



Rodrigo Ribeiro de Oliveira <rodrigo@dcc.ufam.edu.br>

TCSVT 9275: decision on your paper7 mensagens

tcsvt@tcad.polito.it <tcsvt@tcad.polito.it>

26 de maio de 2015 03:34

Para: rodrigo@dcc.ufam.edu.br

Cc: tcsvt-eic@tcad.polito.it, tcsvt@tcad.polito.it, rodrigo@dcc.ufam.edu.br, lucascordeiro@ufam.edu.br, eddie@ctpim.org.br, vicente@ufam.edu.br

May 26, 2015

Dear RODRIGO RIBEIRO DE OLIVEIRA:

Control Number: 9275

Title: Hardware Reconfiguration Scheme Based on the Digital TV Signal

Authors: RODRIGO RIBEIRO DE OLIVEIRA ; Lucas Carvalho Cordeiro ; Eddie Batista de Lima Filho ; Vicente Ferreira de Lucena Jr.

We have completed the review process of the above referenced paper for the IEEE Transactions on Circuits and Systems for Video Technology. Based on the reviewers' comments, we recommend that your paper undergo a Major Revision and be resubmitted for consideration by the reviewers.

Enclosed are the comments by the Associate Editor and reviewers of your paper. If you should choose to revise your paper, please append to your revised paper a detailed response to each of the Associate Editor and reviewers' comments and document any changes you have made to the original manuscript. This information should be included at the end of your revised manuscript.

In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to each of the Associate Editor and reviewers' questions and comments and changes made in the revised manuscript.

You should submit a revised manuscript for consideration by the reviewers only if you are confident that you can fully satisfy all the reviewers' concerns. Please also note that, under the CSVT editorial policy, revised papers that require a further revision will be rejected.

Please be mindful when making your revisions that you must still adhere to our submission guidelines. The revised version of Transactions Paper are strictly limited to fourteen (14) pages in two-column format. For more information, please refer to <http://tcsvt.polito.it/general.html>

It is important that you resubmit the revised version of your paper within the next five weeks for further processing. Delay will result in removal of the paper from the list of papers awaiting revision.

Once the revised manuscript has been prepared, you must upload it and submit it through the online system at <http://tcsvt.polito.it/Forms/Authors/index.html>. In the web page titled "Submit a Paper: Step 1", you must specify that the paper is a resubmission and provide the control number of the original paper, so that the revised paper can be linked to the original paper.

I will contact you should we have any concerns or questions regarding your revision. Otherwise, your revision will be forwarded to the assigned Associate Editor and reviewers with a request for a final decision.

If you find that you have made an error in the submission of your revised manuscript (e.g., downloaded the wrong file or left out one or more files, etc.), please contact me via e-mail.

Please do not hesitate to contact me should you have any questions about our process or are experiencing technical difficulties. You can reach me by email at tcsvt@tcad.polito.it

Thank you for your submission to CSVT, and we look forward to receiving your revised manuscript.

Jackie Zelkowitz
Managing Editor
IEEE Transactions on Circuits and Systems for Video Technology
tcsvt@tcad.polito.it

Title: Hardware Reconfiguration Scheme Based on the Digital TV Signal
Authors: RODRIGO RIBEIRO DE OLIVEIRA ; Lucas Carvalho Cordeiro ; Eddie Batista de Lima Filho ;
Vicente Ferreira de Lucena Jr.

Reviewers' and Associate Editor's Comments

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Recommendation

Resubmit after Major Revision for Review (only for Transactions Papers)

Comments to the Author

The paper presents a way to reconfigure the DTV receiver. This might be good to compare the approach with what is done in the MPEG reconfigurable video coding standard whose has merely the same goal.

Key references that must be included:

From reviewers' comments (please check this section):

The related work section is rather short. I think more work around agile software update can be added which can include some watermarking based approaches supporting both legacy systems and new systems.

