Quranic Linguistics a model module for artificial intelligence to understand Quranic language

6.1.5 Applying GGT- AIDid to Quranic linguistics offers a novel approach to understanding the intricacies of the language. Here's how:

i. Identifying Deep Meanings: By analysing the deep structure of Quranic verses, we can uncover
ii. the core message and intent, independent of surface-level variations.
iii. Explaining Grammatical Choices: GGT- AIDid sheds light on the rationale behind specific grammatical choices in the Quran, potentially revealing deeper stylistic or rhetorical purposes.
iv. Understanding Syntactic Complexity: The framework helps us comprehend the complex syntactic structures employed in the Quran, contributing to a richer appreciation of the text's literary beauty.
v. Developing a Model Module for AIDid a model module for artificial intelligence to understand Quranic language and applying direct through the verses of Quranic miracle

6.1.6 By integrating GGT principles with AIDid, we can create a powerful tool for Quranic language learning:

i. AI-powered Parsing: The model can automatically parse Quranic verses, identifying deep and surface structures, grammatical elements, and syntactic relationships.
ii. Personalized Learning: The AI can personalize the learning experience by adapting to the student's level and tailoring explanations accordingly.
iii. Interactive Exercises: The module can offer interactive exercises that leverage GGT-AIDid concepts to reinforce understanding and enhance engagement.
iv. Comparative Analysis: The AI can facilitate comparative analysis of different Quranic verses with similar grammatical structures, highlighting subtle variations in meaning.

6.1.7 Benefits of this Approach a model module for artificial intelligence to understand Quranic language

6.1.7.1 This innovative approach offers several advantages:

i. Deeper Understanding: Students gain a deeper understanding of Quranic linguistics through the lens of GGT.
ii. Enhanced Learning: AI personalizes learning and offers interactive exercises, fostering a more engaging experience.
iii. Accessibility: The model can make Quranic learning more accessible to a wider audience, including those with different learning styles.
iv. Preserving Tradition: By systematically analyzing the language, the model contributes to the preservation and transmission of Quranic knowledge.
v. Challenges and Considerations a model module for artificial intelligence to understand Quranic language

6.1.7.2 While promising, this approach faces challenges:

i. Data Acquisition: Training the AI model requires a vast corpus of Quranic text with detailed linguistic annotations.
ii. Accuracy and Interpretation: Ensuring the accuracy of AI-generated analyses and interpretations of complex Quranic concepts is crucial.
iii. Ethical Considerations: Ethical considerations regarding the application of AI in the study of religious texts must be addressed with sensitivity.

7. Conclusions

This research proposes an innovative approach to understanding Quranic linguistics by employing GGT and developing an AIDid model module. This approach holds immense potential for enhancing Quranic learning, making it deeper, more engaging, and accessible to a wider audience.
Exploring the application of advanced AI techniques like Natural Language Processing (NLP) for deeper Quranic analysis.Developing a user-friendly interface for the “AI Did” model module to ensure accessibility and ease of use.Conducting user studies to evaluate the effectiveness of the model in facilitating Quranic language learning. This innovative approach represents a significant step forward in harnessing the power of AI for the study and dissemination of Quranic knowledge for a new model module for artificial intelligence to understand Quranic language. By fostering a deeper understanding of the language, it can contribute to enriching the experience of learners and preserving this sacred text for generations to come.

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