

Main page
Contents
Featured content
Current events
Random article
Donate to Wikipedia
Wikipedia store

Interaction

Help About Wikipedia Community portal

Recent changes Contact page

Tools

What links here Related changes Upload file Special pages Permanent link Page information Wikidata item

Print/export

Create a book
Download as PDF
Printable version

Cite this page

Languages

Deutsch

日本語

Русский

Æ Edit links

Article Talk Read Edit View history Search Q

BCJR algorithm

From Wikipedia, the free encyclopedia

The **BCJR** algorithm is an algorithm for maximum a posteriori decoding of error correcting codes defined on trellises (principally convolutional codes). The algorithm is named after its inventors: Bahl, Cocke, Jelinek and Raviv.^[1] This algorithm is critical to modern iteratively-decoded error-correcting codes including turbo codes and low-density parity-check codes.

Contents [hide]

- 1 Steps involved
- 2 Variations
- 2.1 SBGT BCJR
 - 2.2 Log-Map BCJR
 - 2.3 Max-Log-Map BCJR
- 3 Implementations
- 4 See also
- 5 References
- 6 External links

Steps involved [edit]

Based on the trellis:

- Compute Forward probabilities \(\alpha \)
- ullet Compute Backward probabilities eta
- Compute smoothed probabilities based on other information (i.e. noise variance for AWGN, bit crossover probability for Binary symmetric channel)

Variations [edit]

SBGT BCJR [edit]

Berrou, Glavieux and Thitimajshima Simplification.^[2]

Log-Map BCJR [edit]

[3]

Max-Log-Map BCJR [edit]

Implementations [edit]

• Susa framework implements BCJR algorithm for Forward error correction codes and channel equalization in C++.

See also [edit]

- Forward-backward algorithm
- Maximum a posteriori (MAP) estimation
- Hidden Markov model

References [edit]

- 1. ^ L.Bahl, J.Cocke, F.Jelinek, and J.Raviv, "Optimal Decoding of Linear Codes for minimizing symbol error rate", IEEE Transactions on Information Theory, vol. IT-20(2), pp.284-287, March 1974.
- 2. ^ Sichun Wang and François Patenaude, "A Systematic Approach to Modified BCJR MAP Algorithms for Convolutional Codes," *EURASIP Journal on Applied Signal Processing*, vol. 2006, Article ID 95360, 15 pages, 2006. doi:10.1155/ASP/2006/95360 ₺
- 3. ^ P. Robertson, P. Hoeher and E. Villebrun, "Optimal and Sub-Optimal Maximum A Posteriori Algorithms Suitable

for Turbo Decoding", European Transactions on Telecommunications, Vol. 8, 1997.

External links [edit]

- The on-line textbook: Information Theory, Inference, and Learning Algorithms &, by David J.C. MacKay, discusses the BCJR algorithm in chapter 25.
- \bullet The implementation of BCJR algorithm in Susa signal processing framework $\ensuremath{\not \! E}$

Categories: Error detection and correction

This page was last modified on 25 June 2015, at 08:17.

Text is available under the Oreative Commons Attribution-ShareAlike License; additional terms may apply. By using this site, you agree to the Terms of Use and Privacy Policy. Wikipedia® is a registered trademark of the Wikimedia Foundation, Inc., a non-profit organization.

Privacy policy About Wikipedia Disclaimers Contact Wikipedia Developers Mobile view

