VISUAL ROBUST MULTIMEDIA SEARCH FRAMEWORK FOR EFFICIENT QUERY OPTIMIZATION

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Abstract
Internet Searches have always been the one stop solution for 90% of Internet users. Such searches can be classified into text based searches and multimedia search which includes image or video related search or combination of both. Are the users satisfied with the search results? Are these multimedia query searches yielding the expected results? Primary issues involve relevance of search results and time taken to fetch the multimedia query fired by the audience. Query addressing framework is utilized to furnish replies with instinctive and precise media substance, rather than literary response. Existing Video and Image results are unable to provide useful text based responses to suitable inquiries. There is a requirement for a visual robust framework which is more assorted to the media information and highlighting response to the inquiries. Proposed Visual Robust Multimedia Search (VRMS) framework would provide a robust mechanism for generating published replies with media information. The framework involves the measures for "Answer Relevance Score", which is an important criterion for observing the pertinence of each answer returned by the framework. Answer Relevance score is calculated using number of applicable factors. Exploratory outcomes show that the responses returned by the framework have better performance and based on this score the framework shows better execution when contrasted with the current mixed media question addressing framework. This paper provides a breakthrough for novice or such audience who may not be conversant with various Search Engine Optimizers in the Multimedia Query domain.

Keywords— Multimedia framework, search optimization, question answer order strategy, Answer relevance score

Abbreviations list –
ARS: Answer Relevant Score, QAs: Question Answering System, QA: Question Answer,
OCR: Optical character recognition ASR: Automatic speech recognition

Introduction

The reach of Internet cannot be disputed. However numerous results for one query create confusion among the users and they end up selecting the top few search results listed. Proper utilization of the web can help make our life simple, quick and straight for-ward. People are addicted to searching on the web whether relevant or irrelevant information. Client's type in inquiries as unstructured arrangements of catchphrases, and the web indexes recover requested arrangements of pointers to website pages in light of the assessed importance. Notwithstanding, clients are frequently perturbed by the enormous measure of information get from the search engine and they regularly need to carefully peruse huge positioned arrangements of results to find the right responses. Subsequently another recovery worldview, the supposed inquiry - addressing (QA) has advanced trying to tackle this data over-burden issue. Asking question is an easy way to get appropriate solution as compare to previous searching system. It plans to observe succinct and exact responses to a characteristic language questions. Contrasted with watchword based

Journal of New Zealand Studies NS35 (2023), https://doi.org/ 10.5281/zenodo.7805493

inquiry frameworks, it incredibly works with the correspondence among people and PCs by normally expressing client's goal in plain sentences. It likewise stays away from the meticulous perusing of a tremendous amount of data substance via web indexes for the right responses [1]. Question in QA framework can be classified in numerous ways, for example, tidbit question, list question and definition question. For example "Who is the leader of U.S.A" is a tidbit question requesting an individual name, "What organization is best for assembling of carmaker" is requesting association name (a firm name).In people group QA framework client can post their particular inquiry and acquire reply by different clients. By utilizing local area endeavors, they can improve replies than just utilizing web index. Fig 1 shows the case of QA sets. Fig 1.1 and 1.2 represent models. If user ask question like this “how to make a climate vane?" & "how treats 2 Trillion resemble", then we get an answer in long textual sentential form. So there is need of pictures and video which portray the response plainly. Clients typically present URLs that connection on advantageous pictures and recordings in their printed replies. Fig 1(1) and (2) depicts the response and client posted a connection of pictures and recordings [1]

