

Developer's Guide on SJTUBeamer MIN

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1 Preface

SJTUBeamer MIN is a presentation template based on `beamer` package in L^AT_EX, to fulfill the enthusiasm of those SJTU users to present their content nicely benefiting from the technology of T_EX typesetting engine.

This is a Developer's Guide on SJTUBeamer MIN. The document is written in English because the operation in this guidance could be dangerous. Be careful when playing with those macros.

SJTUBeamer MIN — the minimal work set of SJTU VI

MIN	- <i>minimal</i> :	minimal work set of SJTU VI.
MIN	- <i>minimalism</i> :	designed in the style of minimalism.
MIN	- <i>minimum</i> :	minimum shapes to show your content.

2 Compilation

Most problems come from L^AT_EX compilation. The required packages are in the following list.

The detailed description is documented below.

pgfplots	tikz	xcolor
pgfplotstable	sansmath	tcolorbox
ctex	biblatex	beamer

2.1 MiKTeX

All required packages will be automatically installed if you are using MiKTeX[1]. And if you want to use the `latexmk` command, please install Perl[2] first. And the compilation command for SJTUBeamer [MIN] is as follows:

```
latexmk -pdf main -interaction=nonstopmode
```

2.2 T_EX Live

Since some packages are not default installed in the full release of T_EX Live, you have to install the packages manually.

On Ubuntu, you could install `pgf` and `xcolor` and other drawing packages through the following command[3]:

```
sudo apt install texlive-pictures
```

To typeset Chinese characters, you would better use `CJKutf8` package (in SJTUBeamer [MIN], set `[cjk=true]`), since it is compatible with all platforms and multiple language support. Surround `CJK` environment to make it work and remember to move all the Unicode characters in the permeable to the `CJK` environment[4]:

```
\begin{document}
\begin{CJK}{UTF8}{gbsn}
  \institute[]{}
  \title{}
  \subtitle{}
  \author{}
  \date{}
  % your content here ...
\end{CJK}
\end{document}
```

However, if you stick into `ctex`, you can install through `tlmgr`. If that works, then we call it a day.

```
sudo tlmgr install ctex
```

Sometimes, you installed an old T_EX Live, and you have to upgrade the `tlmgr` for the new version. And the process could be very buggy, since the following warning may be shown:

```
unexpected return value from verify_checksum: -5
```

and to upgrade the `tlmgr` is painful on Ubuntu. You should add the following content to `/etc/profile/`, which will add the newest path when the system is booting up[5]:

```
export PATH=/usr/local/texlive/2021/bin/x86_64-linux:
/usr/local/texlive/:$PATH
```

Reboot your computer if necessary. Then the compile system will be moved to the newer version of T_EX Live. Try to install the corresponding packages through the GUI interface of `tlmgr`:

```
sudo tlmgr update --self
sudo tlmgr gui
```

And if you encountered that

```
Critical Package ctex Error: CTeX fontset 'fandol' is
unavailable in current(ctex) mode.
```

You have to modify your compiling program from pdfL_AT_EX to XeL_AT_EX by adding the following magic command on the first line:

```
% !TeX TS-program = xelatex
```

2.3 Boost Up

However, it has been tested that the compilation on SJTUBeamer `[MIN]` is slow. Since the complex patterns have to be rendered in vector shapes and the bibliography requires multiple times of compilation, the time could be wasted on some repetitive works.

This scenario could be improved by enable `[pattern=none]` option on SJTUBeamer `[MIN]` and enable `[draft]` option on beamer. The former one will disable all the pattern rendering, and the latter one will ignore all the TOC (table of contents) generating.

The project has been implanted to Overleaf. Here is the link [6]. And to make that works, the compilation on T_EX Live 2021 has to be implemented. And it is discovered that setting the document information outside the `document`

environment will cause a significantly longer compiling time, which may be caused by some improper settings in C_TE_X package. The workaround of that is to follow the setup mentioned in CJK settings: put that info into the body of document[4].

Currently, CI is available on Github Actions by compiling on Lua_LA_TE_X. SJTUBeamer [MIN] uses xu-cheng/latex-action@v2 for the compilation docker [7] and relocates the compiling folder to `src/`. After compiling, output the PDF artifact. See `.github/workflows/main.yml` for details.

At the same time, AutoBeamer[8] is making its own effort on generating beamer code automatically by some replacing strategies. You could preview your beamer code through conversion on Markdown or the article L_AT_EX code.