The motivations of this work are more or less the same that those of the MPEG Reconfigurable Video Coding. Authors should mention it in the background of their work, e.g.:

- S. S. Bhattacharyya, J. Eker, J. W. Janneck, C. Lucarz, M. Mattavelli, M. Raulet, Overview of the mpeg reconfigurable video coding framework, Jnl. of Signal Proc. Systems 63 (2). Considering also that, in that field, reconfiguration has already been tackled either at a fine-grain (FPGA only):
- E. Bezati, S. Casale-Brunet, M. Mattavelli, J. Janneck, Synthesis and optimization of high-level stream programs, in: Electronic System Level Synthesis Conf., 2013, pp. 1-6.
- J. Janneck, I. Miller, D. Parlour, G. Roquier, M. Wipliez, M. Raulet, Synthesizing Hardware from Dataflow Programs: An MPEG-4 Simple Profile Decoder Case Study, Jnl. of Signal Proc. Systems 63 (2) 241-249.

and at coarse-grain (including, but not limited to, FPGA implementations):

- Nezan J, Siret N, Wipliez M, Palumbo F., Raffo L (2012). Multi-Purpose Systems: A Novel Dataflow-Based Generation and Mapping Strategy. Symp on Circuits and Systems (ISCAS), pp. 3073-3076
- C. Sau, L. Raffo, F. Palumbo, E. Bezati, S. Casale-Brunet, M. Mattavelli, Automated design flow for coarse-grained reconfigurable platforms: An rvc-cal multi-standard decoder use-case, in: 2014 International Conference on Embedded Computer Systems: Architectures, Modeling, and Simulation, pp 59-66.

Would suggest including a reference to the Transport Stream standard.
ISO/IEC 13818-1, ITU-T Recommendation H.222.0

Review Number 1.

Comments to the Author

This paper covers very up to date topics: how to keep pace with the rapid evolution of the video standards without the need of completely changing the provided technologies and how to manage intelligent/adaptable systems.

According to my humble opinion the paper is too much pedantic. Section IV.A for example reports basic concepts for hardware designers.

Motivations:

Keeping pace with the rapid evolution of the video standards is one of the claims of the paper. Point is that reconfiguration help maintaining the same reference technology by means of re-programmability.

Nevertheless, it does not help in passing from one standard to other in a flexible way. As far as I understood from the paper the designers would need to write the hardware description from scratch. Please comment on this aspect considering also the considerations made below with respect to Reconfigurable Video Coding.

Background:

The motivations of this work are more or less the same that those of the MPEG Reconfigurable Video Coding. Authors should mention it in the background of their work, e.g.:

- S. S. Bhattacharyya, J. Eker, J. W. Janneck, C. Lucarz, M. Mattavelli, M. Raulet, Overview of the mpeg reconfigurable video coding framework, Jnl. of Signal Proc. Systems 63 (2).

Considering also that, in that field, reconfiguration has already been tackled either at a fine-grain (FPGA only):

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Methodology:

1. Is the proposed methodology limited to a specific vendor?
2. What happen, from the functional point of view, if the bitstream I receive is not compatible with the available hardware?
3. How long the reconfiguration process take? Are there any timing limitation?

Results:

1. Which boards did you used for prototyping activities?
2. Did you get any result on complete decoders?
3. What is the reconfiguration overhead?

Review Number 2.

Comments to the Author

The paper is easy to understand and the proposed method is technically sound. I however had difficulties understanding what is the scientific novelty of the work as using part of a communication channel (DTV in this case) to achieve software update at the receiver's end does not sound a real research question, but an engineering issue. The way how the reconfiguration information is embedded in the DTV signal is naive in that it is merely mixed with other signals via time sharing. The syntax of the data transmitted and the steps

of the processes involved are so detailed that they look very arbitrary and unnecessary -- as a research paper the main focus should be a novel technical concept and a proof of concept but this paper seems to have just the latter.

Another less relevant (for the proposed application) but very important (for ANY actual real applications of the proposed technique) is the implications of the proposed approach on systems security. What the proposed method allows is basically remote and automatic update of FPGA hardware (similar to automated software code update in agile software engineering context), but if this can be done in such a transparent manner and without a careful security-by-design approach, the technique will lead to easy attacks to hardware devices via the air which could cause large-scale system failure. While security is not a main concern of the paper, at least this should be discussed and the processes and data syntax should reserve some space for adding security into the overall solution.

Because of the above comments I cannot recommend this paper for acceptance. The authors may consider resubmitting their paper to a more practitioner-oriented venue such as a conference focusing on implementation aspects of DTV and hardware design for possible publication.

Review Number 3.

