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Editor's Note

I am pleased to introduce you to the inaugural edition of the Research Journal Fortis published from our College. Fortis, very unique in its structure and taste, publishes articles from different categories of specialized knowledge. This journal strongly promotes and encourages the publication of materials that are of value not only to the academia but also to the public who are interested in happenings in intellectual circle. The journal's immediate goal is to provide such people with responsible and balanced information in order to improve their resource and knowledge. Besides, the academic ambience of today necessities attempts of this sort to realize the mission of precision in education. As Robin Morgan, the American political theorist and activist remarks, "Knowledge is power. Information is power. The secreting or hoarding of knowledge or information may be an act of tyranny camouflaged as humility". The aim of the journal is thus to share knowledge. Appreciations and constructive criticisms are welcome as I feel they will be of immense value for proceeding further with added confidence.

Principal

Classroom discourse: An analysis based on critical discourse analysis

Muralikrishnan T.R.

Introduction

This paper focuses on that aspect of classroom which is the soul of everything that happens within the four walls, the ceaseless stream of talk through which relationships are negotiated, knowledge is transmitted, minds are reframed, identities are displayed and a host of other functions. It is also an activity which concerns itself with the student's intervention and interaction in the process of teaching and learning. In order to highlight the crucial role of the student and the teacher, the present paper makes use of Critical Discourse Analysis (CDA) for attempting to analyze the pedagogic procedures involved. That will succor the analytic procedure in many ways, especially to open up the hidden assumptions and the meaning making process outlined by critical literacy and linguistics. The possibilities of making this study, at the theoretical level, would help us to throw light on the ways that classroom discourse – as a system of systems – relates to power, ideology and social inequalities

Basic Assumptions and studies

Conventional teaching have been practicing the ritual of catechism, to enable students to display their knowledge by giving correct answers to questions, and teachers of all persuasions still at times use the technology of interrogation and response for various reasons. Owing to the studies from Barnes and colleagues (Barnes *et al*.1969, Barnes 1976), teachers with progressive frame of mind encouraged a different kind of student talk for different purposes; shared exploratory talk to develop thinking and understanding. Sinclair and Coulthard (1975), Baker and Freebody (1989) came up with studies on conversational analysis based on classroom talk.

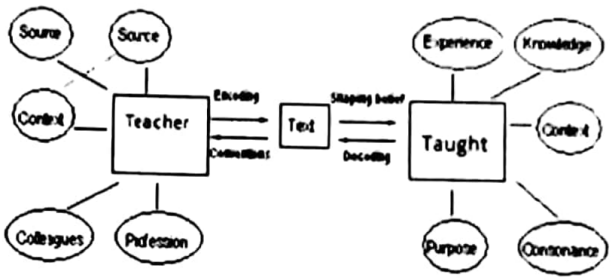
The method of a general classroom situation advocates student involvement and it is often taken as cliché. However, the fundamental problem here is the characteristic modification of student responses based on teacher's method. The exposure of the students to the trained and class room centered discussion prepares them for such context specific discourse. The

position of the teacher is almost legitimate and his discourse appropriate. From here onwards, the classroom talk of the students and their interaction resembles to that of the teacher's. The role of critical discourse analysis comes into play in this context. Till recently, the language of classroom interaction is viewed as unproblematic. Explicitly or implicitly a dyadic apprenticeship model of teaching is endorsed, in which 'teachers are to be understood as actively intervening in and guiding their students' learning' (Christie *et al.* 1991). Such intervention may easily slide into an authoritarian style of 'one-to-many' teaching. Learning may be seen as bridge building activity between the known and new, where the teacher is not supposed to delegate but to lead.

While analyzing the concept of discourse, the term discourse has to be viewed as language in use and its analysis is the analysis of texts in context. Discourse has to be situated in a context. It does not assume a value neutral entity in the given social context. It is often viewed as constituted and constitutive, since, as Gee (1999) puts it language simultaneously reflects reality (*i.e.* the way things are) and constructs it to be in a certain way. In critical discourse analysis, language must play some part in producing and reproducing social inequalities. CDA is often perceived as a politically involved research. Critical discourse analysis investigates and aims at illustrating "relationships between the text and social conditions, ideologies and power relations"(Wodak: 1996). For Fairclough, CDA means the analysis of relationships between concrete language use and the wider social cultural structures. The three dimensions in every discursive event, *viz*, text, discursive practice and social practice are integral part of analysis. The text as discourse sees three functions which include ideational function, interpersonal function and textual function. In other words, ideational means 'representations', interpersonal means 'identities and social relations' and textual means 'cohesion and coherence'. When these functions are taken up then the duty is to look for alternative possibilities and hence the fundamental question: 'how could this have been different?' Blommaert (2005) believes that text linguistics is not enough. He says, "If we see discourse as contextualised language, and take this dimension of contextualisation seriously, we shall be forced to develop a linguistics that ceases to be linguistic from a certain point onwards". In social practices, many operational forms of public discourse become relevant. They include government pamphlets, market oriented write

ups, advertising and other forms. Gee (1999), has identified two forms of 'discourse'-one with a small 'd' and other with a capital 'D'. The word with letter'd' refers to the various structures of language that constitute much of the give and take of daily life. Whereas 'D' refers to the larger pervasive and often invisible sets of values, beliefs and ideas with which we are positioned in various setting.

In discursive practices, in a classroom situation, there is context which shapes beliefs based on background experiences. The interaction between the teacher and the taught follows a specific convention. See fig 1 below;



In general discourses the meaning making function is important. It could be experiential, interpersonal or textual. The experiential meaning expresses the content, the phenomena of the external world including thoughts and feelings. When a leader says "I chose this party", he is part of the action and he did something or simply he is the actor. When another leader says, "I am a particular party man by choice", he is described by something or he is being something.

In interpersonal meaning, the language expresses the details about the participants in the situation and speaker's own intrusion into it. For example, when someone states, "I have told you" (It is declarative) or "Have you told me" (interrogative), "(you) Tell me! (Imperative), they represent different contextual but interpersonal necessities. Finally, the textual function is intrinsic to language. It is the linguistic resource that lets speakers create text.

Studies on classroom discourse

As it has been stated by Francis Christie (2007), "One fundamental theme that runs through virtually all the work in classroom discourse analysis is the recognition it gives to behaviour, including language behaviour as structured experience". It was Flanders (1970), who studied what he termed 'interaction analysis' for understanding the nature of teacher interactions with students. He focused on teacher talk and its consequences for students' achievements using terms such as asking questions, giving directions, accepting feedback and so on. Bellack and his colleagues (1966), recognized four units of analysis to which Bellack gave the names: game, subgame, cycle and move. Sinclair and Coulthard (1975), developed a model of classroom discourse involving a series of ranks and levels arranged in hierarchical order. Ranks at the discourse level were in the descending order: lesson, transaction, exchange, move and act. Mehan (1979,) proposed the initiation, response, evaluation move popularly known as the IRE in the pattern of discussion. Later researchers such as Wells (1993, 1999), Mercer (2000), suggested to look beyond the IRE and to identify the total sequences of classroom talk. Francis Christie (2007), says, "Ironically, a great of classroom discourse analysis had had a lot to say about the structuring of talk in terms of the IRE and related moves, but it has often neglected to look at the nature of the meanings in construction, the relative roles and responsibilities of teachers and students at the time of constructing those meanings and the placement of such pattern in the overall larger cycle of classroom work".

One may analyze the sequence of discourse in a typical language classroom. Initially we have the exposition, the step where the teacher describes, informs, or explains the point, theme, topic to be elaborated either directly or indirectly. In conventional lesson planning one calls it as a phase where the students are mentally prepared and interested in the given area. The explanation follows discussion, followed by question and answer exchanges. There could also be peer talk, involving the whole class or smaller groups. Listening, reading and writing could also be part of the sequences as appropriate to the context and the challenges posed by the lesson. Finally there will be a quick recap and list of opportunities based on which the learners can pass on to higher levels of self learning. As far as this paper is concerned, the primary interest is in the understanding of how CDA opens up the relation of authority among teacher, text and students.

Francis Christie (2007) argues that there are two registers at work in classroom texts: those of the 'first order' or regulative register, to do with types of behaviours in the classroom and those of the 'second order' or the instructional register, to do with the content being taught and learned.

The CDA of the instructional sequence talks about the asymmetric relation between teacher and taught. For example, one can identify the positive and negative orientation for each as in;

'You have got some work to do'

'We have got some work to do'

'I am passing on to the next topic'

'Let us now pass on to the next topic'

'Answer me'

'Will you not find an answer for me'?

'I want you to listen, so listen to what happened next'

'Won't you listen to what happened next?

Another problem is the excessive use of negative polarity and negative attributes.

'You are not to do that'

'You are irresponsible'

'You are wrong'

As Francis Christie (2007), says, "Teachers and students take up various roles vis-à-vis each other across a classroom text, and identification of their respective speech roles becomes one important measure of their relative roles and responsibilities...pattern of theme distribution in classroom talk are very revealing, for it is through the theme choices that the discourse is developed and carried forward. Who controls theme, to what extent, and at what points in the lesson, tell a lot about the overall organization of the classroom text and about the relative responsibilities assumed by participants".

The four related senses as part of classroom discourse are;

- It draws attention to the discourses that are intended to be imparted in the pedagogic relationship;
- It draws attention to the privileged and privileging status of discourse;
- It draws attention to the authority carried by the teacher in initiating, facilitating, and structuring the pedagogic relationship;
- It suggests a lot about the subject position of the learner in the learning activity discourse.

Moreover CDA can immensely beneficial in classroom participation analysis. The benefits are;

1) Classroom discourse, like all other discourses, is socially constructed, politically motivated and historically determined;
2) The racialised, stratified and gendered experience that discourse participants bring to the classroom setting are motivated and molded not just by the learning and teaching episodes they encounter in the classroom but also by the broader linguistic, social, economic, political and historical milieu in which they all grow up;
3) The classroom is not a self-contained mini society it is rather a constituent of the larger society;
4) The classroom is a manifestation of many forms of resistance, articulated or unarticulated;
5) Language teachers neither can ignore the socio-cultural reality that influences identity formation in and outside the classroom, nor can separate learners linguistic needs and wants from their socio-cultural needs;
6) Teachers should develop the necessary knowledge and skills to evaluate their classroom and to theorize what they practice and practice what they theorize without depending upon external agencies.
7) The negotiation of discourse meaning should not be confined just to the acquisitional aspects of input and interaction, instead discourse participants' complex and competing expectations and beliefs, identities and voices, and fears and anxieties.

Conclusion

It may be noted that many a times meta-linguistic analysis of the classroom would throw open the numerous benefits regarding classroom participation. Allied forms of linguistic analysis in such contexts can help the teacher to address issues which would either be taken for granted or it would remain implicit. One should look into the discourse processes enacted during production and consumption of the same. Such an analysis might reveal the fact that classroom discourse – as a system of systems- relates to power, ideology and social inequalities.

