

From: Boyce Jill (Princeton) <BoyceJ@tce.com>
Sent: Wednesday, September 18, 2002 12:00 AM
To: 'Sandy (Alexander) MacInnis'; Gary Sullivan; Luthra Ajay-MGI1164; Jvt-Experts (E-mail)
Subject: [jvt-experts] RE: Special position + MC memory analysis adhoc group

In JVT-D064, I proposed a limit for the number of motion vectors for SD as well as HD, but based on 4 consecutive MBs rather than 2, as in the JVT-D134 proposal. I hope to run some similar experiments to what Sandy discusses with MV count histograms as outputs for some SD sequences (high action from the interlaced test set) and one HD sequence. I was planning on using only a single QP=24. I'm planning to use B frames, ABT, CABAC, and am still undecided about picture-level or MB-level AFF.

For this type of limit, I think we are better off having everyone use different experimental conditions rather than a common set, as we are measuring what the existing encoder does, rather than trying to do an apples-to-apples comparison of competing tools.

Jill

> -----Original Message-----
> From: Sandy (Alexander) MacInnis [<mailto:macinnis@broadcom.com>]
> Sent: Saturday, September 14, 2002 3:09 PM
> To: Gary Sullivan; Luthra Ajay-MGI1164; Jvt-Experts (E-mail)
> Subject: [jvt-experts] RE: Special position + MC memory analysis adhoc
> group
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>
> My reply is below:
>
> At 01:36 AM 9/14/2002, Gary Sullivan wrote:
>
> > I guess item 4 of my previous message (evaluating JVT-D134) was
> > HD-specific. And I think item 2 was too - I think the
> > larger MV range
> > was discussed only in the HD context. More remarks in-line
> > in response
> > to Sandy:
> >
> > > -----Original Message-----
> > > From: Sandy (Alexander) MacInnis [<mailto:macinnis@broadcom.com>]
> > > Sent: Friday, September 13, 2002 9:11 PM
> > > To: Gary Sullivan; Luthra Ajay-MGI1164; Jvt-Experts (E-mail)
> > > Subject: Re: [jvt-experts] RE: Special position + MC memory
> > > analysis adhoc group
> > >
> > >
> > > At 06:54 PM 9/13/2002, Gary Sullivan wrote:
> > > ...
> > > > JVT-D134 (limit of number of MVs per two macroblocks)
> > > > had lots of
> > > > people listed
> > > > as authors and lots of support at the last meeting ...
> > >
> > > ...
> > >
> > > There
> > > are some issues,

> >+> such as an expressed need to use the latest software, the
 > >+> need to modify
 > >+> any chosen decoder software in order to do the experiments
 > >+> (it is necessary
 > >+> to generate histograms of MV usage),
 > >
 > >
 > >Are histograms being generated in addition to other
 > >measures such as PSNR, or as a substitute?
 >
 > The experiments consist of the generation of histograms. There are no
 > experiments defined that would measure PSNR.
 >
 > D-134 showed the results of experiments which consisted of
 > histograms, and
 > probabilities based on them. The histograms examined the
 > frequency with
 > which unconstrained operation of the RDO committee encoder
 > generated pairs
 > of macroblocks with each possible number of motion vectors, and in
 > particular they showed an extremely low usage of more than 16
 > MVs per 2 MBs
 > when encoding 720p HD material at very high visual quality,
 > again with no
 > constraints on the encoder. The logical conclusion is that if
 > the encoder
 > had been constrained to 16MV/2MBs it would have had to code
 > only a very
 > few MBs with a different set of choices, i.e. fewer MVs, there is the
 > possibility that some more bits might be used for residual
 > coding only those
 > few macroblocks. At the Klagenfurt meeting the committee
 > asked for more data.
 >
 > So the action is to perform similar experiments with more
 > video sequences.
 > If it is convenient it may be attractive to perform
 > additional experiments
 > using newer versions of the JM software, although I am not
 > currently aware
 > of any explained technical reasons why the results would be
 > different. The
 > experiment covers the choices of motion compensation block
 > sizes that an
 > unconstrained RDO committee encoder makes.
 >
 > In order to perform such experiments it is necessary to
 > either modify the
 > committee encoder, or the decoder that matches the encoder,
 > to generate the
 > appropriate histograms, or create new software that analyzes the bit
 > streams created. This argues against using the latest software, since
 > modifications are needed, and we already did those
 > modifications to an
 > earlier version.
 >
 > PSNR experiments do not appear to be feasible nor would the
 > be particularly

- > meaningful. Presumably if we wanted to test PSNR effects we
- > would have to
- > create a modified version of the encoder that makes optimal
- > choices for
- > encoding macroblocks while avoiding exceeding the limit on
- > the number of
- > motion vectors. In addition to the fact that nobody has
- > volunteered to make
- > such changes to the encoder, there is also the risk that any
- > such changes
- > made to the encoder would not be optimal and therefore would not be
- > conclusive. There are many possible ways for encoders to be
- > designed to
- > handle this.
- >
- > One thing we could do is consider, either through experiments
- > or analysis,
- > what the bit rate increase would be in cases where the
- > encoder cannot use
- > as many motion vectors as it might like to, with a given QP
- > and content. It
- > seems logical that with all other things being equal, if the
- > encoder is
- > limited in the number of motion vectors it can use for a
- > given macroblock
- > the residual information that needs to be conveyed would be
- > increased in
- > its complexity and some more bits would be required for that specific
- > macroblock. If the percentage increase in bits for
- > macroblocks that don't
- > get as many vectors as the encoder would like is P and the
- > percentage of
- > macroblocks that have such limits is Q, then the bit rate
- > increase is $P * Q$
- > Q. We don't know what P is. Even if we were to assume 20% - a large
- > increase indeed - if Q is 1%, then the bit rate increase is
- > $20\% * 1\% =$
- > 0.2%. Not a big price to pay for avoiding a serious
- > compatibility issue
- > that would likely result from the current draft standard,
- > where there is a
- > significant economic incentive to build and deploy
- > non-compliant decoders.
- >
- > --Sandy
- >
- >
- >
- > ---
- > The use of the jvt-experts list is intended only for the
- > video coding standardization work conducted by the Joint
- > Video Team (JVT) of ISO/IEC JTC1/SC29/WG11 (MPEG) and ITU-T
- > SG16 Q.6 (VCEG).
- >
- > You are currently subscribed to jvt-experts as: boycej@tce.com
- > To unsubscribe send a blank email to
- > %email.unsub%
- >

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