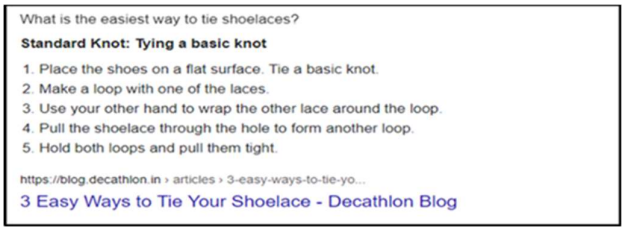

Fig 1.1 QA have only textual answer

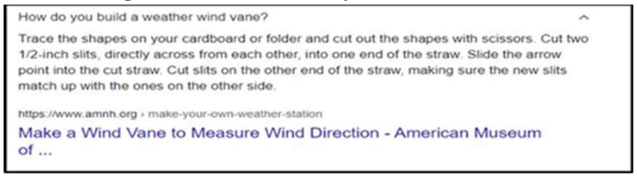

Fig 1.2 QA have only textual answer with steps

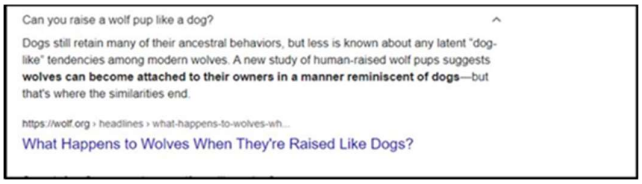

Fig 1.3 QA have only textual answer in paragraph The objective of this paper are listed below:

1. Study of existing Multimedia Query System.
2. Propose and compare new methodology named Visual Robust Multimedia Search (VRMS) which provides instructive and exact response with media content with existing mechanism.

The remaining portion of paper is composed as follows: Section-II provides an exhaustive literature survey of the available mechanism. Section-III elaborates and depicts the proposed framework for Multimedia Answering mechanism. Section-IV provides comparative performance between existing models and proposed models through the proper execution and test dataset. Section-V deals with the conclusion with summary of performance of the proposed model and the future work to be undertaken.

I. RELATED WORK

The assessment of query processing structures commenced from early 1960’s and principally

Journal of New Zealand Studies NS35 (2023), https://doi.org/ 10.5281/zenodo.7805493

centered on master frameworks in explicit spaces. Textual answer based query processing system acquired its exploration prevalence since the foundation of a Question answering system which commenced in e 1990's. In light of the kind of inquiries and expected responses, we can generally sum up such QA into Open province system, restricted province system and catalogue QA.

Programmed Query processing framework actually experiences issues in addressing composite inquiries. With the advent of Web 2.0, community based Question answering system (cQA) provided an alternative mechanism. Various inquiry answer discussions are being undertaken for sharing specialized information as well as where one can look for counsel and conclusions [5], [7]. Nonetheless, almost the current MMQA frameworks, gives the printed answer which isn't educational. Media answer relies on the text based responses. Because of that the importance of mixed media question responding to is decline.

A few exploration endeavors have been put on media QA, which plans to respond to questions utilizing sight and sound information. So video based QA system was introduced [10]. This type of framework provides query solution with multimedia data like text with image, text with video, text with animation. After this efforts, a number of video based query processing frameworks were introduced and the vast majority of them depend on the utilization of textual record got from video through OCR and ASR yields. Li et al. [2] introduced an answer "on the best way to" QA by utilizing local area provided texts and recordings. Kacmarcik et al. [8] investigated a multimedia input mode for system that depends on exceptionally clarified essential photos. A picture based framework was presented in [6], which chiefly centers around tracking down data about actual articles. Chua et al. [3] proposed a summed up way to deal with stretch out text-based QA to mixed media QA for a scope of tidbit, definition and "how-to" questions. Their framework was intended to observe sight and sound responses from website's data source assets like YouTube and other media service provider websites. Notwithstanding, writing in regards to sight and sound QA is still moderately scanty. Not the same as these works, our methodology is assembled in view of cQA. Rather than straightforwardly gathering media information for responding to questions, our technique just tracks down animation and sequence of images answers given by people. This makes our methodology ready to manage more broad inquiries and to accomplish better execution.

There is certain limitation in existing work link Existing MMQA gives the literary response which isn't useful; due to that media answers produce superfluous information & Absence of variety of produced media information.

II. PROPOSED METHODOLOGY

Proposed methodology Visual Robust Multimedia System aims to remove the defects existing in the current models and also steps to enhance and provide a robust mechanism which can result in search optimization in multimedia domain. Fig 2 shows the square outline of media question responding to framework.