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Enhancing Emotional Proximity through ICT in Secondary Level

T.S .Sanjayan

Introduction

Most of the affair of everyday life is tinged with feeling and emotion, joy and sorrow excitement and disappointment, love and fear, attraction and repulsion, hope and dismay. Our emotions have a great impact on others when we express them in ways on others when we express them in ways that can be perceived by others. When we perceive the emotional responses of other people, we respond in appropriate ways perhaps with an emotional expression of our own. The focus of this paper will be on how ICT enhances the emotional proximity in higher secondary level. The possibility of creating ICT-mediated proximity has been dramatically enhanced in Pedocompunity.

Aim

To determine how ICT and emotional proximity are interrelated and correlated each other

Objectives

- To study the relation between ICT and Emotional Proximity.
- To find out the influence of ICT on Emotional Proximity.
- To compare the menu scores of ICT and emotional Proximity(component Wise and total score) for the group.
  - (a) Boys and Girls.
  - (b) Government and aided schools.
  - (c) Rural and Urban Schools.
  - (d) Male and Female Teachers.

Hypothesis of the study

(1) There will be no significant relationship between ICT and emotional Proximity.

(2) There will be no significant influence of ICT on emotional Proximity.

(3) There will be no significant difference between the mean scores of ICT

and emotional proximity (component wise and total score) for the group.

(a) Boys and Girls.

(b) Government and aided schools.

(c) Rural and urban schools.

(d) Male and Female teachers.

Methodology in brief

For the purpose of study, representative samples of 300 students are taken for consideration. 25 teachers who are teaching in the higher secondary level of Ernakulum district of Kerala are also selected. The sample was selected by stratified sampling techniques giving due representation to the factors like sex of students and teachers, locality and management category of the schools. Emotional proximity rating scale (EPRS) and computer and mobile mediated strategies are used as tools for the study. The researcher has conducted preliminary analysis to see whether the dependent and independent variable are normally distributed. For this the important –statistical characteristics mean, median, mode, standard deviation, skewness and Kurtosis were calculated. Carl Pearson product moment correlation was used in major analysis .They were done by using SPSS statistical software.

Relationship between emotional proximity and ICT mediated technology

The total sample

Validity No. 250	Co efficient of correlation	Fingers t-value	Confidence interval		Share variance	Level of significance
Emotional proximity	0.203	4.613	0.115	0.261	4.12	0.01
ICT mediated teaching	0.215	4.210	0.210	0.219	3.96	0.01

From the table1 we can see that the correlation coefficient 'r' for total sample is 0.203,which is positive. The t-value calculated as 4.613 which are greater than the value required to be significant at 0.01 levels. Thus it can be interpreted as there exists as significant positive relationship between the variable emotional proximity and ICT mediated teaching for the total sample at 0.001 levels.

The important finding presented in the following heads

The coefficient of correlation between emotional proximity and ICT mediated teaching for the total sample is 0.203 .This shows a significant relationship between emotional proximity and ICT mediated teaching. The coefficient of correlation between emotional proximity and ICT mediated teaching for boys are found to be 0.1914. This shows a negligible relationship between emotional proximity and ICT mediated teaching strategy.

Comparison of the variable emotional proximity with respect to sex, locate and management

While comparing emotional proximity of boys and girls the critical ratio obtained was 3.213 which is significant at 0.01 levels. This indicates that there exists a significant sex difference in the variable emotional proximity. The arithmetic mean for boys is 102; arithmetic mean for girls is 96.312. Hence boys are more influenced by emotional proximity than girls. Comparison of the variable ICT mediated teaching with respect to sex of the students locale and type of management

While comparing the effects of ICT mediated teaching on sex of the students the critical ratio obtained was 3.12, which is significant at 0.01 levels. This indicates that there exists a significant sex difference in the effect of variable ICT mediated teaching on students. While comparing ICT mediated teaching of rural and urban students ,the critical ratio obtained was 3.12 which is significant at 0,05 levels. This indicates that there exists a significant locale difference in the variable ICT mediated teaching.

Conclusion / Recommendation

The study under consideration investigated the relationship between emotional proximity and ICT mediated teaching on the basis of the study it may be stated that there is a significant correlation between emotional proximity and ICT mediated teaching .Some of the recommendation of the study as follow.

(a) Modern ICT creates a telemediated presence in the children

(b) ICT mediated teaching and learning process enhances emotional proximity between students and teaches

(c) Congenial ICT mediated environment definitely accelerate the talents of children

(d) Teachers should bear in mind that amalgam of emotional proximity and appropriate ICT mediated learning environment are a part-and parcel of education

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Antibacterial Studies On *In Vitro* propagated *Mentha piperita*

Dr.Umesh B.T and Sanila Ashik

Abstract

In the present study, nodal explants of *Mentha piperita* were cultivated on the basal Murashige and Skoog (M S) culture medium enriched with various concentrations of auxins and cytokinins. Of the tested medium varieties, the best combination for stimulating both roots and multiple shoots was found to be 0.2 mg/l IAA and 4mg/l BAP. The rooted plantlets were hardened in polycups containing sterile sand and soil (1:1). Plantlets thus developed were successfully established. The plantlets showed high survival rate in the soil (90%). The extract of *Mentha piperita* was screened for antibacterial activity against 5 different pathogenic Bacteria like *Staphylococcus aureus, Escherichia coli, Serratia marcescens, Klebsiella* and *Pseudomonas*. The screening was performed by agar disc diffusion method. The extract of *Mentha piperita* exhibit highest antibacterial activity against *Escherichia coli* (zone of inhibition 25mm) . *Pseudomonas* Showed resistant to *Mentha* extract

.Introduction

Peppermint (*Mentha piperita*) is a perennial and aromatic herb belonging to family Lamiaceae. It thrives well in humid and temperate climate and is most widely cultivated in temperate regions of Europe, Asia, United States, India and and Mediterranean countries. The plant is highly sensitive to drought. The plant is aromatic, stimulant, stomachic, carminative and used for allaying nausea, flatulence, headache and vomiting (Kiran Ghanti, 2003).

Mentha genus is a hybrid between *Mentha aquatica* and *Mentha spicata* (Hefendehl and Murray, 1972). The *Mentha* genus consist of a number of approximately 25 species, differing in their ploidy levels (Bhat *et.al*, 2002) and characteristics. Most of the commercially important mints are hybrids or amphiploids.

Mints are extensively cultivated for their oils. Peppermint oil has a fresh, sharp menthol smell. It is clear to pale yellow in colour and watery in viscosity. Peppermint contains about 1.2-1.5% essential oil. The volatile oil, also known as *menthae piperitae aetheroleum*, contains 30-70% free menthol

and menthol esters and more that 40 other compounds. The terpenoid components of the oil such as menthol, carvone, linalyl acetate and linalool are used in food products, cosmetics, pharmaceuticals, dental preparations, mouth washes, soaps, chewing gums, candies, confectionery and alcoholic liquors (Kiran Ghanti, 2003).

Medicinal plant propagation using nodal segments with axilar buds has proved to be a simple and fiable method for mass production of desired clones (Sunandakumari *et al*., 2004).

Kirby-Bauer method was used to assess the antibacterial activity of the *Mentha piperita* extract against various Bacteria. The Mint extract possess antibacterial activity against various pathogens like, *Staphylococcus aureus*, *Serratia marcescens*, *Escherichia coli* and *Klebsiella*.

Materials and Methods

Tissue Culture Studies:

Washing and sterilization of utensils:

Glasswares (culture bottles, petri plates etc) were washed thoroughly after treating 24 hours in dilute soap solution. It was then rinsed in single distilled water and dried for one hour at 70°C in hot air oven. The glasswares were then autoclaved at 121°C for 20 minutes and kept safely in air tight cupboards.

Preparation of media:

MS media (Murashige and Skoog, 1962) was used in the present study. Appropriate amount of salts were weighed and dissolved in distilled water and made upto final volume. Plant growth regulator used in the present study was IAA, IBA and BAP. Various concentrations of IAA, IBA and BAP(0.1, 0.2, 4.0 mg/L) were tested for rooting and shoot induction.

The P^H of the medium was adjusted to 5.8 with the help of a digital P^H meter using 1N NaOH and 1N HCl. After adjusting the P^H, 7% agar was added as gelling agent and was dissolved by boiling the medium. About 25 to 30 ml media were poured into sterilized culture bottles and sealed tightly. The media culture bottles were autoclaved at 15 lb pressure for 15 minutes. The sterilized media were kept in culture room for solidification.

Explant preparation and surface disinfection:

The explants collected from the herbal garden (of the department) were washed in Tween 20 (detergent) and then thrice in sterile distilled water.

Inoculation of the explants into MS medium:

The inoculation of the explants into autoclaved culture media was carried out in Laminar Air Flow chamber. Before inoculation, the platform of the chamber was wiped with 70% ethanol. The autoclaved accessories such as forceps, surgical blade, Petridish and blade holder was immersed in 70% Ethanol and were placed inside the chamber. The cabinet door was closed and UV light was switched on for 30 minutes. After switching off UV light, switch on the blower and fluorescent lamp. The hands were wiped with 70% Ethanol. The explants were surface sterilized in 0.1% HgCl, and again three times in distilled water. The nodes and leaves were separated from the explants using scalpel and were inoculated into the media using forceps. The mouth of the culture bottle should be in front of the flame while inoculation. This can reduce contamination. To ensure complete sterile condition, the blade and forceps were flamed after each inoculation. After inoculation, replace the cap after flaming the mouth of the inoculated culture bottle.

Table:1 Growth regulator combinations used for micropropogation:

GROWTH REGULATOR	CONCENTRATION (mg/l)
IAA	0.1
IBA	0.1
BAP	0.2
IAA+BAP	0.2+4.0

Maintenance of culture:

The culture bottles were incubated in a culture room provided with a temperature of 23± 2°C, 16 hour photoperiod at 3000 lux and 50-60 % humidity. The cultures were observed regularly and the morphological changes were recorded.

Antibacterial Test

The antibacterial activity of the plant was evaluated by agar diffusion technique. Pure cultures of bacterial strains *Staphylococcus aureus, Pseudomonas, Klebsiella, Serratia marcescens and Escherichia coli* were used for the study.

Nutrient agar was poured on sterile petridishes and was kept for solidification. After solidification, the entire agar surface was streaked by means of a sterile cotton swab so as to obtain a confluent growth over the entire surface of the agar. The plates were allowed to dry for 5 minutes.

Using a sterile foreceps, the filter paper disc impregnated with specific concentration of plant extract was placed on the agar plate. The plates were then incubated in an inverted position at 37°C for 24-48 hours. Inhibition zones were noted and data was recorded. Photographs were taken showing the effect of plant extracts on cultures.

Results

1. Tissue Culture Studies

The explants (nodal) of *Mentha piperita* were maintained at the herbal garden of the department. They were cultured in MS medium supplemented with various concentrations of IAA, IBA (auxins) and BAP (cytokinins).