Comments to the Author

There are many reasons why the proposed concept of reconfiguring FPGA systems through DTV channels will encounter problems in practice:

- Security: HW cores have access to unencrypted content, system busses, and raw memory access. Thus such a scheme will expose the system to piracy, identity theft, etc. Manufacturers of set-top boxes and content owners will be very resistant to this approach.

- HW targets. It is nearly impossible to guarantee all clients will have a particular model of FPGA chip available in the set-top box. It also heavily constrains what is possible from a HW code perspective. For example if a particular model of set-top box can decode AVC with some FPGA core, it does not mean it could be reconfigured to decode HEVC on the same hardware due to larger requirements on the amount of available FPGA cells, memory, clock speed etc.

Additionally, this approach all but rules out the use of SoCs with FPGA logic on the same die.

- Cost. Set-top boxes are built with low profit margins, or even at loss since the idea is to recover the cost by selling the content and services that such devices enable. FPGA parts are not particularly cheap, and manufacturers of set-top boxes are not likely to include extra expensive hardware for a codec that may or may not show up one day.

- Not applicable to mobile space. FPGA implementations of a decoder, while they can be much faster than software, are much slower, more expensive in terms of device cost and more power hungry than ASIC implementations. Thus devices such as mobile phones and tablets almost never contain useful FPGA resources. And mobile devices are the fastest growing users of DTV services.

Review Number 4.

Comments to the Author

This work presents a methodology to change the behavior of hardware components of TV receivers using FPGA dynamic reconfiguration based on digital TV signal content. Several hardware behaviors are already synthesized into configuration bitstreams. These bitstreams are sent using the same packeting method as other broadcast information (video, audio etc).

Remarks:

*abstract
reassemblies -> reassembles

*Figure 3:

- Video "DENC" never explained before!
- Unify the use of de-multiplexer and demultiplexer

*5.D

- "The above rates this range have similar values ..." sentence not clear
- The FPGA used for implementation tests is not mentioned
- The FPGA frequency that gave the timing results is not mentioned

*Tables 7 and 8 have the same title !

*comparison with literature

In related works, the transmitted signal is not changed and the use of local predefined hardware configurations in the receiver is applied.

In comparison, does the presented approach need to modify in a certain way the broadcast standard?

In that case, what is the impact on existing materials using such broadcast standard and is it simpler than continuously update the receiver with new configurations?

Eddie <eddie@ctpim.org.br>

26 de maio de 2015 08:25

Para: lucascordeiro@ufam.edu.br, vicente@ufam.edu.br, rodrigo@dcc.ufam.edu.br

Caros,

Major revision significa que temos excelentes chances de emplacar esse artigo. Além disso, esta é a circuits and systems for video technology, ou seja, uma revista respeitada e na qual todo pesquisador da área de vídeo/imagem gostaria de publicar. Temos que responder cada pergunta/modificação de forma direta e honesta, sem enrolação. Quem será o primeiro a realizar as modificações? Eu indico que o Rodrigo faça logo as do revisor 4, enquanto nós damos uma olhada nas outras.

Tudo de bom,

Eddie

[Texto das mensagens anteriores oculto]

Vicente Lucena Jr <vicente@ufam.edu.br>

26 de maio de 2015 10:21

Para: Eddie <eddie@ctpim.org.br>, lucascordeiro@ufam.edu.br, rodrigo@dcc.ufam.edu.br

Concordo com o eddie, temos ao todo 5 semanas para reenviar o artigo.

Saudações,

Vicente F. Lucena Jr. (Dr.-Ing.)

IEEE Senior Member, ACM Senior Member

Tel.: (+55 92) 3305-4680 ou 3305-4695

Mobile: (+55 92) 98158-6371

CETELI – PPGEE – UFAM

Engenharia Elétrica e Engenharia da Computação

Campus da Universidade Federal do Amazonas - Setor Norte

Pavilhão Prof. Nilmar Lins Pimenta (CETELI)

Av. General Rodrigo Otávio Jordão Ramos, 3000

CEP 69077-000 Manaus – AM – Brasil (Brazil - Brasilien)

-----Mensagem original-----

De: Eddie [mailto:eddie@ctpim.org.br]