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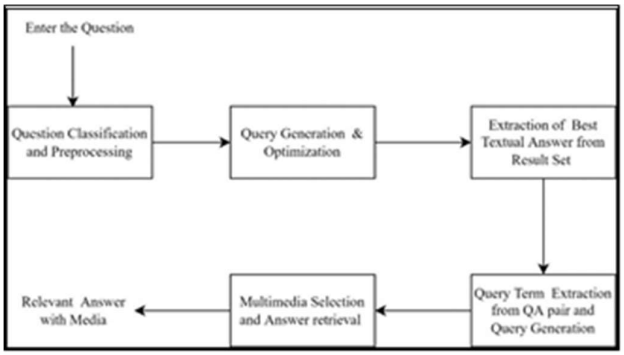

Figure 3.1 Architecture Diagram of Proposed System- Visual Robust Multimedia System (VRMS)

Fig 3.1 shows the square outline of media question responding to framework. It contains following principle parts.

Here is steps for Multimedia Query Response System algorithm

1. Question classification and preprocessing
2. Query generation and optimization
3. Extraction of best textual answer from result set
4. Query term extraction from QA pair and query generation
5. Multimedia selection and answer retrieval
6. System generate relevant answer with media

Question Classification and Preprocessing: Client enters the inquiry as question. First the inquiry order module examinations an inquiry and decide its response type. A response type addresses the kind of data mentioned by question: an individual's name, place name is a portion of the conceivable response types. The preprocessing module processes the inquiry and creates question term by eliminating the stop words which are not significant. After the expulsion of stop words and the disposal of inquisitive from the client question then the remaining summary of words known as inquiry term. In the event that the client not enters the inquiry in the accompanying class like whom, where and so forth these means are killed and question is straightforwardly converted to question term.

Query Generation & Optimization: This module takes term set as its feedback, creates a question and concentrates the response from the data set. We use "SELECT" activity to get the printed reply. We work on the exhibition of SELECT tasks to make lists on at least one of the segments that are utilized in question. At some point client enters long inquiry in a way that would sound natural to you. In the event that a long inquiry neglects to return the response, it can change over into reformulation.

Question Class	Answer Type
Who	Person, Organization
Where	Location, Place
What	Cash, Digit, defination, Method, Short form, Institution, Human being, Era, Month, Day, Time, Place
When	Time, Era, Day, Month, Date
Which	Human being, Place, Month, Time, Year, Day
Why	Cause
How	Procedure
Otherwise	Generate query term directly

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Table I. Question Classification into Answer Type

Inquiry Expansion: for example, with wh modifier questions, for example, "How tall is Everest?" the responses might happen in sentences, for example, "the tallness of Everest is…." For these inquiries makes another inquiry by supplanting the descriptive word with its quality thing.

Change: Subject-Aux Movements - for inquiries with a solitary helper and a following expression, for example, the American in space question. The framework can eliminate the inquisitive and structure two questions with the expression set in front and after the assistant, individually for example "was the primary American space" and "the main American in space was".

Based on the study, significant elements for each Answer Types are distinguished. Then the presentation examination of the framework was performed on 270 inquiries in complete where 10 inquiries were chosen having a place with each answer types.

Extraction of Best Textual Answer from Result Set: This module separates most fitting response among the recovered responses. Every one of the sentences in answer are investigated to give them a position that mirrors the pertinence of reply. The primary objective of this investigation is to dole out a higher position to answer which contain the vast majority of clear data. This should be possible by computing the normal position score for recovered sentences. This score is made using collection of below the three.

I. Matching score as far as key phrases
II. Matching count as far as 2 grams
III. SCO - QAT Score for answer applicants.

Normal positioning Score = Matching score as far as key phrases + Matching count as far as 2 grams + SCO - QAT Score for answer applicants

Based on the normal positioning score we award the most elevated position to the recovered response with the most noteworthy score.