Initiation of shoots and roots in *Mentha piperita* was rather difficult due to fungal and bacterial contamination.After 10 days, out of 25 bottles inoculated, 7 bottles were contaminated. The medium turned brown due to release of phenolic exudates and the leaves turned necrotic and fell off. Multiple shoots were observed on medium supplemented with 4.0 mg/l of BAP and rooting was observed on rooting medium supplemented with 0.2 mg/l of IAA. Different concentration of IAA and BAP has varying effects on shoot induction and rooting.

The highest number of shoots was observed on medium supplemented with 4 mg/l of BAP and high frequency of rooting was observed on medium supplemented with 0.2 mg/l of IAA. This combination of growth regulators gave better result in multiple shoot induction and rooting (IAA+BAP).

The rooted plantlets were hardened in polycups containing sterile soil and sand (1:1). Plantlets developed were successfully established and they showed high survival rate in the soil.

2. Antibacterial Test

In the present study, the antibacterial activity of *Mentha piperita* extract was estimated. Five bacteria were employed in the study- *Pseudomonas, Serratia marcescens, Staphylococcus aureus, Escherichia coli and Klebsiella.*

Out of these bacteria, the most sensitive organism is E*scherichia coli*. The maximum zone of inhibition was found in *Escherichia coli* seeded nutrient agar plate.

Staphylococcus aureus and *Serratia* displayed almost similar zone of inhibition. There was only a small zone of inhibition on *Klebsiella* seeded plate.

There was no inhibition zone formation the nutrient agar plate inoculated with *Pseudomonas*. This implies that Pseudomonas is resistant to *Mentha* extract.

Bacteria	Zone of inhibition (mm)
Staphylococcus aureus	18
Escherichia coli	25
Serratia marcescens	15
Klebsiella	8
Pseudomonas aeroginosa	0

Rule Induction- A Rough Set Approach

Sabu M.K

Abstract

Rough Set Theory (RST) proposed by Z Pawlak provides a well understood formal model, which allows to find several kinds of information such as relevant features or classification rules without requiring any additional parameters to operate other than the supplied data. In RST all computations are performed directly on the supplied data and works by making use of the granularity structure of the data. A problem of using conventional association rule algorithms is that too many rules are generated by these algorithms and it is very difficult to analyze these rules. This paper proposes a rough set based approach to generate rules from an inconsistent information system consisting of the preprocessed data collected from coconut cultivators of the Keezhur Chavassery Grama Panchayath using stratified random sampling method. An existing algorithm, namely, Learning from Examples Module version 2 (LEM2) is modified to incorporate some conditions, leading to the generation of significant rules. By applying the proposed algorithm, a set of significant rules are generated. These rules are expected to be helpful to the farmers of the state to design their farming plans, which will enable them to improve their coconut production.

Keywords: Rough sets, association rule mining, local covering, minimal complex, discernibility matrix, indiscernibility relation, lower approximation, upper approximation.

Introduction

Rough Set Theory (RST) proposed by Zdzislaw Pawlak is a mathematical approach to intelligent data analysis and data mining [1, 2, 3, 4]. It is an emerging soft computing tool with wide range of applications in many domains especially in the areas of machine learning, knowledge acquisition, decision analysis, knowledge discovery from databases, expert systems, inductive reasoning and pattern recognition [5, 6]. It mainly deals with imprecise or vague concepts. The rough set approach provides efficient algorithms for finding out hidden patterns in data, minimal sets of data (data reduction), evaluating significance of data and generating sets of decision rules from data [1]. In RST all computation are performed directly on data sets. It requires no additional parameters to operate such as, for example, a probability distribution in statistics, a grade of membership from fuzzy set theory etc., other than the supplied data [7]. It works by making use of the granularity structure of the data. One advantage of Rough Set theory is that, it provides a well understood formal model, which is very helpful in generating several kinds of information such as relevant features or association rules using minimal model assumptions.

Association rule mining is a process to search relationships among data items in a given data set. Association rule algorithms can be used to extract rules from a decision table [8]. The main problem with association rule algorithm is that too many rules are generated and it is difficult to analyze these rules and discover which ones are more important and interesting [14].

Rough Sets can be used to determine whether there is any redundant information in data and also it is possible to find the essential data needed for our applications. Since it is possible to generate representative attributes from a decision table using rough set methods, fewer rules will be generated due to the reduction in attributes and the rules will be as significant as the rules generated without using rough set approach [9].

The selection of significant attributes from a problem domain becomes necessary for rule induction, because most of the relevant rules generated from the given data set are formulated with these important attributes. With this idea in mind, the rule induction algorithm LEM2 is modified to incorporate the attribute selection process in rule induction. In the proposed method an attribute selection process based on the idea of a discernibility matrix [7][11][13] is used to select significant attributes from the given data set. From the attribute-value pairs of the selected attributes, only those attribute-value pairs which are necessary to define the given concept (the set of objects with the same decision attribute value) are selected. These attribute-value pairs are then used to generate a single local covering for the given concept. In a local covering [12], each member represents a minimal complex which corresponds to a single rule. Similarly the local covering of the remaining concepts are also generated separately by using the same method. In this way various association rules are generated from the decision table.

The remainder of the paper is organized as follows. The idea of a decision table is presented in Section 2. An introduction to the concept of local covering is given in Section 3, a description of the data set used is given in

Section 4 and the algorithm used is described in section 5. In section 6 the work is explained with the data set together with the results obtained. Finally, Section 7 gives the conclusion.

Decision Tables

An information system I = (U, A$\cup${d}), where d ϵ A, is usually called a decision table. The elements of A are called conditional attributes and d is called the decision attribute. An example of a decision table is given in Table – 1. This decision table characterizes six objects (patients) and it consists of four conditional attributes {Temperature, Headache, Nausea, Cough}and a decision attribute {Flu}. Such a decision table defines an information function f : UAV, where V represents the set of all attribute values. For example, f(1, Temperature) = high. Let a A and v V, and t = (a, v) be an attribute-value pair. Then a block of t, denoted by [t], is a set of objects from U for which attribute 'a' has value 'v' [12].

Table – 1: A Simple Decision Table

Case	Attributes				Decision
	Temperature	Headache	Nausea	Cough	Flu
1.	high	yes	no	yes	yes
2.	very_high	yes	yes	no	yes
3.	high	no	no	no	No
4.	high	yes	yes	yes	yes
5.	normal	yes	no	no	No
6.	normal	no	yes	yes	No

For the decision table given in Table – 1,

[(Temperature, high)] = {1, 3, 4}

[(Temperature, very_high)] = {2}

[(Temperature, normal)] = {5, 6}

[(Headache, yes)] = {1, 2, 4, 5}

[(Headache, no)] = {3, 6}

[(Nausea, no)] = {1, 3, 5}

[(Nausea, yes)] = {2, 4, 6}

[(Cough, yes)] = {1, 4, 6}and

[(Cough, no)] = {2, 3, 5}

Let xU and BA. An elementary set of B containing x, denoted by $[x]_B$ and is defined by the following set.

$\cap$ {[a, v]aB, f(x, a) = v}

Elementary set is a subset of U consisting of all cases from U that are indistinguishable from x while using all attributes from B [12]. Elementary sets are also known as information granules, which represents the building blocks of knowledge about U. When subset B is restricted to a single attribute, elementary sets are blocks of attribute-value pairs defined by that specific attribute. For example, if B = {Temperature, Headache} then an elementary set of B with Temperature = high and Headache = yes is

[(Temperature, high)] $\cap$ [(Headache, yes)] = {1, 4}

Elementary sets can also be defined by using the idea of indiscernibility relation, the mathematical basis of rough set theory [13].

Local Covering

An information system I = (U, A $\cup$ {d}), where d A, is usually called a decision table. The elements of A are called conditional attributes and d is called the decision attribute. A decision table defines an information function f : UAV, where V represents the set of all attribute values. Let a A and v V, and t = (a, v) be an attribute-value pair. Then a block of t, denoted by [t], is a set of objects from U for which attribute 'a' has value v [12].

Let xϵU and B$\subseteq$A. An elementary set of B containing x, denoted by $[x]_B$ and is defined by the following set.

$\cap$ {[a, v]aB, f(x, a) = v}

Elementary set are subsets of U consisting of all cases from U that are indistinguishable from x while using all attributes from B [12]. Elementary sets are also known as information granules, which represents the building blocks of knowledge about U. When subset B is restricted to a single attribute,

elementary sets are blocks of attribute-value pairs defined by that specific attribute. Elementary sets can also be defined by using the idea of indiscernibility relation, the mathematical basis of rough set theory.

There are two main approaches to data mining from complete data sets based on RST. In both approaches decision tables are used. In the first approach, the entire attributes are used for analysis and hence the approach is known as global. The second approach is known as local, in which blocks of attribute-value pairs are used for analysis. In this paper a rule induction process based on local covering is discussed because local coverings are useful for rule induction [12]. To define the concept of a local covering, the idea of a minimal complex is introduced first. A minimal complex corresponds to a single rule. Let X is a concept. Let t be an attribute-value pair (a, v), [t] be a block of t and T be the set of all such attribute-value pairs. Set X is said to depend on set T of attribute-value pairs if and only if:

$$\varnothing \neq \bigcap \{[t] \mid tT\} \subseteq X$$

A set T is a minimal complex of X if and only if X depends on T and no proper subset T of T exist such that X depends on T [12].

A local covering corresponds to a rule set describing a concept. Let L be a non-empty collection of non-empty sets of attribute-value pairs. Then L is a local covering of X if and only if the following conditions are satisfied [12].

1. Each member T of L is a minimal complex.
2. $\bigcup \{[T] \mid T\ L\} = X$ and
3. L is minimal, i.e., L has smallest possible number of members.

Description of the Data Set

Data set used for this experiment is collected from 80 coconut cultivators of the Keezhur Chavassery Grama Panchayath of the Kerala state[15]. Stratified random sampling is the sampling method used, taking wards in the panchayath as the strata. Number of samples is chosen in such as way that at

least 5% of the total population is being included in the study. At the time of data collection a number of attributes are considered and data are collected based on these attributes. To construct the decision table to apply the rule induction process we randomly selected three important attributes namely atmospheric temperature, amount of rainfall and the amount of fertilizers used for coconut cultivation as the conditional attributes and the amount of coconut production is considered as the decision attribute. Table 2 gives a portion of the actual data collected from the farmers [15].

As a preprocessing these attribute values are mapped on to three domain values namely low, normal and high. The definitions of these values for various attributes are given in Table 3.

After the preprocessing the data set is formatted as a decision table required for the rule induction algorithm. Table 4 gives the decision table. Rows of the decision table represent various objects and columns represent the set of conditional attributes {Temperature, Rain, Fertilizers}and the decision attribute {Production}.

