

Producing Video Tutorials With Open Source Tools

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Motivation

- I've been teaching about 1.5 years
 - University of St. Thomas (St. Paul) Grad Programs in Software
- I needed to learn how to record my lectures
- I also needed to make software tutorials
- I wanted to use Open Source tools

Goals

- Share experiences about making video tutorials and lectures
- Two-way sharing of experiences is ideal: please share your experiences as well

Overview

- 1** Intro
- 2** Use Cases
- 3** Techniques
- 4** Tools
- 5** Discussion

Recording a Lecture

- A normal classroom experience but it's recorded
 - Students can consume lectures remotely if they are sick or travelling
 - Students can rewatch difficult material
 - Beneficial for English-as-a-Second-Language (ESL) students
 - Since my university provides classrooms equipped with recording tools and proprietary software, I won't go deep into this

“Flipped” Lecture

- Normal lecture: lecture in class, homework/project at home
- “Flipped” lecture: recorded lecture watched at home, homeworks and projects in class.
- Seems like a good idea but I didn't have any video recording or editing skills

Video Tutorial

- Video tutorials illustrate a skill using video instead of text
 - Our scenario: the tutorial is about using some software so the base case is screen capture + voice
 - I'll be using this case as an example:
 - Example video posted on [YouTube](#): how to make a Sozi animation
 - Sozi is a way to make animated presentations, e.g. this [overview of my presentation](#)

Inspiration: Citizen Journalism

- Public citizens play the role of traditional, professional journalists
 - E.g. Arab Spring, Japan Tsunami, Ferguson unrest, Occupy Wall Street, Haiti Earthquake, etc.
 - Often relies on open source tools, new media platforms, and mobile phones
 - USC Annenberg project: a smart phone app that guides the user to record specific shots, in order to foster the creation of higher quality video content

Video Screen Capture

- Video screen capture is a recording of the screen and usually includes audio narration
- Useful for demonstrating features of software
 - Especially useful for teaching software that has GUIs (graphical user interfaces)
 - Also useful for filing bug reports
- By default, screencasts are real-time, but after-the-fact editing can be useful
 - Fixing mistakes, shorten the video
 - Adding other footage to make it more interesting, e.g. a talking head

Video Editing

- Video editing involves cutting, arranging, and other transformations of video shots
- Editing is a big aspect of storytelling using video
 - Difference between plot and story
- Editing video tutorials can make your videos shorter
 - Saves your viewers' time...
 - ...but costs you your time

Open Question

How much value is added from editing and adding other footage besides screen+audio?

B-Roll

- “B-Roll” refers to supplementary or alternative footage
 - The main footage is called “A-Roll”
 - In our case the screen recording would be the A-Roll
- B-Roll can be other video or still images
 - E.g. talking head to go with narration, hands/pointing, logos/branding, etc.
- Helps establish context and adds dramatic support
- Helps prevent jump cuts, i.e. two shots that are very similar that are edited to be temporally adjacent
 - The result with B-Roll in between the cut is called a “cut-away shot”

Tip:

Collect B-roll footage. B-roll footage can give context and depth to the video and it can break up jump cuts.

5 Shot Sequence

- Combining A-Roll and B-Roll builds up shot sequences
 - Like software design patterns for cinema and television
- The “5-Shot Sequence” is a formulaic sequence in journalism composed of the following 5 shots
 - ① A close-up of the hands
 - ② A close up of the face
 - ③ A wide shot of the environment with the subject in it
 - ④ An over-the-shoulder shot showing the action from the subject’s perspective
 - ⑤ A creative shot to capture an unusual perspective or something else the viewer should know
- I was inspired by an app done by Melissa Loudon and Andrew Li at USC Annenberg School of Communication and Journalism
- Example

Animation

- Screen capture of is itself a type of animation
 - E.g. mouse/cursor movement and slide shows
- Sozi is an open-source version of Prezi, which uses an SVG canvas to build animated presentations
- Otherwise animation is a large topic and we won't cover animation outside of screen capture

Audio Synchronization

- If you are using multiple streams of video, you'll want to make sure that they are all synchronized
- It's easier to synchronize video using audio
 - Audio sampling rate $>>$ video sampling rate, so there is more resolution to work with
- A clap (impulse noise) can be used to mark the synchronization point

Tip

Two claps can be used to mark an error that you want to edit out

Room Tone

- If you record in different acoustic settings, the difference background noise (e.g., heating/ventilation, traffic, lights/electrical) will create noticeable changes when editing
 - This gives the video an unpleasant, amateurish feel
 - Especially noticeable when going from ambient recording to complete silence

Tip:

Record 30 seconds of “room tone” to smooth out audio during silences.