Matching Score as far as key phrases

Matching Score as far as watchwords (Sk) is determined in view of the number of key phrases shared an inquiry and a recovered sentence [9]

$$Sk(AC, Li, Lq) = Ck \sum_{k \in SKW(AC,Li,Lq)} w(k)$$

Where $SKW(AC, Li, Lq) = (KW(Li)\{AC\} \cap KW(Lq)$ $SKW(AC, Li, Lq) = (KW(Li)\{AC\} \cap KW(Lq)$and Sk matching score regarding key expression and Li is the rundown of key phrases for recovered sentences and Lq is the list of query's key phrases. Value of w(k), weighting function of key phrase (k) is equal to 1.

Matching count as far as 2 grams

This count is calculated using the numbers of letters & symbols shared by a recovered sentence and an inquiry term. Li = {Lk1, Lk2… Lkn} and lk1 and lkn are the keywords in retrieved sentence Li [9].

$$\underline{Sb}(AC, Li, Lq) = Sb1(s, e, Li, Lq) = Cb \sum_{k \subset KW(Lq)} w(k). \frac{\sum_{1-s}^{c} \sum_{j-1}^{len(Li)} bfreq(Li, Lq, l, j)}{len(AC)}$$

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Where s is starting character position of solution term, e is the ending character position of the solution term Lkn, and Sb is matching count as far as of 2 grams. Freq (x,y) represent how many times x appears in y and len(Li) represent the span of the retrieved solution.

$$bfreq(Li, Lq, l, j) = (j \neq l).freq(substr(Li, j, j+q), Lq)$$

This equation provide the substring of Li that initiate from jth alphabet of Li and terminate at j+1.

SCO-QAT Score for answer applicants.

To find the right solution: we think about SCO-QAT (Sum of co-events of responsive terms) technique as follows [4]

$$SCO - QAT(A) = \sum_{i=1}^{|QC|} \frac{1}{|QC|} Conf(qci, A)$$

Where $qc_i = \{qc_1, qc_2 \ldots qt_n\}$, A = $\{c_1, c_2\}$ and Answer Candidate having the top score given as result to the client question.

$$Conf(qci, A) = \begin{cases} \frac{freq(qci,A)}{freq(qci)} & ,if\ freq(qci) \neq 0 \\ 0 & ,if\ freq(qci) = 0 \end{cases}$$

Query Term Extraction from QA pair and Query Generation: Separate the inquiry term from Query & solution. Utilizing query and solution pair, we produce three inquiries. We can start with convert the request to an inquiry i.e we convert an etymologically right curious sentence into one of the linguistically right conclusive sentences or huge articulations. At last we consolidate the two inquiries that are produced from the inquiry and the response. We really want to pick one from three inquiries that are created from the inquiry, reply and the blend of Q & A. We use grammatical feature tagger it mirrors the quality of inquiry. It allocates grammatical features to each expression of both Q & A. We overlook the inquiry which contains the enormous number of action words and select the question which contains the thing.

Multimedia Selection and Answers Retrieval: For a given Query and solution pair, it confirms that printed solution can be upheld with sort of interactive media information and consequently provide with sight and sound information in the response. For certain inquiries, for example, "When did America become aligned with Vietnamese", unadulterated text-based responses are adequate. Be that as it may, for certain inquiries we want to add a picture or video data. For example "Who was the Steelers quarterback before Terry Bradshaw?", it is smarter to additionally provide pictures to supplement the literary response, and we also provide additional recordings for responding to the inquiry. " How do you replace a damper pulley? ". Utilizing the query and solution pair, it checks whether the text-based response have to be improved with multimedia information, and which sort of multimedia resources to be added.

IV.IMPLEMENTATION AND EXPERIMENTAL EVALUATION

Fig 3 shows the last result of the proposed mixed media question responding to the framework. An overview was directed on Answer Types recorded in Table 3.2. Based on the study, applicable elements for each Answer Type are distinguished. Then, at that point, the exhibition investigation of the framework was performed on 270 inquiries in all-out where 10 inquiries were chosen having a place with type of every answer. The significance count of each solution type was determined through utilizing the equation.

$$\text{Answer Relevance Score} = \frac{No.of\ appropriate\ factor\ in\ answer\ type}{Totle\ No.of\ appropriate\ factor\ in\ answer\ type} * 100$$

Table 2 shows the number of applicable elements returned by the framework for 10 example inquiries of "Individual" Answer Type and an absolute number of important variables. Additionally, the normal importance score is determined.