Table 2: Data Collected from farmer

Temperature [Celsius]	Rain [cm]	Fertilizers [Kg. Per Acre]	Production [In 1000 Per Acre]
32	121	90	4000
32	121	70	5000
34	100	50	7000
32	136	110	5000
34	123	140	9000
28	113	90	8000
38	124	120	7000
28	128	50	3000

As a preprocessing these attribute values are mapped on to three domain values namely low, normal and high. The definitions of these values for various attributes are given in Table 3.

Table 3: Domain values of the attributes

	Temperature [Celcius]	Rain [Cm]	Fertilizers [Kg/Acre]	Production [in 1000/Acre]
Low	Less than 31	Less than 111	Less than 119	Less than 6500
Normal	31-33	111-115	119-121	6500-7500
High	Greater than 33	Greater than 115	Greater than 121	Greater than 7500

Table 4: Decision Table

Objects	Temperature	Rain	Fertilizers	Production
1	High	High	High	Normal
2	High	High	High	Low
3	High	High	Low	Normal
4	High	High	Normal	High
5	High	Low	Low	Low
6	High	Low	Low	Normal
7	High	Low	Normal	Normal
8	High	Normal	Low	Low
9	Low	High	High	Low
10	Low	High	Low	Low
11	Low	Low	Normal	Normal
12	Low	Normal	Low	High
13	Normal	High	High	Low
14	Normal	High	High	Normal
15	Normal	High	Low	Low
16	Normal	Low	Low	Low
17	Normal	Normal	Low	High

1. Algorithm used for Rule Induction

In the original version of LEM2, the idea used for generating the local covering is based on the condition $[T-\{t\}] \subseteq X$. But the use of this condition alone will leads to the elimination of some useful attribute-value pairs from the local covering. This will greatly affect the efficiency of the rules generated. So in the proposed work, to overcome this, we introduce another condition, say $(T-\{t\}) \neq \varnothing$, before using the already specified condition $[T-\{t\}] \subseteq X$. The algorithm used for computing a single local covering for each lower or upper approximation of various concepts from the decision table is presented below.

```
Algorithm MODILEM2(X)
// X represents a set of objects representing lower/upper
// approximation of the concept selected.
// t represents an attribute-value pair.
// The algorithm returns a single local covering L of X.
{
 G := X;
 L := ;∅
 while (G ≠ ∅) do
 {
  T := ;∅
  T(G) := {t | [t] ∩ G ≠ ∅ };
  while ((T = ∅) or (not([T] ⊆ X)))
  {
    Select a pair t ∈ T(G) such that |[t] ∩ G| is maximum.
    if a tie occurs arbitrarily select any one pair.
     T := T    {t};
     if ([t]   G ≠ ∅)
      {
        G := [t] ∩ G;
        T(G):={t | [t]G ≠ ;∅ t ∈ T(G)}
        T(G) := T(G)  T;
      }
  }
 for each t in T do
```

{
if ((T {t}) ≠ ∅) then
if ([T {t}] ⊆ X) then
T := T - {t};
}
L := L ∪ {T};
G := X - ∪ {T};

1. Data Analysis and Results

In Table 4 there are three elementary sets {1, 3, 6, 7, 11, 14}, {2, 5, 8, 9, 10, 13, 15, 16}and {4, 12, 17}of the decision attribute {Production}. These sets respectively represent classification of farmers with production 'normal', 'low', and 'high'. Elementary sets of the decision attribute are called concepts. The equivalence class structure induced by the conditional attributes {Temperature, Rain, Fertilizers}are {{1, 2}, {3}, {4}, {5, 6}, {7}, {8}, {9}, {10}, {11}, {12}, {13, 14}, {15}, {16}, {17}}. From Table 4, it is clear that the decision 'production' does not depend on attributes {Temperature, Rain, Fertilizers}because neither of {1, 2}nor {13, 14}are subsets of any concept. Hence Table 4 is inconsistent because entries 1 and 2 are conflicting. Entries 13 and 14 are also conflicting.

These inconsistencies can be handled by using RST. The idea is that for each concept X, lower and upper approximations are computed and based on these approximations rules are generated. In Table 4, for the concept {1, 3, 6, 7, 11, 14}, the farmers with production 'normal', the lower approximation is {3, 7, 11}and upper approximation is {1, 2, 3, 5, 6, 7, 11, 13, 14}. Similarly the lower approximation for the concept {2, 5, 8, 9, 10, 13, 15, 16}is {8, 9, 10, 15, 16}and upper approximation is {1, 2, 3, 5, 6, 7, 11, 13, 14}. And for the concept {4, 12, 17}, the lower and upper approximation are same and is given by {4, 12, 17}. This means that the concept {4, 12, 17} representing farmers with production 'high' are definable with the attributes {Temperature, Rain, Fertilizers}. The other two concepts are not definable by the given attributes and hence they are roughly definable or rough sets.

The idea of lower and upper approximations is used for rule mining in the case of inconsistent data sets. For any concept, rules induced from its lower approximations are certainly valid and hence such rules are called certain rules

[14]. Rules induced from upper approximation of the concept are possibly valid are called possible rules.

After computing the lower and upper approximations, select those attribute-value pairs (a, v) satisfying the condition [(a, v)] X ≠ , where X represents the lower or upper approximation of the concepts as the case may be. These attribute-value pairs are then used in the modified LEM2 algorithm to generate a local covering for the set X. Each member of the local covering is a minimal complex, which corresponds to a single rule. Hence the local covering represents a set of association rules generated from the decision table satisfying the set X. By changing the set X, all the decision rules satisfying the lower and upper approximations of the remaining concepts are also generated separately by using the same algorithm. Various attribute-value pairs of the selected attributes are {(Temperature, low), (Temperature, normal), (Temperature, high), (Rain, low), (Rain, normal), (Rain, high), (Fertilizers, low), (Fertilizers, normal), (Fertilizers, high)}. Then elementary sets defined by these attribute-value pairs are:

[(Temperature, low)] = {9, 10, 11, 12}
[(Temperature, normal)] = {13, 14, 15, 16, 17}
[(Temperature, high)] = {1, 2, 3, 4, 5, 6, 7, 8}
[(Rain, low)] = {5, 6, 7, 11, 16}}
[(Rain, normal)] = {8, 12, 17}
[(Rain, high)] = {1, 2, 3, 4, 9, 10, 13, 14, 15}
[(Fertilizers, low)] = {3, 5, 6, 8, 10, 12, 15, 16, 17}
[(Fertilizers, normal)] = {4, 7, 11}
[(Fertilizers, high)] = {1, 2, 9, 13, 14}

If the set X is taken as {3, 7, 11} (i.e., the lower approximation of the concept {1, 3, 6, 7, 11, 14}representing the normal production), the attribute-value pair blocks [(a, v)] which satisfies the condition [(a, v)] ∩ X ≠ ∅ are:

[(Temperature, low)] = {9, 10, 11, 12}
[(Temperature, high)] = {1, 2, 3, 4, 5, 6, 7, 8}
[(Rain, low)] = {5, 6, 7, 11, 16}
[(Rain, high)] = {1, 2, 3, 4, 9, 10, 13, 14, 15}
[(Fertilizers, low)] = {3, 5, 6, 8, 10, 12, 15, 16, 17}

[(Fertilizers, normal)] = {4, 7, 11}

When the set X = {3, 7, 11}is given to the algorithm, the local covering given by the algorithm is {{(Rain, Low), (Fertilizers, Normal)}, {(Temperature, High), (Rain, High), (Fertilizers, Low)}}. Based on the local covering the following certain rules are generated describing the 'Normal' production. The rules are presented in LERS format.

2, 2, 2

(Rain, Low) & (Fertilizers, Normal) (Production, normal)

3, 1, 1

(Temperature, High) & (Rain, High) & (Fertilizers, Low) (Production, normal)

If we select the set X as {8, 9, 10, 15, 16} (the lower approximation of the concept {2, 5, 8, 9, 10, 13, 15, 16}, that is for [(production = low)]), the local covering generated by the algorithm is {{(Temperature, low), (Rain, high)}, {(Temperature, Normal), (Rain, Low)}, {(Temperature, High), (Rain, Normal)}, {(Temperature, Normal), (Rain, High), (Fertilizers, Low)}}. Hence the certain rules describing 'Low' production are:

2, 2, 2

(Temperature, Low) & (Rain, High) (Production, Low)

2, 1, 1

(Temperature, Normal) & (Rain, Low) (Production, Low)

2, 1, 1

(Temperature, High) & (Rain, Normal) (Production, Low)

3, 1, 1

(Temperature, Normal) & (Rain, High) & (Fertilizers, Low) (Production, Low)

Certain rules describing the 'High' production (i.e., when X = {4, 12, 17}, the lower approximation of the concept {4, 12, 17}) are:

2, 1, 1

(Temperature, Low) & (Rain, Normal) (Production, High)

2, 1, 1

(Temperature, Normal) & (Rain, Normal) (Production, High)

2, 1, 1

(Rain, High) & (Fertilizers, Normal) (Production, High)

Possible rules describing the 'Normal' production (i.e., when X = {1, 2, 3, 5, 6, 7, 11, 13, 14}, the upper approximation of the concept {1, 3, 6, 7, 11, 14}) are:

2, 1, 2

(Temperature, High) & (Fertilizer, High) (Production, Normal)

2, 2, 3

(Temperature, High) & (Rain, Low) (Production, Normal)

2, 1, 2

(Temperature, Normal) & (Fertilizers, High) (Production, Normal)

2, 1, 1

(Temperature, Low) & (Rain, Low) (Production, Normal)

3, 1, 1

(Temperature, High) & (Rain, High) & (Fertilizers, Low) (Production, Normal)

Possible rules describing the 'Low' production (i.e., when X = {1, 2, 5, 6, 8, 9, 10, 13, 14, 15, 16}, the upper approximation of the concept {2, 5, 8, 9, 10, 13, 15, 16}) are:

2, 2, 3

(Temperature, Normal) &(Rain, High) (Production, Low)

2, 2, 3

(Rain, Low) & (Fertilizers, Low) (Production, Low)

1, 3, 5

(Fertilizers, high) (Production, Low)

2, 1, 1

(Temperature, High) & (Rain, Normal) (Production, Low)

2, 2, 2(Temperature, Low) & (Rain, High) (Production, Low)

2. Conclusion

Rough Set Theory provides sound mathematical tools for mining association rules even from an inconsistent information system. In this paper, we present a modified version of LEM2 algorithm, which has been proved reliable to draw decision rules from a decision table in an efficient manner. To prove the efficiency of the proposed method, we applied the algorithm on a small data set related to farming and rules are generated. To form the decision

table used for rule mining, in this work the actual attribute values are mapped on to some intervals and all these intervals are crisp in nature. In order to overcome this drawback, we are focusing on designing a novel algorithm by incorporating soft computing technique such as fuzzy logic, which may lead to better results.