Furthermore, there is a wider space for boosting up the beamer compilation time by making use of multi-core processors. Since it is a frame-based document, and the connection between each frame is loose (only some page numbers and citations need to be calculated), the multi-threaded compilation is possible for the `beamer` class. You can glimpse the multi-threaded processing for L_AT_EX from the package `animate`. In fact, the author created some batch compiling work[9] together with the `-Parallel` parameter in PowerShell 7 to make full use of the concurrent computer architecture.

3 Modular Architecture

By the recommendation from `beamer` package[3], SJTUBeamer [MIN] uses the same modular architecture to build the template. Like it is in Java, to let the `beamer` template locate your theme, the style file have to be in the standard name.

.sty File	Description
<code>beamercolorthemeSJTUBeamermin.sty</code>	Define global color schemes.
<code>beamerfontthemeSJTUBeamermin.sty</code>	Set the font format.
<code>beamerinnerthemeSJTUBeamermin.sty</code>	Specifies all parts inside a frame.
<code>beamerouterthemeSJTUBeamermin.sty</code>	The frame header and bottom bar.
<code>beamerthemeSJTUBeamermin.sty</code>	Entry point of the theme.

Notice that there are some dependencies (logo files) in the `vi/`. Copying the `vi` folder is necessary. Or you could define the location of the logo file by the option `[logo=]`.

main.tex			
beamerthemeSJTUBeamermin.sty			
colortheme.sty	fonttheme.sty	innertheme.sty	outertheme.sty
logo.pdf			

3.1 Theme

The main theme file `beamerthemeSJTUBeamermin.sty` is the entry point of the theme template. For users, after acquiring the `beamer` package, `\usetheme` command will serve as the caller of the theme.

```
\documentclass{beamer}
\mode<presentation>
\usetheme{SJTUBeamermin}
```

And this file will preprocess the option passed to the theme. Some options will be affected immediately, while others will get processed in the sub-style files.

<code>theme.sty</code>	<code>colortheme.sty</code>	color
<code>lang</code>	<code>fonttheme.sty</code>	
<code>cjk</code>	<code>innertheme.sty</code>	pattern,color,logo
<code>gbt</code>	<code>outertheme.sty</code>	pattern,navigation,logo
<i>other settings</i>		

3.2 Color

The color style file `beamercolorthemeSJTUBeamermin` is the color setup of the template. Most color schemes are derived from the basic color of SJTU VI[10]. And to adapt the color definitions of `beamer`, the corresponding interface is mapped, see 17.2 in [3].

interface	color=	red	blue
palette primary	cprimary	#004098	#9E1F36
palette secondary	csecondary	#298626	#F28101
palette tertiary	ctertiary	#004D4B	#FED201
palette quaternary	cquaternary	#FFFFFF	#000000

As it is mapped to those beamer interfaces, to use the color, you have to declare the color struct first by

```
\usebeamercolor{palette primary}
\color{palette primary.bg}
```

or by simply

```
\usebeamercolor[bg]{palette primary}
```

However, there are some scenarios that you cannot put temporary variables in some package options. In this complex case, the redefinition of those standard colors is required. And that's the reason why `innertheme.sty` gets color.

References

- [1] “MiKTeX.” [Online]. Available: <https://miktex.org/>
- [2] “Perl.” [Online]. Available: <https://www.perl.org/>
- [3] T. Tantau, J. Wright, and V. Miletić, *The beamer class: User Guide for version 3.59.*, Jul. 2020. [Online]. Available: <https://github.com/josephwright/beamer>
- [4] Log Creative, “L^AT_EX Sparkle Project Chapter 3.” [Online]. Available: <https://logcreative.github.io/LaTeXSparkle/src/art/chapter03.html>
- [5] TUG, “Upgrade from T_EX Live 2020 to 2021.” [Online]. Available: <http://www.tug.org/texlive/upgrade.html>
- [6] Log Creative. SJTUBeamermin. [Online]. Available: <https://www.overleaf.com/latex/templates/sjtubeamermin/shxnnnjgqvp>
- [7] xu-cheng, “L^AT_EX-action.” [Online]. Available: <https://github.com/xu-cheng/latex-action>
- [8] Log Creative, “AutoBeamer.” [Online]. Available: <https://github.com/LogCreative/AutoBeamer>
- [9] —, “PGFPlotsEdt.” [Online]. Available: <https://github.com/LogCreative/PGFPlotsEdt/blob/master/res/logo/anim/animrender.ps1>
- [10] Shanghai Jiao Tong University, *SJTU VI Manual*, Apr. 2016. [Online]. Available: <https://vi.sjtu.edu.cn/>