#1569419731: *Channels with Intermittent Errors*

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	Name	ID	Flag	Affiliation	Email	Country
Authors	Arya Mazumdar	131934		University of Maryland, College Park	arya@umd.edu	USA
	Alexander Barg	131497		University of Maryland	abarg@umd.edu	USA

Presenter		presenter not specified
Registration		
Category		Eligible for ISIT Student Paper Award
Title		*Channels with Intermittent Errors*
Abstract		We study coding for binary channels in which out of any two consecutive transmitted bits at most one can be affected by errors. We consider a set of basic coding problems for such channels, providing constructions of codes and deriving estimates on the size of optimal codes. We also consider a probabilistic model of noise with nonadjacent errors, as well as a generalization to errors separated by at least s = 2,3,.... error-free channel uses.
Keywords		Non-adjacent errors; bounds on codes; list decoding; channel capacity; linear codes
Topics		Coding theory and practice; Information theory and statistics
Session		The program is not yet visible (tpc)
DOI		
Status		accepted

	Document (show)	Pages	File size	Changed	MD5	Similarity score
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Personal notes

Reviews

You are a TPC member for this conference.

2 Reviews

Review 1 (Reviewer F)

Importance	Technical Level	Novelty	Presentation	Recommendation
Very Important (4)	Extremely high technical level (5)	Extremely Novel (5)	Excellent (5)	Strongly Recommend (5)

Strengths (What are the key strengths of this paper?)

This is a veryy interesting paper dealing with coding schemes and capacity issues for channels in which errors are separated by at least a certain number of error-free channel uses.

Weaknesses (What are the major weaknesses of this paper?)

There are a few sloppy things in the presentation. The dot at the end of the last equation on page 1 should be removed. The final expression in the statement of Theorem 4 is missing.

Comments and Recommendation (Please give the reasoning for your overall recommendation and any additional comments you wish to add.)

This paper deals with a new and interesting channel model, for which results on coding and capacity are provided.

I suggest to change the title of the paper in such a way that it will reflect that it is mainly about coding for such channels. Also, I suggest to add a

concluding section, summarizing the major results and giving suggestions for further work.

Student Paper Award (This paper is eligible for the student paper award. Do you think it would rank among the top ten papers out of the 500 submitted papers in that category? If so, explain why.)

Yes! I think this is a mature paper dealing with an interesting new topic, i.e., channels with intermittent errors. Coding and capacity results are derived involving some deep mathematical analysis.

Review 2 (Reviewer C)

Importance	Technical Level	Novelty	Presentation	Recommendation
Average Importance (3)	Good technical level (4)	Very Novel (4)	Good (4)	Recommend (4)

Strengths (What are the key strengths of this paper?)

Considers channels with constraints on errors introduced --- errors separated by at least s error-free channel uses. Gives lower and upper bounds on size of codes, code constructions, capacity for these channels.

It is shown that capacity is achieved by i.u.d. inputs, and further by binary linear codes.

Weaknesses (What are the major weaknesses of this paper?)

Typos / suggestions

1. Definition 2.1: Extra parenthesis ")" after $\{0, 1\}$.
2. Line following Eq. (2) : "... increases in i for ...". Also, I get $i \leq \frac{5n + 12 - \sqrt{5n^2 - 20n + 24}}{10}$.
3. Last line of Section II.A : "... approaches 0 as $O(\theta^3)$." sounds better?
4. Last inequality in the proof of Theorem 2.5 : Extra parenthesis ")" on the left hand side (cardinality of the set).
5. Eq. (3) : The lower bound should be $- \frac{1}{L + 1}$. "-" sign instead of "+".
6. Proof of Theorem 3.2, point 2) : Better to specify : $j_1 < j_2 < \ldots < j_l$. Shouldn't $l > 3$ if $1 \leq i \leq l - 3$?
7. Use of lowercase letters to represent random variables is confusing.
8. Eq. (6) : Function $q()$ undefined.
9. Proof of Lemma 4.3 : vector $\mathbf{x}^n$ instead of x_n in the argument of function $q()$.
10. Proof of Theorem 4.4 : First equation $\mathrm{Pr}(H\mathbf{x} = H\mathbf{y})$, "=" instead of $\neq$.

A couple of ambiguous arguments.

1. In Eq. (3), isn't $\lim_{n \rightarrow \infty} \frac{\log L}{n} = 0$? If it isn't, shouldn't there be a $\lim_{n \rightarrow \infty} \frac{1}{L + 1}$ on the left hand side?

2. The proof of Theorem 3.2 is not clear. First of all, the claim of "at least $s - 1$ zeros" in point 2) is not very convincing. And why ${s + 1 \choose 2}$ possibilities? If this is the number of choices for each $j_i, 1 \leq i \leq l - 3$, why the exponent l in the final expression? Shouldn't that be $l - 3$?

Comments and Recommendation (Please give the reasoning for your overall recommendation and any additional comments you wish to add.)

Presentation and compilation of technical results is good. A list of possible extensions and open problems will be appreciated by the reader.

For TPC eyes only (Write here if you have comments you don't wish the author to see.)

May be accepted with some minor changes, especially in proof of Theorem 3.2

Student Paper Award (This paper is eligible for the student paper award. Do you think it would rank among the top ten papers out of the 500 submitted papers in that category? If so, explain why.)

Yes. Comprehensive coding and information theoretic treatment of an interesting topic.

1 Summary review by TPC member

Review 1 (Reviewer A)

TPC recommendation

Strong accept (5)

TPC Recommendation Justification (Please give a justification for your recommendation, especially if the review scores vary widely or your recommendation differs significantly from those of the reviewers.)

This is an original and technically strong contribution. The channel model is new, and the information-theoretic results are interesting and non-trivial. Both reviewers agree that this paper, following minor but
necessary revisions, should be presented at ISIT.

Discussion