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Automatic License Plate Recognition using Feed-Forward Neural Networks

Mohammed Sidheeque

Abstract

Automatic License Plate Recognition (ALPR) is a form of automatic vehicle identification by using advanced image processing technology like computer vision and machine learning. In this paper, a smart and simple algorithm using **Feed-Forward Neural Network** is proposed for all kinds of vehicle's license plate recognition system. This work is focused on improving the character recognition capability of feed-forward back-propagation neural network by using one, two and three hidden layers and the modified additional momentum term.

182 English letters were collected for this work and the equivalent binary matrix form of these characters was applied to the neural network as training patterns. While the network was getting trained, the connection weights were modified at each epoch of learning.

Introduction

Intelligent Transportation System has become an integral part of the Transportation Industry these days and it consists of Automatic License Plate Recognition (ALPR) System. In ALPR System , a special set of hardware and software components that works on an input image signal containing one or more vehicles (like static pictures or video sequences), and recognizes valid license plate characters from the vehicle(s) contained in the input image signal. A hardware part of the ALPR system typically consists of a camera, image processor, camera trigger, communication and storage unit. From the enhanced image, license plate region is recognized and extracted. Then character fragmentation/segmentation is performed on extracted LicensePlate and these segmented characters are recognized using Neural Network in this paper.

Structural constraints

To improve the recognition process, we can assume structural constraints in the Table A. such as edge detection method or pixel matrix.

The syntactical analysis can be combined by other methods. The simplest way is to use one global neural network that returns several candidates and then select the best candidate that meets the structural constraints(figure A).More sophisticated solution is to use the structural constraints for adaptive selection of local neural networks. (figure B) .

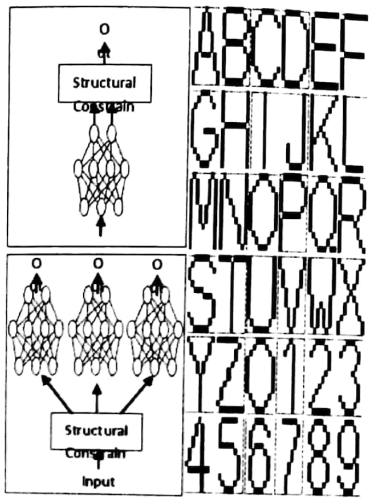

Figure : (A, B) Structural constraints can be applied before and after the recognition by the neural network. **(c)** Example of the skeletonized alphabe

	Line ends	Loops	Junctions
	BDO08	CEFGHIJKLMN STUVWXYZ123 457	CDGIJLMNO SUVWZ012 357
	PQ69	ADOPQR09	EFKPQTXY4 69
	ACGIJLMNR SUVWZ123 457	B8	ABHR8
	EFTY		

Table-A Structural constraints

Feed Forward Neural Network

A feed forward neural network is an artificial neural network where connections between the units do *not* form a directed cycle. This is different from recurrent neural networks. The feed forward neural network was the first and arguably simplest type of artificial neural network devised. In this network, the information moves in only one direction, forward, from the input nodes, through the hidden nodes (if any) and to the output nodes. There are no cycles or loops in the network[1].

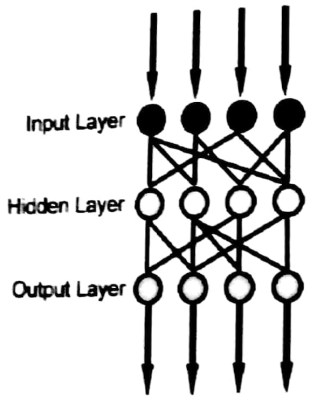

Figure D : In a feed forward network information always moves one direction; it never goes backwards

The operation of this network can be divided into two phases:

1. The learning phase
2. The classification phase

Learning Phase

During the learning phase the weights in the FFNet will be modified. All weights are modified in such a way that when a pattern is presented, the

output unit with the correct category, hopefully, will have the largest output value.How does learning take place?The FFNet uses a *supervised* learning algorithm: besides the input pattern, the neural net also needs to know to what category the pattern belongs. Learning proceeds as follows: a pattern is presented at the inputs. The pattern will be transformed in its passage through the layers of the network until it reaches the output layer. The units in the output layer all belong to a different category. The outputs of the network as they are now are compared with the outputs as they ideally would have been if this pattern were correctly classified: in the latter case the unit with the correct category would have had the largest output value and the output values of the other output units would have been very small. On the basis of this comparison all the connection weights are modified a little bit to guarantee that, the next time this same pattern is presented at the inputs, the value of the output unit that corresponds with the correct category is a little bit higher than it is now and that, at the same time, the output values of all the other incorrect outputs are a little bit lower than they are now. (The differences between the actual outputs and the idealized outputs are propagated back from the top layer to lower layers to be used at these layers to modify connection weights. This is why the term *backpropagation network* is also often used to describe this type of neural network[2].

Classification Phase

In the classification phase the weights of the network are fixed.A pattern, presented at the inputs, will be transformed from layer to layer until it reaches the output layer. Now classification can occur by selecting the category associated with the output unit that has the largest output value. For classification we only need to select an FFNet and a Pattern together and choose To Categories.In contrast to the learning phase classification is very fast.

Improving The Character Recognition Efficiency of Feed Forward BP Neural Network

One of the most important types of feed forward neural network is the Back Propagation Neural Network (BPNN) [12]. It is a multi-layer feed forward network using gradient-descent based delta-learning rule, commonly known as back propagation (of errors) rule. Back Propagation provides a

computationally efficient method for changing the weights in a feed forward network, with differentiable activation function units, to learn a training set of input-output examples. Being a Gradient Descent Method, it minimizes the total squared error of the output computed by the net.

The network is trained by supervised learning method. The aim is to train the network to achieve a balance between the ability to respond correctly to the input characters that are used for training and the ability to provide good responses to the input that were similar. The total squared error of the output computed by network is minimized by a gradient descent method known as Back Propagation or Generalized Delta Learning Rule [4].

OCR System Design

The various steps involved in the recognition of a handwritten character are illustrated in the form of flow chart in **Fig. E.**

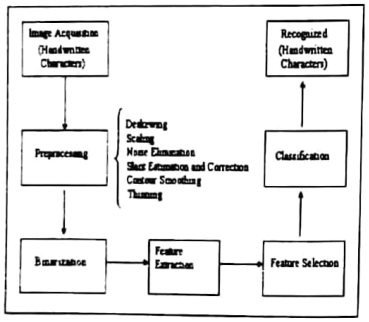

Figure E. Typical Off-Line Character Recognition System

Pre-Processing

Pre-processing is done to remove the variability that was present in off-line handwritten characters. The pre-processing techniques that have been employed in an attempt to increase the performance of the recognition process are as follows: *Deskewing* is used to make the base line of the handwritten word in a horizontal direction by rotating the word in a suitable direction by a suitable angle. Some examples of techniques for correcting slope are described by Brown and Ganapathy [6].

Contour Smoothing is a technique to remove contour noise which is introduced in the form of bumps and holes due to the process of slant correction.

Thinning is a process in which the skeleton of the character image is used to normalize the stroke width.

Binarization

All hand printed characters were scanned into grayscale images. Each character image was traced vertically after converting the grayscale image into binary matrix [3, 5]. The threshold parameter along with the grayscale image was made an input to the binarization program designed in MATLAB. The output was a binary matrix which represented the image shown in Fig. G(c).Every character was first converted into a binary matrix and then resized to 8 X 6 matrixes as shown in Fig. G(c) and reshaped to a binary matrix of size 48 X 1 which is made as an input to the neural network for learning and testing. Binary matrix representation of character 'A' can be defined as in Fig. G(c). The resized characters were clubbed together in a matrix of size 48 X 26 to form a sample . In the sample, each column corresponds to an English alphabet which was resized into 48 X 1 input vector.

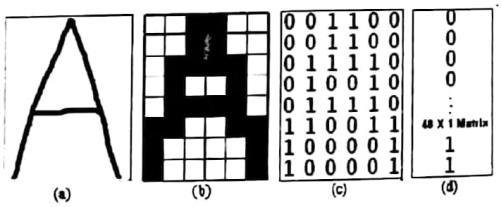

Figure F (a) Grayscale image of character 'A' (b) Binary representation of character 'A'; © Binary matrix representation and (d) Reshaped sample of character 'A'.

Feature Extraction And Selection

The derived information can be general features, which were evaluated to ease further processing.

Classification

Classification is the final stage of our OCR system design. This is the stage where an automated system declares that the inputted character belongs to a particular category. The classifier here we have used is a feed forward back propagation neural network.

Neural Network

To accomplish the task of character classification and input-output mapping, the multi-layer feed forward artificial neural network was considered with nonlinear differentiable function 'tansig' in all processing units of output and hidden layers. The neurons in the input layer have linear activation function. The number of output units corresponds to the number of distinct classes in the pattern classification. A method has been developed, so that network can be trained to capture the mapping implicitly in the set of input output pattern pair collected during an experiment and simultaneously expected to modal the unknown system to function from which the predictions can be made for the new or untrained set of data [5, 12].

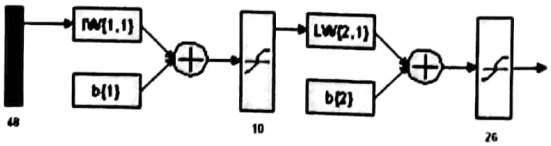

Figure G. Feed forward neural network with one hidden layer.

The network has 48 input neurons that are equivalent to the input character's size as we have resized every character into a binary matrix of size 8 X 6. The number of neurons in the output layer was 26 because there are 26 English alphabets. The number of hidden neurons is directly proportional to the system resources. The bigger the number more the resources are required. The number of neurons in a hidden layer was kept 10 for optimal results.

The output of the network can be determined as

Thus the weight updates for output unit can be represented as;

$W(t+1) = W(t) + DW(t) + DW(t-1)\ ik\ ik\ ik\ ik\ h\ a$

where

$W(t)\ ik$ is the state of weight matrix at iteration t

$W(t+1)\ ik$ is the state of weight matrix at next iteration

$W(t-1)\ ik$ is the state of weight matrix at previous iteration.

$W(t)\ i\ k$ D is current change/ modification in weight matrix and a is standard momentum variable to accelerate learning process. This variable depends on the learning rate of the network. As the network yields the set learning rate the momentum variable tends to accelerate the process.

Conclusion and Future Scope

The proposed method for the handwritten character recognition using the descent gradient approach and modified momentum term yielded the remarkable enhancement in the performance. This paper has introduced an additional momentum term in the weight modification process. This additional momentum term accelerates the process of convergence and the network shows better performance.

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NOTES

Coverage and Capacity Improvements in Mobile Communication

Sam Kollannore U.

Abstract

As the demand for wireless service increases, the number of channels assigned to a cell eventually becomes insufficient to support the required number of users. At this point, cellular design techniques are needed to provide more channels per unit coverage area. Techniques such as cell splitting, sectoring, and coverage zone approaches are used in practice to expand the capacity of cellular systems. These three popular capacity improvement techniques is explained in this paper. Along with these techniques, other methods to improve the performance of mobile communication system are also discussed. The effect of co-channel interference on the system capacity is analysed.

