medstarbeamer: A new beamer class

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Abstract

Beamer's popularity as a document class for creating slides has grown considerably since its release in 2003. This paper is intended to serve as a guide to beamer users on how to go about writing their own beamer document class. A new beamer document class, medstarbeamer, is presented as an example.

1 Introduction

With its many handy features, Till Tantau's beamer class is widely used for making presentations. While I find the pre-existing beamer themes pleasing, I recognize that not everyone shares the sentiment. Further, even those who find the existing themes satisfactory may feel the need to exercise fine control over the layout of their slides. While the beamer user guide is an excellent resource, I thought a paper outlining the process and providing an example of a beamer document class constructed from scratch would be a useful addition to the existing literature. This paper goes over medstarbeamer, an original beamer document class written by me. The package is available at https://www.ctan.org/pkg/medstarbeamer.

In addition to what is covered in this paper, a useful resource for those contemplating writing their own document class is the website http://www.r-bloggers.com. A post from November 2011 titled "Create your own Beamer template" provides a nice introduction to how beamer themes are typically written. In writing the beamer class, Till Tantau defined several inner, outer, color, and font themes. Extensive documentation on these can be found in the beamer user guide. Additional information is available at https://en.wikibooks.org/wiki/LaTeX/Presentations. Perhaps most importantly, the style files for these themes are easily downloadable from CTAN and can prove a valuable resource while customizing one's own theme.

In writing the medstarbeamer package, I chose to write a color theme (in the package, this is the style file beamercolorthemeMedStarColors.sty) and a separate .cls file (medstarbeamer.cls). Maintaining distinct files makes writing packages easier since it is less cumbersome than sorting through command after command in one very long .cls file. Further, users who have defined several themes of their own, be they inner, outer, color or font themes, find it easier to mix-and-match these themes while creating slides if the themes are saved in separate files. On the other hand, for simpler themes with fewer features, one file should suffice.

Section 2 covers how the document class was written, section 3 covers salient features of the color theme, and section 4 provides examples of usage. The reader is urged to download and compile the example presentation (example.tex) provided with the package on CTAN.

2 Writing the document class

I chose to write the document class by borrowing features from the beamer themes infolines and miniframes. The .sty files for both of these themes are downloadable from CTAN. To define the footline, I customized the footline command from the infolines theme. Here is the customized version:

```
\defbeamertemplate*{footline}{}{\hbox{%
  \begin{beamercolorbox}[center,
     wd=.3333333\paperwidth,ht=0.25cm,dp=0.2cm]
    {author in head/foot}%
    \usebeamerfont{author in head/foot}%
    \insertshortauthor
  \end{beamercolorbox}%
  \begin{beamercolorbox}[center,
     wd=.3333333\paperwidth,ht=0.25cm,dp=0.2cm]
    {title in head/foot}%
    \usebeamerfont{title in head/foot}%
    \insertshorttitle
  \end{beamercolorbox}%
  \begin{beamercolorbox}[center,
     wd=.3333333\paperwidth,ht=0.25cm,dp=0.2cm]
    {date in head/foot}%
    \usebeamerfont{date in head/foot}%
    \insertshortdate{}\hfill
    \insertframenumber{} /
    \inserttotalframenumber
  \end{beamercolorbox}%
}}
```

For my document class, I altered the height (ht) and depth (dp) and deleted some of the other features included in the infolines theme, such as the inclusion of the institute name. Since I feel more comfortable using (constant) centimeters as a metric of measurement, I used cm instead of ex. Additionally, the width for each beamercolorbox was set to one-third the paper width.

Notice the first beamercolorbox corresponds to the leftmost box at the bottom of the slides provided in section 4. The second beamercolorbox contains the title of the talk. Lastly, the third beamercolorbox contains the date as well as the current frame number. The reader should be aware that certain commands such as totalframenumber and framenumber, shortauthor, etc. have been predefined in the beamer document class.

While the code above gives the reader an idea of how the document class was constructed, it is also important for the reader to grasp how it's used. Here is the preamble from the `example.tex` file included with the package:

```
\documentclass{medstarbeamer}
\title[Applied Bayesian Data Analysis]
{Binary Response Regression and Model Selection}
\institute[]{}
\author[Anagha Kumar]{Anagha Kumar}
\date{August 26th, 2015}
```

One sees that the text provided in square brackets appears in the footline. The institute is deliberately left blank as I chose to exclude it from the footline in the construction of this document class.