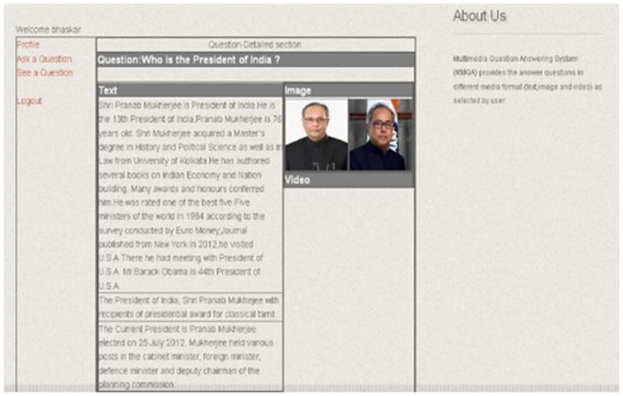

Fig. 4 Results of Proposed Multimedia Question Answering System

Relevance Average Score for each answer is recorded in table 3. We contrast our framework and the existing MMQA framework. The framework is thought about by posing a bunch of 10 inquiries, and the responses are examined by taking important elements got from the overview, and the outcomes show promising practices of this framework when contrasted with the existing MMQA framework.

Sr. no	appropriate factors	Questions	No of appropriate factors	Total no. of AF	ARS
Q1	1. Person's Name2. Education 3. Birthplace 4. When he/she was born ordied 5. His/herContribution 6. Other relatedin	“Who was the firstwoman Prime Minister in the world?”	5	6	83.33
Q2		“Who is thefounder of Infosys?”	4	6	66.67
Q3		“Who is MotherTeresa?”	6	6	100
Q4		“Who is barakObama?”	5	6	83.33
Q5		“Who is MichaelJackson?”	3	6	50.00
Q7	“Who was the third man on the moon?”		4	6	66.67
Q8	“Who discovered America?”		5	6	83.33

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Q6	Q9	“Why is Dr Kalamknown as the 'Missile Man of India?”	5	6	83.33	“Who is theinvestor of Telephone?”	4	6	66.67
	Q10	“Who was the first mughal emperor ofindia?”	6	6	100				
	formation								

Table 2 Calculate Average Relevance Score

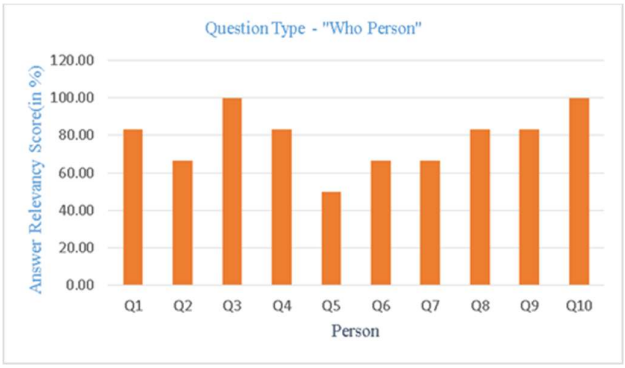

Fig 5 Graph showing the ARS for sample questions of “Person” Solution Type

Report of 10 inquiries are generated based on frameworks as per Table 3. During the examination of factors,pertinent variables for various responses were taken from the overview.