Keywords: Wireless, Cellular systems, Cell splitting, Sectoring, Co-channel interference

Introduction

Mobile communication deals with the communication between two moving units called Mobile Stations/one mobile unit and one stationary unit. The service provider will locate and track a caller and assign a channel to the call. It also transfers the channel from one base station (BS) to another as the caller moves out of range. Cells are optimized to prevent interference of adjacent cells. Hence the transmission power has been kept low. Mobile Switching Centre (MSC) coordinates communication between all the base stations and the central telephone office. MSCs are responsible for connecting calls, recording call information and billing. Each base station is allocated a group of radio channels to be used within a small geographic area called cell. Base stations in adjacent cells are assigned channel groups which contain completely different channels than neighboring cells. Base antennas are designed to cover only a desired area. By limiting the coverage area, the same group of frequencies may be used at another place by keeping interference within the limits [1]. The design process of selecting and allocating channel groups for all the cellular base station within a system is called frequency reuse or frequency planning. The hexagon shape of cell is just a model. In practical

the shapes will be very different. The actual radio coverage of the cell is called footprint. When using hexagons to model coverage areas, base station transmitters are depicted as either being in the center of the cell (center excited cell) or on three of the six cell vertices (edge excited cells). For center excited cells, omni-directional antennas are needed and for edge excited cells, sectored directional antennas.

Channel Capacity And Frequency Reuse Principle

Consider a cellular system which has a total of S duplex channels. If each is allocated a group of k channels (k<S) and if S channels are divided among N cells into unique and disjoint channel, the total number of available radio channels can be expressed as

$$S = kN. \quad \text{.....(1)}$$

The N cells which collectively use the complete set of available frequencies is called a cluster and if the cluster is repeated M times, the capacity becomes

$$C = MkN = MS \quad \text{.....(2)}$$

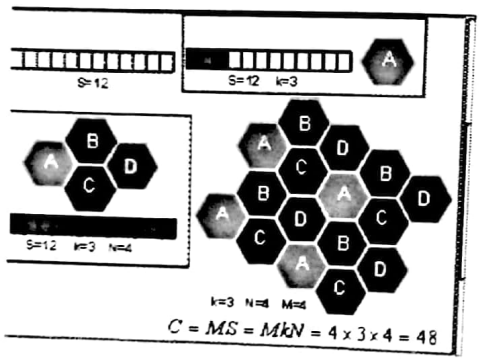


Figure 1. Frequency Reuse principle

Factor N is called cluster size and is typically 4, 7, 12.[1]. The frequency reuse factor of a cellular system is 1/N. The equation to use is

$$N = i^2 + ij + j^2 \quad \text{.....(3)}$$

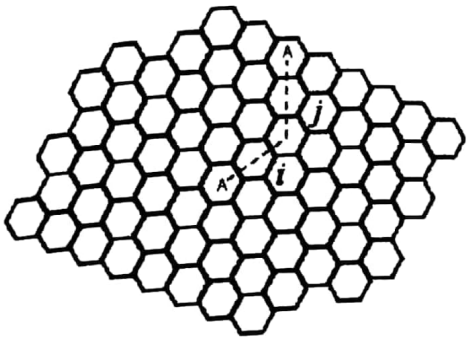


Figure 2. Frequency Reuse Factor calculation

Handoff

When a user moves from one cell to the other, to keep the communication between the user pair, the user channel has to be shifted from one BS to the other without interrupting the call, i.e., when a MS moves into another cell, while the conversation is still in progress, the MSC automatically transfers the call to a new FDD channel without disturbing the conversation. This process is called as handoff. Processing of handoff is an important task in any cellular system. Handoffs must be performed successfully and be imperceptible to the users.

Co-Channel Interference and System Capacity

The cells which are using the same set of frequencies are called co-channel cells and the interference between signals from these cells is called co-channel interference. To reduce co-channel interference, co-channel cells must be physically separated by a minimum distance to provide sufficient isolation due to propagation [1,2].

Co-channel reuse ratio for a hexagonal geometry

Where R – radius of the cell; D – distance between the centres of the nearest co-channel cells [1].

$$Q = \frac{D}{R} = \sqrt{3N} \quad \text{.....(4)}$$

Table 1. Co-channel Reuse ratio for some values of N

	Cluster Size (N)	Co-channel Reuse ratio (Q)
I = 1, j=1	3	3
I = 1, j=2	7	4.58
I = 2, j=2	12	6
I = 1, j=3	13	6.24

Small value of Q provides larger capacity since the cluster size N is small. Large value of Q improves the transmission quality, due to a smaller level of co-channel interference. A trade-off must be made between these two objectives in actual cellular design.

Let i_0 be the number of co-channel interfering cells. Then the Signal-to-interference ratio (S/I or SIR) for a mobile receiver which monitors a forward channel can be expressed as.

$$\frac{S}{I} = \frac{S}{\sum_{i=1}^{i_0} I_i} \quad \text{.....(5)}$$

Where S - desired signal power from the desired base station.

Ii - interference power caused by the i th interfering co-channel cell base station [1,2].

Performance Improvements

As the number of people using the mobile is increasing day by day and the cells are getting congested with users, eventually the channels that are available in the cell are insufficient to support the users. The techniques adopted to improve the performance of mobile communication system in terms of coverage and capacities are:

1. Cell splitting
2. Sectoring
3. Coverage zone approaches
4. More efficient modulation formats and coding
5. Better source coding
6. Discontinuous transmission
7. Multiple antennas

1. Cell splitting

1. Cell splitting

Cell splitting involves subdividing a congested cell into smaller cells called microcells, each with its own base station and a corresponding reduction in antenna height. Increased number of cells would increase the number of clusters over the coverage region, which in turn would increase the number of channels, and hence capacity, in the coverage area. Cell splitting allows a system to grow by replacing large cells with smaller cells, while not upsetting the channel allocation scheme required to maintain the minimum co-channel reuse ratio Q.

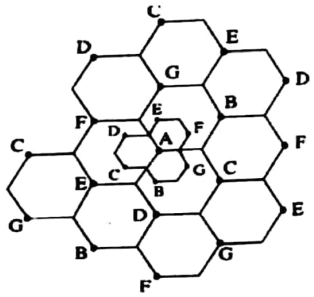


Figure 3. Cell splitting – microcells

For the new cells to be smaller in size (say half the radius) the transmit power must be reduced.

$$P_r[\textit{at old cell boundary}] \propto P_{t1} R^{-n} \quad \text{.....(6)}$$

$$P_r[\textit{at new cell boundary}] \propto P_{t2} (R/2)^{-n} \quad \text{.....(7)}$$

Where P_{t1} and P_{t2} are the transmit powers of the larger and smaller cell base stations respectively and 'n' is the path loss exponent . Taking n = 4 and received powers equal to each other.

$$P_{t2} = \frac{P_{t1}}{16} \quad \text{.....(8)}$$

The transmit power must be reduced by 12dB in order to fill in the original coverage area with microcells, while maintaining the S/I requirement [1].

Practical issues

i. Practically difficult to find new cell sites on ground.
ii. Handoff issues arise for high and low traffic in new cells.
iii. New and old cell power variations would give rise to interference
iv. Antenna downtilting is done to make the coverage area small.

Sectoring

Another way to increase capacity is to keep the cell radius unchanged and seek new methods to decrease the D/R ratio. Sectoring increases the SIR so that the cluster size may be reduced. First the SIR is improved by using the directional antennas, then capacity improvement is achieved by reducing the number of cells in the cluster, thus increasing the frequency reuse. The co-channel interference in a cellular system may be decreased by replacing a single omnidirectional antenna at the base station by several directional antennas, each radiating within a specified sector [1, 2]. The technique for decreasing co-channel interference and thus increasing system performance by using directional antennas is called sectoring. The factor by which the co-channel interference is reduced depends on the amount of sectoring used [2]. A cell is normally partitioned into three 120° sectoring sectors or six 60° sectors as shown

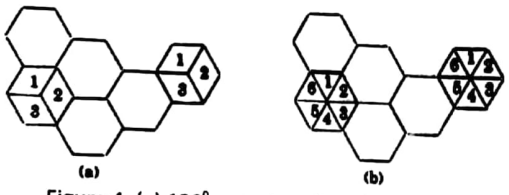


Figure 4. (a) 120° sectoring (b) 60° sectoring

Assuming seven-cell reuse, for the case of 120 degrees sectors, the number of interferers in the first tier is reduced from six to two

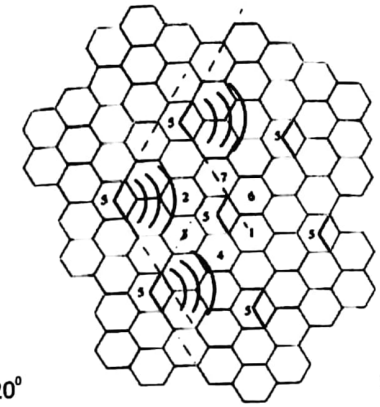
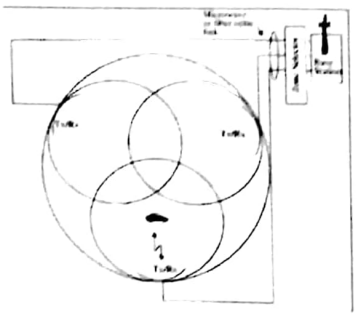


Figure 5. 120° :l interference

The figure 5 illustrates how 120° sectoring reduces interference from co-channel cells. Out of the 6 co-channel cells in the first tier, only two of them interfere with the centre cell. If omnidirectional antennas were used at each base station, all six co-channel cells would interfere with the centre cell. The new SIR may come out to be 24dB in this case which is much higher than the minimum required 17dB. This allows the engineer to reduce the cluster size N, in order to improve the frequency reuse. Further improvement in SIR is achieved by antenna down tilting by which a notch appears at the nearest co-channel cell [1]. The penalty of sectoring is that the antenna number increases drastically and there is a decrease in trunking efficiency.

Coverage zone approaches

Sectoring requires increased number of handoffs which subsequently increases the load on the switching and control link elements of the mobile system. Here the coverage area is divided into zones and the zone sites are connected to a single base station and share the same radio equipment. The zones are connected by coaxial cable, fibre optic cable or microwave link to the base station. Multiple zones and a single base station make up a cell [1].



The subscriber will be served by the zone with the strongest signal. Here the antennas are placed at the outer edges of the cell. Any channel can be assigned to any zone by the base station. The main advantage is that as the mobile travels the same channel is assigned during the entire conversation without the need of handoff. Co-channel interference is reduced since a large central base station is replaced by several low powered transmitters on the edges of the cell. Decreased co-channel interference improves the signal quality and also leads to increased capacity.