I modified the headline from the `miniframes` theme similarly, as follows:

```
\defbeamertemplate*{headline}{}{%
  \begin{beamercolorbox}{section in head/foot}
    \vskip3pt\insertnavigation{\paperwidth}%
    \vskip3pt
  \end{beamercolorbox}%
  \ifbeamer@theme@subsection
    \begin{beamercolorbox}[ht=0.25cm,dp=0.2cm,
      leftskip=0.5cm]
      {subsection in head/foot}
      \usebeamerfont{subsection in head/foot}%
      \insertsubsectionhead
    \end{beamercolorbox}%
  \fi}
```

My headline is a greatly simplified version of the headline definition from `miniframes.sty`. Again, I altered the height (`ht`) and depth (`dp`) values to suit my liking. The first `beamercolorbox` corresponds to the topmost yellow (I defined a new color `medstaryellow` which will be described in detail in the following section) band in the slides presented in section 4. The section name (in bold) along with the other sections are presented in this topmost color box. Next, if a subsection exists, the second navy blue band (`medstarblue`) contains the subsection heading (notice the command `\insertsubsectionhead`).

Next, I customized the layout even further by specifying margin sizes:

```
\setbeamersizetext{margin left=0.5cm,
  text margin right=0.75cm}
```

I wanted to include the MedStar logo in every frame:

```
\logo{\includegraphics[height=1cm, width=2.5cm]
  {medstarlogo}}
```

I chose to suppress the navigation symbols and number the captions in my slide deck:

```
\setbeamertemplate{navigation symbols}{}
\setbeamertemplate{caption}[numbered]}
```

Finally, I defined two new commands as follows, `\sizecontentsoutline`, `\sizecontentscurrent`:

```
\newcommand{\sizecontentsoutline}[1]{%
  \ifnum#1=1
    \begin{frame}
      \tableofcontents
    \end{frame}
  \fi
  \ifnum#1=2
    \begin{frame}
      {\footnotesize \tableofcontents}%
    \end{frame}
  \fi
}
\newcommand{\sizecontentscurrent}[1]{%
  \AtBeginSection{%
    \ifthenelse{\thesection > 1}{%
      \ifnum#1=1
        \begin{frame}
          \tableofcontents[currentsection]
        \end{frame}
      \fi
     \ifnum#1=2
       \begin{frame}
         {\footnotesize
           \tableofcontents[currentsection]}%
       \end{frame}
     \fi}%
}}
```

Each command consists of two `if` statements which are set up such that if the parameter value is 1, then the table of contents (of the whole document for the first command, of the current section for the second) appears in the normal font. If the parameter is 2, on the other hand, the table of contents is reduced by using the font size `\footnotesize`. Users need only specify one of

```
\sizecontentsoutline{1}
\sizecontentsoutline{2}
```

or

```
\sizecontentscurrent{1}
\sizecontentscurrent{2}
```

respectively, in their `.tex` file. Notice that there is no need to enclose these commands in `\begin{frame}` and `\end{frame}` since these options have already been specified in the body of the command definitions. This option has proven a handy feature in presentations with several sections and subsections since a lengthy table of contents can be displayed in a smaller font size if needed.

Another useful feature of this document class is a new command called `class`. I wrote this command after noticing that when I give lectures, the students find it useful to have space for taking notes included

in the handouts themselves. Therefore, I wrote a simple `if` statement:

```
\newcommand{\class}[1]{%
\ifnum #1=1
  \begin{frame}{Notes}\end{frame}
\fi
\ifnum #1=2
  \begin{frame}{Notes}\end{frame}
  \begin{frame}{Notes}\end{frame}
\fi
\ifnum #1=3
  \begin{frame}{Notes}\end{frame}
  \begin{frame}{Notes}\end{frame}
  \begin{frame}{Notes}\end{frame}
\fi}
```

The above command takes one parameter as an argument. The parameter specifies the number of blank slides to be inserted, up to three. I chose to limit the number of slides inserted at once to three since I have yet to encounter a situation where more than three pages of notes would be required to be taken by students after a given slide. That said, of course the code can easily be altered to suit individual requirements.

As for usage, one need merely type `\class{1}`, `\class{2}` or `class{3}` to insert the desired number of slides. As before, there is no need to enclose this command in `\begin{frame}` and `\end{frame}`.

3 Designing a color theme

My highest priority in writing this document class was to design an interesting color theme. I chose to use the MedStar logo as inspiration. The first step was to define my own colors. I elected to define three colors: `medstaryellow`, `medstarblue`, and `medstarred`. The colors were defined so as to match the colors in the MedStar logo. Should one want to use existing LaTeX colors, the website `http://latexcolor.com` provides color definitions and syntax for a very extensive range of colors and should prove an invaluable resource.

I chose to stick with white as the background color but users can alter this using the command

```
\setbeamercolor{background canvas}{bg=⟨color⟩}
```

Table 1 presents a summary of how the colors for the theme were specified. These commands are in the file `beamercolorthemeMedStarColors.sty`. The next section has examples of what the slides look like.