Sr.No	QuestionClass	Answer Type	ARS
1	Who	“Person”	78.33
2	Where	“Organization”	79.00
		“Location”	81.27
3	When	“Time”	76.45
		“Year”	79.00
		“Day”	85.00
		“Month”	83.00
4	What	“Money”	84.20
		“Number”	81.00
		“Definition”	84.00
		“Procedure”	83.00
		“Abbreviation”	80.10
		“Organization”	80.00
		“Person”	83.66
		“Year”	82.00

		"Month"	83.00
		"Day"	79.33
		"Time"	83.76
		"Location"	79.00
		"Person"	84.00
		"Location"	77.00
		"Month"	83.00
		"Time"	77.00
		"Year"	80.00
		"Day"	84.00
		"Reason"	76.88
		"Reason"	80.12

Table 3 Average Relevance Score for each Answer Type

Q. No	Total no of appropriate factors	Number of appropriate factors(Existing System)	Number of appropriate factors(Proposed System)	ARS for Existing System	ARS for Proposed System
Q1	7	5	6	71.43	85.71
Q2	7	5	7	71.43	100.00
Q3	7	5	6	71.43	85.71
Q4	7	6	5	85.71	71.43
Q5	2	1	2	50.00	100.00
Q6	2	1	2	50.00	100.00
Q7	7	5	6	71.43	85.71
Q 8	7	6	7	85.71	100.00
Q 9	7	4	6	57.14	85.71

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Q 10	8	6	8	75.00	100.0 0

Table 4: Calculate ARS of Existing and Proposed System

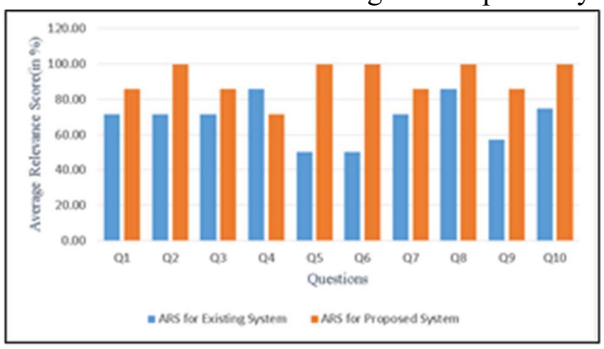

Figure 6 Chart showing Comparison of Existing and newly define System

The above figure portrays the presentation by plotting 3D grouped section bar outlines of two frameworks. The orange section shows the presentation assessment of our framework which is very considerable. The normal right response given by the existing situation is 64.64% and the normal pace of the proposed framework is 78.17%, which is great. Henceforth, these trial results show that this framework execution is better than the current MMQA framework.

10 inquiries are taken from various response types. On these inquiries, we work out the time needed with enhancement to get the response and the time needed without advancement to bring the response. The presentation gain is determined as equation [11].

$$\text{Perfomance Gain} = \frac{Processing\ time\ without\ opt. - Processing\ time\ with\ opt}{Processing\ time\ without\ opt.}$$

Question	Time Without opt.(In ms)	Time With opt.(In ms)	Performance Gain
Q1	310	263	0.15
Q2	1002	609	0.39
Q3	512	264	0.48
Q4	490	291	0.41
Q5	508	217	0.57
Q6	423	261	0.38
Q7	2027	259	0.87
Q8	752	708	0.06
Q9	303	258	0.15
Q10	2030	1603	0.21

Table 5 Query Optimization Result

These outcomes show that the general inquiry streamlining further develops the question handling execution.

V. CONCLUSION AND FUTURE WORK

This paper has discussed at length the existing problem and mechanisms available. The proposed methodology Visual Robust Multimedia System provides Multimedia Query Assessment for "Multimedia

Question Answering System". This model emphasizes on the local area contributed replies, and it can along these lines manage general inquiries and accomplish better execution. The proposed framework furnishes the useful printed answer advance with the necessary media information.

The framework involves the measures for "Answer Relevance Score" for observing the pertinence of each answer returned by the framework. The exploratory outcomes show that the responses returned by the framework have a higher pertinence score compared to traditional querying mechanism. Results shows better execution in terms of all parameters like time and content relevance in sharp contrast to the current inquiry responding system. Future scope of research involves tracking the significance of the last chosen pictures and recordings on a huge predetermined dataset.

VI. ACKNOWLEDGEMENT

Hardik Patel might want to earnestly express gratitude toward Prof. Sailesh Iyer for all his steadiness, direction, support, motivation, and inspiration all through. Prof. Sailesh Iyer might want to thank his loved ones for their unending help. We might want to thank mysterious commentators for their significant ideas.

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