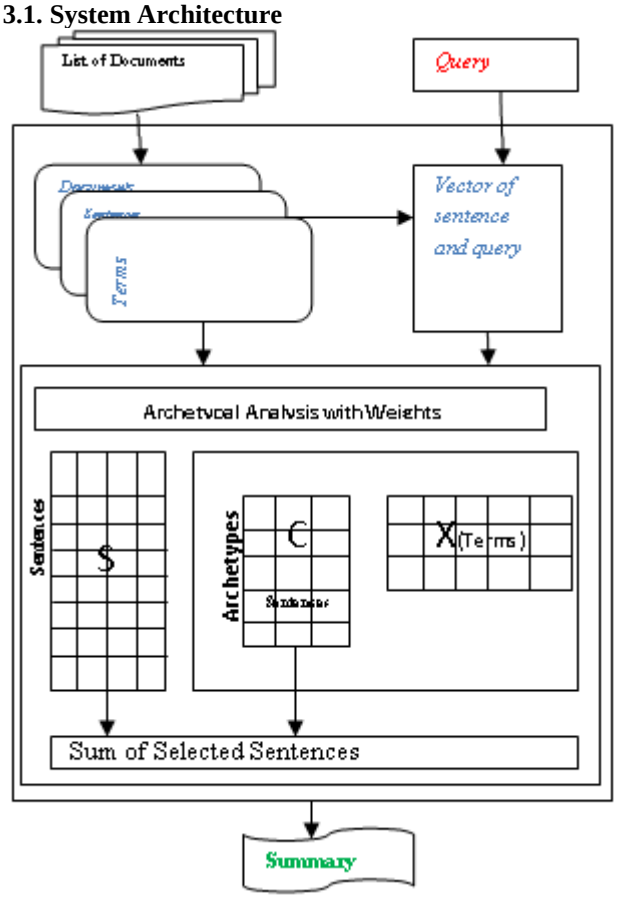
negative values suitable for process of human knowledge and used matrix factorization method to select important sentences for automatic generic document summarization. Selected sentences are significant for automatic generic document summarization than the Latent Semantic Analysis (LSA).[4]

Functions of Archetypal:
Economics and Law Department , Italy (Giovanni C. Porzio, Paola Costantini, Juan Romo, Giancarlo Ragozini). Archetypal analysis means using some underlying ideas discovers the datasets by some mathematical procedure. Main objective of this function is detect some point not an essentially determined but combine all points by approximation of convex combination of determined data.[5]

LexRank (Erkan & Radev, 2004) andTextRank (Mihalcea. & Tarau, 2004) this are the Graph-based methods. It takes sentences as vertices and compute the weight based on similar sentences. This method consider information altogether to extract important sentence to produce summary [6]

3. Proposed Systems

3.1. System Architecture



1. Formula to create matrix X:
$[X]mx\,k = [[W_M]mx\,m\,O\,[A]\,mx\,m]\,mx\,m\,[G]\,mx\,k$
$\otimes$
2. This is diagonal matrix of query to sentence similarity this shows W weighted matrix

$$\partial(si\ ,q) = \frac{sim\ (si\ ,q)}{\sum_{sk\ \epsilon D} sim\ (sk\ ,q)}\ W$$
$$= [\partial(si\ ,q)]mxm$$

3. Calculate weighted archetype AA of matrix X:
a) Calculate C and S as given in equation (2)
b) Calculate importance of archetype by using
c) $Sa_i = \sum_{j=1}^{m} CXij$. CX is sum of values.
d) Arrange the archetypes based on the C and Sa_i values.
e) Removes the archetypes those are less important i.e. lowest weight archetype.

4. Select archetypes *l* which has the highest weight than other archetypes
a) Select important archetype i.e. having maximum weight calculated by selected sentence C and keep on selecting archetypes in decreasing order (having weight less) until best level summary not generate.
b) Then selected sentence is compare with earlier sentence if it similar then newly selected sentence should not include as summary.

3.2. Implementation Details:

3.2.1. Analysis of Weighted Archetypal
Important form of Archetypal Analysis is shown in first section of summarization (Cutler & Breiman, 1994), and then we present inherited form of archetypal analysis, weighted version from (Eugster & Leisch, 2011)paper.

3.2.2. Archetypal Analysis:
Take an m x n matrix, X stands for variable data set with n observation and m attributes then factorize matrix into random matrices S ϵ R^{nxz} and C ϵ R^{nxz} as follows:

$$X \approx SY \text{ with } Y \approx X^T C \qquad (1)$$

S and C initialise to calculate starting archetype XC based on constraints. Initially it chooses the value randomly then using equation (2) continues updating S and C until it reach to maximum iteration.
$RSS(k) = \| X - SY^T \|^2$ with $Y = X^T C$

$\sum_{j=1}^{n} Sij = 1\ S_{ij} \geq 0$, i=1, ..,n

$$\sum_{i=1}^{n} Cij = 1\ C_{ij} \geq 0,\ j=1,\ldots,z \qquad \textbf{(2)}$$

Both $\sum_{j=1}^{n} Sij = 1$ and $S_{ij} \geq 0$ used for feature matrix and $\sum_{i=1}^{n} Cij = 1$, $Cij \geq 0$ used for bell-shaped(convex) combination, $X = SY^T$ shows meaningful combination of archetypes. ‖.‖ This represents the Euclidean matrix for archetype mixture.

3.2.3. Weighted archetypal analysis
$RSS(k) = \|W(X - SY^T)\|^2$ with $Y = X^T C$
X= n x m matrix and W= n x n Square matrix, W is weight matrix shows similarity between sentences and query.

3.2.5. Summary of document using Query and Weighted Archetypal Analysis:

Query focused Multi-document summarization selects Sentences and represents using Weighted Archetypal Analysis by following methods:

Here sentences are grouped into weighted archetypes and n, m,k represents documents, sentences and terms respectively

Labels using Functions:		
Equations of Graph	*Notation of Matrix*	*Explanation*
$\alpha(si, sj) \frac{sim(si, Q)}{\sum_{sk \in d \cap k \neq i} sim(Si, Sk)}$	$A=[\alpha(si, sj)]_{mxm}$	Matrix of Similar Sentence
$\beta(di, dj) \frac{sim(di, q)}{\sum_{dk \in D \cap k \neq i} sim(di, dk)}$	$B=[\beta(di, dj)]_{nxn}$	Matrix of similar Documents
$\gamma(si, tj) = tf(si, tj) * isf(si, tj)$	$G=[\gamma(si, tj)]_{mxk}$	Term to sentence matrix
$\delta(si, sj) \frac{sim(si, q)}{\sum_{sk \in D} sim(sk, q)}$	$W=[\delta(si, q)]_{mxn}$	Sentence to query similarity matrix

3.3. Expected Results

The weighted Archetypal based summarization technique compare with other existing summarization techniques to estimate effectiveness. We compared results with DUC 2004 and DUC 2005 and other proposed techniques, it generate the summary less than 250 words.

4. Conclusion

The paper has validated with query based document summarization and weighted archetypal analysis problem in addition with this we have used AA with query information also used weighted methods of AA for clustering and ranking simultaneously. Compared our results with several existing summarization techniques.

We can improve this algorithm by using WorldNet for interpreting the similarity between sentences and set of terms and many other techniques can be used.

In the comparison of other technique this project gives the best result because use of the weighted archetypal analysis includes query information into its own form and weighted edition for ordering and combining the most significant sentences for summarization.

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