- The primary palette controls the foreground and background colors for the rightmost `colorbox` in the footline.
- The secondary palette controls the foreground and background for the leftmost `colorbox` in the footline, and the second strip in the headline.

Table 1: Summary of commands used in `beamercolorthemeMedStarColors.sty`.

Author	`\setbeamercolor{author}` `{fg=medstarblue}`
Date	`\setbeamercolor{date}` `{fg=medstarblue}`
Title	`\setbeamercolor{title}` `{fg=medstarblue}`
Subtitle	`\setbeamercolor{subtitle}` `{fg=medstarblue}`
Normal text	`\setbeamercolor{normal text}` `{fg=medstarblue}`
Captions	`\setbeamercolor{caption}` `{fg=medstarblue}`
Caption names	`\setbeamercolor{caption name}` `{fg=medstarblue}`
Items	`\setbeamercolor{item}` `{fg=medstarblue}`
Primary palette	`\setbeamercolor{palette primary}` `{fg=white, bg=medstarblue}`
Secondary palette	`\setbeamercolor{palette secondary}` `{fg=white, bg=medstarblue}`
Tertiary palette	`\setbeamercolor{palette tertiary}` `{fg=medstarblue,bg=medstaryellow}`
Date in footline	`\setbeamercolor` `{date in head/foot}` `{parent=palette primary}`
Author in footline	`\setbeamercolor` `{author in head/foot}` `{parent=palette secondary}`
Title in footline	`\setbeamercolor` `{title in head/foot}` `{parent=palette tertiary}`
Frame Title	`\setbeamercolor{frametitle}` `{fg=medstarblue,bg=medstaryellow}`

- The tertiary palette controls the foreground and background for the middle `colorbox` in the footline, and the topmost strip in the headline.

As shown in the table, the date, author, and title in the footline were set to the primary, secondary, and tertiary palettes respectively.

In addition to the above, sections, subsections, and subsubsections in the table of contents were set to `medstarblue` using the commands

```
\setbeamercolor{section in toc}
  {fg = medstarblue}
\setbeamercolor{subsection in toc}
  {fg = medstarblue}
\setbeamercolor{subsubsection in toc}
  {fg = medstarblue}
```

respectively. Similarly, I inserted a shaded table of contents at the beginning of each section, with the current and shaded sections shown in `medstarblue`, using the commands:
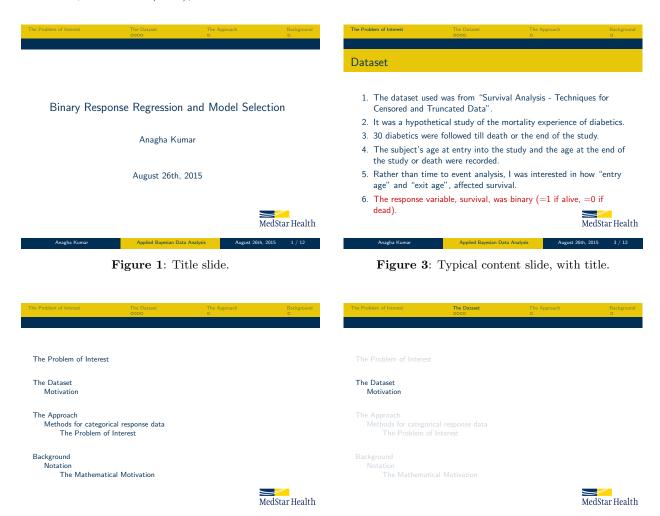
```
\setbeamercolor{section in toc shaded}
```

Figure 1: Title slide.

Figure 3: Typical content slide, with title.

Figure 2: Overview slide.

Figure 4: Shaded table of contents slide.

```
  {fg = medstarblue}
\setbeamercolor{subsection in toc shaded}
  {fg = medstarblue}
\setbeamercolor{subsubsection in toc shaded}
  {fg = medstarblue}
```

It is usually considered good practice to stick to two, or perhaps three, colors while designing a color theme though readers should feel free to tailor themes to their individual needs and preferences. Several other features can be fine-tuned in a given color theme. Readers can explore color themes at even greater length to construct one to their liking.

4 Examples

Figures 1, 2, 3, and 4 present examples of slides made using this document class. (Grayscaled for the printed *TUGboat*.)

5 Discussion

Since LaTeX users often need to customize their slides to suit institutional or personal needs, this paper intends to shed some light on the often daunting task of creating a custom beamer document class. By introducing a novel document class and detailing each command used in its construction, I hope to have provided a high-quality example of how to go about doing so. With the help of the many resources mentioned in this paper, users should find it possible to write their own beamer document classes.

As always, I urge users to upload their contributions to CTAN and accompany such uploads with appropriate documentation.

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