Enviada em: terça-feira, 26 de maio de 2015 07:26

Para: lucascordeiro@ufam.edu.br; vicente@ufam.edu.br; rodrigo@dcc.ufam.edu.br

Assunto: Re: TCSVT 9275: decision on your paper

[Texto das mensagens anteriores oculto]

Lucas Carvalho Cordeiro <lucascordeiro@ufam.edu.br>

26 de maio de 2015 10:37

Para: Vicente Lucena Jr <vicente@ufam.edu.br>

Cc: rodrigo@dcc.ufam.edu.br, Eddie Lima <eddie_batista@yahoo.com.br>

Prezados,

Também concordo com a sugestão do Eddie de iniciar com o revisor 4 que foi bastante positivo na avaliação.

Os comentários do revisor 4 não deve tomar muito tempo do Rodrigo.

Com relação aos demais comentários, não seria bom dividirmos logo?

O Vicente tem razão. É melhor trabalharmos com um deadline de 4 ou 5 semanas.

Abraço,
Lucas

De: "Vicente Lucena Jr" <vicente@ufam.edu.br>

Para: "eddie" <eddie@ctpim.org.br>, lucascordeiro@ufam.edu.br, rodrigo@dcc.ufam.edu.br

Enviadas: Terça-feira, 26 de maio de 2015 9:21:31

Assunto: RES: TCSVT 9275: decision on your paper

[Texto das mensagens anteriores oculto]

Eddie Lima <eddie_batista@yahoo.com.br>

26 de maio de 2015 10:51

Responder a: Eddie Lima <eddie_batista@yahoo.com.br>

Para: Lucas Carvalho Cordeiro <lucascordeiro@ufam.edu.br>, Vicente Lucena Jr <vicente@ufam.edu.br>

Cc: "rodrigo@dcc.ufam.edu.br" <rodrigo@dcc.ufam.edu.br>

Caros,

Como é mais a minha área, eu farei a comparação com compressão reconfigurável (comentário do editor). Lembrem que, para cada modificação, é interessante que deixemos o respectivo trecho em vermelho e com a identificação do revisor que pediu aquilo, dado que depois precisaremos comentar e indicar tudo que foi feito, em um documento a parte.

Tudo de bom,

Eddie

[Texto das mensagens anteriores oculto]

Vicente Lucena Jr <vicente@ufam.edu.br>

26 de maio de 2015 12:40

Para: Eddie Lima <eddie_batista@yahoo.com.br>, Lucas Carvalho Cordeiro <lucascordeiro@ufam.edu.br>

Cc: rodrigo@dcc.ufam.edu.br

Senhores,

Seguem as referências sugeridas pelos revisores.

Saudações,

Vicente F. Lucena Jr. (Dr.-Ing.)

IEEE Senior Member, ACM Senior Member

Tel.: (+55 92) 3305-4680 ou 3305-4695

Mobile: (+55 92) 98158-6371

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Pavilhão Prof. Nilmar Lins Pimenta (CETELI)

Av. General Rodrigo Otávio Jordão Ramos, 3000

CEP 69077-000 Manaus – AM – Brasil (Brazil - Brasilien)

De: Eddie Lima [mailto:eddie_batista@yahoo.com.br]

Enviada em: terça-feira, 26 de maio de 2015 09:51

Para: Lucas Carvalho Cordeiro; Vicente Lucena Jr

Cc: rodrigo@dcc.ufam.edu.br

Assunto: Re: RES: TCSVT 9275: decision on your paper

[Texto das mensagens anteriores oculto]



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4265K

Rodrigo Ribeiro de Oliveira <rodrigo@dcc.ufam.edu.br>

26 de maio de 2015 14:19

Para: Eddie Lima <eddie_batista@yahoo.com.br>

Cc: Lucas Carvalho Cordeiro <lucascordeiro@ufam.edu.br>, Vicente Lucena Jr <vicente@ufam.edu.br>

Sim concordo com o Eddie! Assim que terminar as revisões das correções da Tese eu trabalho nas modificações do Revisor 4.

O interessante é que nesta revista pode mencionar o nome do fabricante e modelo do FPGA...

Abs,
Rodrigo

2015-05-26 10:51 GMT-03:00 Eddie Lima <eddie_batista@yahoo.com.br>:

[Texto das mensagens anteriores oculto]