More efficient modulation formats and coding

Modulation formats require less bandwidth (higher order modulation) and/or are more resistant to interference. The former allows an increase in data rate for each user (or an increase in the number of users while keeping the data rates per user constant). The possible benefits of higher order modulation are limited, they are more sensitive to noise and interference, so that the reuse distance might have to be increased. The use of interference limited modulation allows a reduction in the reuse distance. The introduction of turbo-codes and low density parity check codes is another way of achieving better immunity to interference and thus increase system capacity [3,4].

Better source coding

Depending on the required speech quality, current speech coders need data rates between 32kbps and 4kbps. Better models for the properties of speech allow data rate to be decreased without decreasing the quality. Compression of data files also allows more users to be served [3,5].

Discontinuous transmission

DTX exploits the fact that during a phone conversation, each user talks 50 percent of the time. A TDMA system can set up more calls than there are available time slots. During the call, actively talking users at a moment are multiplexed onto the available time slots [2].

Multiple antennas

Diversity increases the quality of the received signal, which can be exploited to increase capacity. MIMO system which uses multiple antennas increases the capacity. Space division multiple access improves capacity [2].

Summary

The capacity of a cellular system is a function of many variables. The S/I in a wireless propagation channel, along with the specific performance of the air interface in an interference environment, limits the frequency reuse factor of a system, which limits the number of channels within the coverage area. Cell splitting, sectoring, zone microcell technique and the other technical modifications are all shown to improve the capacity by increasing S/I. The main objective in all these methods is to increase the number of users within the system without degrading the quality of service. The radio propagation characteristics influence the effectiveness of all of these methods in an actual system.

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ذ ا خطبهم دون ت هيد و نهيها دون خ تمة. لا تكون لخطبهم بداو معنة كم
. لا تكون نه لة(ا
ت ث في لخ ب و ا و ايا الحـ م و ا مـ ال الت تحو بجو نب حيا هم الف دية و ا ج
ماعية وقد ساع هم ذلك على التـ ميح دون التـ ريح في لتـ بير عن فكـ رهم وحر
وا علي وضو الحـ ة من لال ما رسـ ونهم من كم ب
غ لـ ا ما ات القـ ايا والـ طب قصير ة في با ات موجـ ة و أ بونا تأت الجـ ل مسج
عة و أ بونا أخر مرسـ (ج

مميزات النثر الجاهلي

يمتاز النثر الجاهلية بجريانه مع الطبع فليس فيه
يلف ول زخرف ول مبالغة يسير مع أخلق البدوي و بيئته. فهو
فيقوي ّ الالفظ متين الت ركي بعيور لجملة موجز الس ل ويق ر
لد قا رقليل السجع ا ر وك ان الع ربي جتمع ونمج الس متعد دة
موه موس م الحفلظ مورق و اتق بيولت العربية وكا ن و افتخ رونبو
بيان م ا هرفي الملوك ان ا لعربي دربون لهن ق مع ليه ا مهض غره
ب ه مجيسع مل ون ال ش ال وا ل حكمي ا لملوك ان و اي حبون من الخط
بكري و يكون يحن ا ف ارتج ي ر الصوتسلي م ل من طي. وشل وخ ط ا
وغ بد مهش ا عة ال ي اد ي و ع م ربن كلثوم الت علبيو ا لح ارثبن ال
.ع مر بن م ع دي كرب ا ل ز ب ي دي

*****

الخطابة

الخطابة كالشعر لحمتها الخيال و سدّاها(دم) وهي مظ ر من ظاهر الـ رّية
ج و كانوا يدربو فتـ انهم عليها نذ الحـ اثة و . سبيل من سبيل لتـ ثير. البلاغة
وحـ صو نه لى ل كون لهَ قولة طـ ب يَ ازر ه شـ اعو رفع ذكـ ر اورها ا
بمع ا لقـ ت قـ و احر وقـ د ا ه إليهما د ع الأمم ا لـ دية من الفخر حدبها
جارها و القـ ح مدح إلى لاقـ ا ىلدى عنا قا لحج وطلاة ا لديهة كل لعر
.فيها لقدم ملابة لوالقدح لما لي
والإسـ عانة على العبرة ا شارة إتخـ ذ المحا ر بأ ديه. و ن عا اتهم ب ا الـ
قوف على مكا من الأر أو لقيام لى هر دبة و رفـ ا يد ووضـ ها. فكا راد

. والإ تعانة على الـ بارة الإشا ة و تخاذ الـ حاضر بيديه. فع اليد ووضعها
ومن اد انهم س ن ساعد ا يادي وعمـ و بن كـ ثوم لتغلب وأكـ م بن صيـ يَ
لتميمي حا ث ن عبا البكر وقيس بن زهير لعبسيّ عمرو بن معد يـ رب الزبـ
دي وغـ رهـ . وكـ نوا يحـ ون مـ ا خطيب ان يكون حـ ن الـ ّظ جهـ ر الـ وت سليم
.المنطق

قس بن ساعدة

حياته

ذ وة عمر طويلا. م600 ف عكاظ فـ ثنى عليـ ويـ وي أ ّه ال فيـ رحم الله قسّا
قبّي لأر ج يوم القيامة ل يـ ف أ ّ ةوحد و كي يد ع ليـ ة يصـ مـ ن حق لى ن
ب□كرمه، و لـ نه ضف عق لـ ذ وعش لى ا لفـ فـ عبد ا ويـ عا لـ سل تى و
عـ ّا ظ وحـ ة نة معه الـ ني . كا ن ن اويـ نو إ له اكـ و امـ وع لـ د ذ و
ف نن وخط ا عو و بـ حـ يمـ هـ ا سال سـ ّه وص سن عـ قـ و ن بى يـ قال ف يحـ

اسلوبه

كان أسلوبه مطبوعا مسجوعا شديد الرّوعة متخيّر اللفظ قصير الفواصل يعمد فيه إلى ضرب الأمثال واستنتاج العبر من مصارع الطاعات وظواهر الكون وله شعر يجمع .إلى الجزالة رقة التعبير و قوة التأثير

الزبيدي يكرب معد بن عمرو

حياته

م643 ار ذَ عد ا لاحه ثمّ رجع لى ا حقّ و جاهد ي سبـ ل الله حقّ جـ اده ث ّ شهـ
في لقادسـ ة و عمـ ه ع ى ما قيل عشر سـ ين ماذ ثمّ تـ في في أ اخر خلافة عمـ
بن خطـ ب .لا قبـ لى الـ ين بـ خلاص وصدق و رتع في ا دماء و شـ هـ في الـ
ي هو و ا صهباء. ولـ ن قلب شدبا في الـ ا لية لجهـ ء . لـ ي منصـ فه من تبوك نةَ
ةَ سعة مـ ا لجر ثة اسم هو ومه صل) قي انـ بـ . ذتهي سـ به إ لى قلـ ل ويكـ ذ
.ابـ ا و ر . عو بـ معـ يـ كو الـ ز بدي لـ س مـ ذ وخـ طيـ ا لعب وطـ ال قلسيـ

صفته ومنزلته

يعد في ا طبقة الثا ية مـ الشعـ اء و ي الأو ى من ا خطباء يغلـ ف شعره لتحدث ع ـ نـ سه بالشـ اع. كان قـ يّ بدين و ا سيد مـ اعا بطلا شجـ عا وخطيـ .ا شاعرا

كان مرو اعر مطو ا وا تهر معلقته طة حماسية فخر ة وق نظ ها ذ ب
لأمه و ق يل ه من مرو ب هند صاحب الحيرة. هو د ن العشرين. قد عش
طويلا و كان و اته في أواخر لقر السادس للميلاد" ر البسو "التي دارت بين
بكر تغلب.

النابغة الذبياني

فرجع يطلب ال قاعة فإذ له ف المكان الأول بها في حلته الحسنة حتى م
ت. و ز بعر رو بن الحا س ملك ال ساسنة فمدحه فما زال مقيما ند بني غسان ف
منزلة ادة حتى لم ا النع ا مرو . ثم وقعت العدوة بينهما هرب الشا ر إلى
بن غسا . ثمّ ظهر بشعر و هر ب الشعرا و نبغ من قبه الشعر. شبّ وه بالماء
لنابغ وف على انعمن بن المنذر صا ب احير و مد ه و جمع من عطايا ثروة
طائلة حتى يأك ويشرب في آنية الذهب ولفضة إسمه ز اد بن ها ية و لقبه الن
بغة نه لم يق الشعر حتى رشد.

شعره

وكأ شعره كلام ليس فيه لتكلف وقد أجا في و ف لليل اخلف وله منزلة ك
صرى عد شعر ء عصره فإ ا جاء سوق كاظ ضرب ال قبة جاء الشعراء ينش
اون أشعارا و ك يضي ب يه. وو ف ال ثة امقد من وع الذ اغة يما زق
حبيبه بحسن جزلة ال ب وحسن الكلا و غره

النثر الجاهلي

وعدم قيّد م وضر رة إسعماله وهو نوعا مسجّع مرسل النثر
ومن النثر ا مثا والحكم الو ايا و الخ.سبق أن اع الكلام في لوجود لقرب تناوله
ن ب والو ف الأقاصص. قد إختلفت هذه نات المنطق لأ بات طبيعية ف الترق
لج ق والتفخم ولإبدال الها ل ها عدو ا حسب أ ووها وقد كان العر يظقو
به مع ربما غيره لحن لق ته لد يقوفي ا لوو ق الإخلا بالأ.

وأمّا ما يسمّى بالقصص فهي حكايات رويت بمعناها ولم تحفظ بلفظها
ة و من خلال الوصايا والخطب والأمثال يمكننا أن نسجل الخصائص التالية لنثر
الجاهلي.

ثمّ يعرضه على خصة ا شعراء ي ار ه فلا يشد الناس إلا بعد السنة وجمعه ر
عثير من العـ الم ف قليل من الألفاظ و ه قصائد ت رف با حوليا ان ينظم ا و ار
. أشعر و يه به في ربعة. عي احبه قو ون أنه احسنهم شعرا لهجا

طرفة بن العبد

حوكان شعرا وي لشد صيّة ر لتذكير ص يحا في قو ه وق عده. متز شعره
ارة لعاطفة " القسم ا غزلي، القسم ا وصف ، وا قسم الإخباري"و ه ديوا شعر ول
حـ نه إشتد ر ف الأكث بمعلقة وهي ثلاثة أقسا , عدّ رف من فحول الشعراء كا
يذ لسا بقتل فالملك د الهجو ي مـ عمره هجا لعمرو بن هند اجال
بة. ات أ به وو طفل فكفله أعامه وهولوا تبيد ذكانه عجب ابن فسه
ف يضع نفسه لأحد. وكان يصب لمعاتقة اعلى الد هوا لب. هو بو عمر وطرفة
. العبد نبغ في الشعر نحد اثة سنّه حد تصر في ا لمدمة

لبيد بن ربيعة العامري

ر سة قد درك لإسلام وأسلم وحسن سلامه و حفظ القرآن و ه ر ا شعر نزل
لكوفة أيام عمر ب لخطاب فقا ا ها ت م ا 15هـ وفي ق يروكان في شـ
فيا لشعراء يقل به عز
كانت شاعرية ظاهرة في عينه منذ صغره توسم النابغة فيه الشاعرية وأكثر
شعره في الجاهلية لأنّ الخلفاء شغلوا الناس عن الشعر بالقرآن يقال إنه لم يقل في
الإسلام إلاّ بيتا واحدا
الحمد لله إذ لم يأتني أجلي "
" حتى لبست من الإسلام سربالا
حـ تصور معلقته حيا البا ية و أخلا البد ي. كا لبيد مـ أجو لعرب و نبلاء
نا وظهر ر أخلاقه لها في عره و ا ت شعره صدلة ب لحكم وا لوعظة ال
. وقد جد تصو ع ا قل ال مـ رم و امحزون

عمرو بن كلثوم

كان عمر و شاع ا مطبو ا واشتهر بمعلقة ه معلقة حماسية فخرية، وقد ظم
ا غضبا مّه و بيلة من ع رو ب هند صاحب الحير . وهو دون لعشرين وقد ع

: عشر قصائد وهذه المعلقات هي
معـ لـ ة إمر القـ س(ا
معلقة طرفة بن العبد (ب
معـ لـ ة زهير بن بي سلمى (ج
معـ لـ ة لبيـ بن بيـ ة(د
معـ لـ ة عمر بن لـ ثـ م(ه
معـ لـ ة عنـ ة(و
معـ لـ ة الحرث بن لز البـ ري(ز
معـ قة الأ شى(ح
معـ لـ ة النابغة الذ ياني(ط
ي) معلقة عبيد بن الأبرص

القيس بن حجر إمرئ

و عـ ش إمر . وكان أبوه ملـ بنـ أسد. م 500 لد في حو نة ,
القيس في اللهو والترف والمجون و نظم الشعر الملـ الضـ يل ندح بن حـ ر ا كندي
فطرده أبوه فخرج في جماعة من المجّان يقضون الوقت في اللهو والصيد و راحوا
.ينتقلون من ماء إلى ماء

م540 بحث ليه قـ صر حلة مسمو ة فتقـ ح جسمه وما نحو نة
فلم يساعد حتى بلغ قيـ ر الـ وم فاستـ لره فأ لره و أ رم وفـ دته وجهّ ه بـ
يش والـ ورخـ ن يـ عمون أنه لـ ا ذهب با جنود و ي به أ د أعدا ه. فلما علم
بقتله غضب غضبا شـ يدا رجع وتجـ ل برهة من لد ر يـ تعين الـ بائل لقتا بني
.أسد. كان إمـ ئ القـ س عـ مقتـ أبـ ه غـ نبا
.يونـ تنيوس: اسم قيصر الروم

شعره

وكا يقضـ السا ات و لأيام لى فرسه مـ ذ أجا و ف الخ
ل ونر في ميع صائد أبيـ يصف بها فر ه وكن شعره صـ رة كـ ملة لـ

وكان يقـ ي الساعات والأيا على فـ سه و ن ثمّ أجاد وصف الـ يل نرى في جمـ
ة قصائده أبيا ا يـ صف بها فـ ره وكـ ا ن شعر صور كـ الة ليا ته وهو يجد ا الدرا
ع ة رلس حول العراء لجـ لي . كان ول مـ بـ ك على لأطلال الديار واتـ نجـ
معـ اني لجديدة و كـ شف صو اجديـ

معلقته". عـ زة"لإمـ ئ ا قيس د وان شعر أشهره لمـ لقة نظمها في وصـ
: حادثة جرت مـ حبـ بته وابنـ عمه

" قفا نبك من ذكرى حبيب ومنزلي
" بسقط اللوى بين الدخولي فحوملي

: وبين ما كان في لهوه جاءه نبأ قتل والده فقال كلمته المشهورة
ضيعني أبي صغيرا وحملني دمه كبيرا – لا صحو اليوم ولا سكر غدا – اليوم خمر و غدا أمر

زهير بن أبي سلمى

نشأته و حياته
ولد و ج مـ من أ س بن حجـ فيـ فلـ مع إخوته لـ ه شامة ن ا غدير الذي
اشتهر كثرة مـ له و ود شعـ ه شر ه في قـ مه فكان لـ لك أثـ ه الكـ ير على شا
رية هير و على ذ ك يكـ ن زهير مزنـ الأصل و طفلة النـ أة و قد عاش بينهم في
أثناء لحرو لتي كان بين بس و بيان قد مـ ح هرم بن سنان و ا حا ث بـ
عوف لذ ن سعيـ لإطفاء الحر . هـ زهـ ر بـ ربيعة و ر يعة هذا هو أبو لـ ى من قـ
.يلـ مز نة ولـ يعمـ والد طويلا
ومن أخباره أيضا أنه تزوّج إمرأتين إحداهما أمّ عوفي التي ذكرها في شعره وهي
.أمّ ولديه كعب و جبير

شعره

ثمّ يعرضـ ا على خا ة ا شعراء ي أربعة فلا نشد ا ناس إلّ بـ د الـ نة وأجمـ
هم لكثيـ ن الـ عالم في قليـ من لأ لـ اظ له قصا د تـ ف بـ لحو ية ا ينظمها في أر

ت صد المعاني يشيق المجال فالأفكار محدودة وكان الشعراء إصطـ وا على مثان
موزونة فيقل عندهم التجديد فالمعاني التي يطرقها طرفة في و ف الناقة مثلا جدها
عند يره وأما بكاء الأطـ والديار فهو كبير شاهد على حياتهم وتقاليدهم(د
يت الجا لي خيال م و صو ه من عالم الماديّ المحسوس ويعتمد ابرا ها إلي
التشبيهات فالمرأة تشبه عين لغزال أو ا وحد م(ه
ف ف الناقة في معلقته وا ره القيس في وصف سرعة ر ه طرفة حسية الد
يال أ التشبيه جعلتهم يدققو ا النظ و يفصلون ما يصفو بجميع أجزائه كما فعل
. و
ف و فرّ يفرّ وفي إذ فاعه صخرة يقذف بها سيل جارف م علو شاهق فحصان
إمرء القيس مملوء بالقوة الحركة. بر ز عنصر الحركة وا حيوية ف أو افهم الد
.مسية ز
ب يحمل البيت معنى لا رتبط ب ا قه أو هقه, عدد الابيات ي حد تهم و لهو
و رحلات م ن مكان لي مكان خر إنعكس لي م ضيهم قصا دهم إذ تراهم
نتقلو من معنى ا خر ثم يعودون للمعنى لأول وقد تعدد أغرا شعرهم و م
.ضوعات قصائدهم ح

المعلقات

.تعتبر المعلقات من أجود الشعر الجاهلي و من أبرعه أسلوبا و وصفا و خيالا

سبب التسمية

:إختلف المؤرخون في سبب تسمية هذه القصائد بالمعلقات حيث يروا
.كان العرب يعلقون هذه القصائد في لكعبة فسميت تبعا لذلك بالمعلقات(ا
.كان النعمان ابن المنذر قد مر بتعليق هذه القصائد و إ بتها في زانته(ب
.إ مسميت بالمعلقات تشبيها لها بالقلائد التي تعلق بالنحور(ج
كان العرب يكتبونها في قباطي من لحرير أو لجلد ثم علقها الواحدة في يمه بعيدة عن لأر حتي لا ي يها الدف على أيّ حال كان أن تسميتها تدل على مدي عنا ة العربي بها لومنزلتها في نفوسهم ويروي بعض المؤرخين أن الكعبة بعد ا الب قبل التلاقي إعجابا بها الشاعر فالمعلقات بالتعليق(د

عدد المعلقات

في ين رى آخرون أنها عشر قصائد وهذه لمعلقات هي يرى بعض مؤرخي ا

Smt. Khadeeja Beevi

الأدب العربي في الجاهلية

وكانت منزلة لشعراء عندهم عالية جدا. في مواسم الحج "ا مجنة" ا" ذى المجا "و عكاظ"و كانوا يقيمون المحافل ا دبية فيها واقهم. حيث كان لكل قبيلة شاعر وخطيب يدافع لأقل. كان لعرب في الجاهلية يهتمون لأدب ذو .

وقد بلغ الأدب الجاهلي من حيث النضج الفنيّ في الشكل والمضمون نذاك وحرصهم على تجويد هذاالأدب مدى إهتمامهم العربي بأدبهم ودرجة تدلّ على .وإتقانهم

خصائص الشعرالجاهلي

.يصوّر الشعر الجاهلي الحياة العربية تصويرا صادقا) ا
.ا طه دقوا ل ضو ع أ با الكـ فـ اللفظي: ب ا ة الألفاظ والتراكيب(ب
إل مدح،فخر هجاء) ا بتدء بالوقوف علي الأطلال وبكاء ا ديار – ذ ج القصيدة(ج
خمذ لك الـحيب فى الـنانة فى الرحلة وفى الو له الطبيعية ثمّ يتلو
(...لـ ض لأمدلي !لـ
اي الشعر الجاهلي شعر غنائي فلم يكن لديهم شعر قصصيّ – مـ ضـ عاته الذ تية(د
.كما كان لدي الشعراء الهند واليونان
.عد الإ ناب و لـ صد إلـ الـ عاني في إيـ از ويـ ر(ه
جـ ا ة الألفاظ وفخامتها في لأغراض التي تحتاج إلي جزالة كالفخر والهجاء والمدح(و.
غـ ا ة بعض الألفاظ نسبيا ولكنّها وإن كانت غريبة بالنسبة إلي عصر ا هذا ليست غريبة بالنسبة إلي الشعر الجاهلي(ز.

معاني الشعر الجاهليّ وأخيلته

مـ ا الشعر الجاهلي مستمدة من بيئته الخاصة يلتقط ا الشاعر ممّا يدور وله .ي حيوة بيئته ونظمها والقيم الإجتماعية والأخلاقية التي تدين بها(ا
مـ ا الشعر الجاهلي صادقة واضحة مطابقة للواقع المستمدة منه مقيدة بمعالم .ة حسّية فالفضائل والرذائل تساق ن خلال شخص(ب
يدل على عادته قلة التعمّق فهو يتدلل في خبايا النفس الإنسانية وينقبها الترتيب والتقليم والمنطق ممّا يعجل هي ابـ يـ وعده مستقلة(ج.

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Krashen, S.D. (1982). Principles and practice in second language acquisition. Oxford: Pergamon.

Naiman, N., Frölich, M., Stern, H.H., & Todesco, A. (1978). The good language Learner. Research in Education Series 7, The Ontario Institute for Studies in Education.

Nigh, B. (2007). Language education studies (rev. ed.). New York: TESOL Press.

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Ramirez, A.G. (1986). Language learning strategies used by adolescents studying French in New York schools, Foreign Language Annals, 19, 2, 131-141.

Jin Y. & Yang, H. (2006). The English proficiency of college and university students in China: As reflected in the CET. Language, Culture and Curriculum, 19, 1, 21-36.

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