Effort Estimation

- Effort estimation for video production seems to be similar to software engineering, i.e., it's difficult to estimate

Tip:

Though it is difficult to estimate the time required to edit video, the effort required roughly increases with the ratio of input footage to output footage.

- Setting things up and rehearsing or having a script is much easier than trying to edit multiple takes

Microphone

- An external microphone will help record better audio
 - If you use your computer microphone, you may hear typing noises, especially for software tutorials

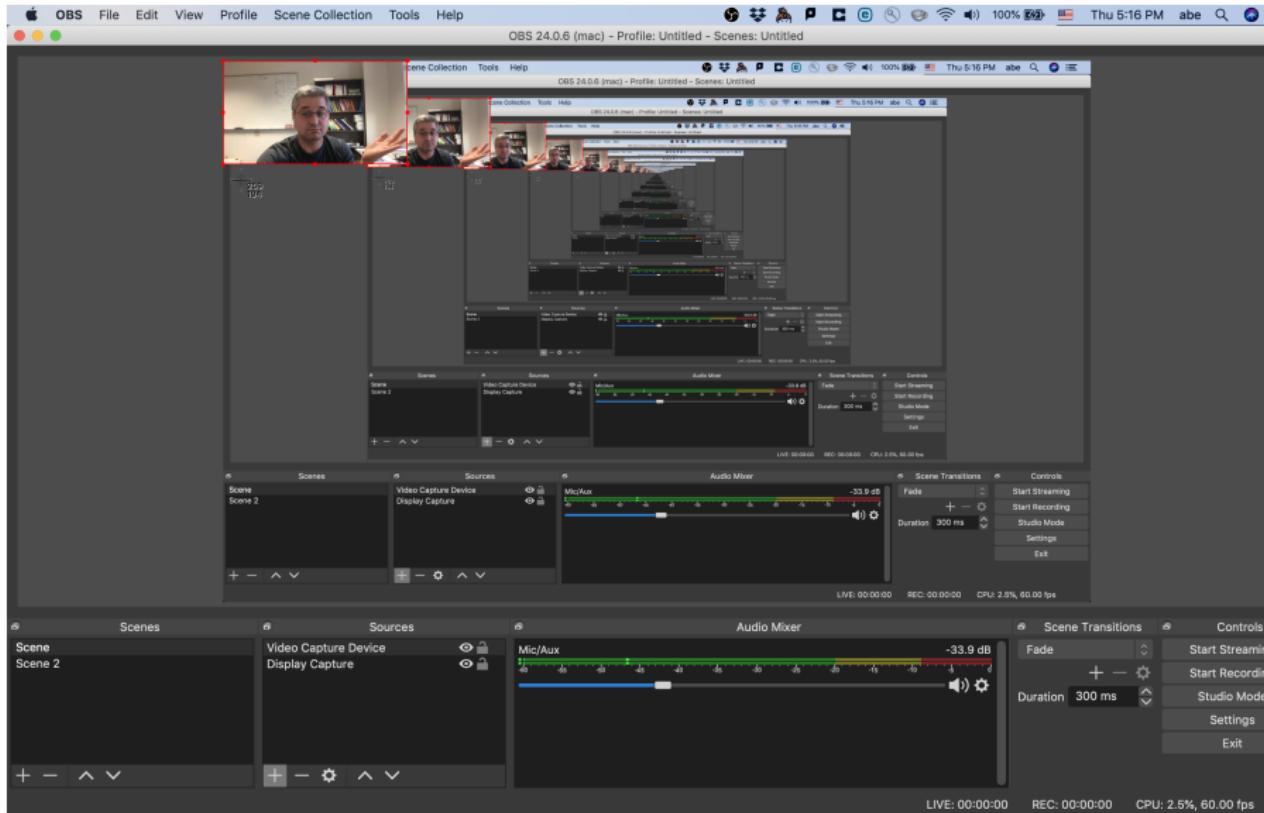
Microphone



Clapper



OBS Studio



OBS Studio

- Open Broadcaster Software (OBS) Studio is an open source screen capture software
 - Has options for both screen capture and streaming (live screencast)
 - Sponsored by Twitch, among others
- Outputs a video file (mkv-format) or streams to a server
- Multiple sources are-mixed into a single file or stream

Tip:

To be able to record two separate filesstreams (screen+webcam) using OBS Studio, you need to start two instances of OBS Studio, and start the second instance on the command line.

- The more I used OBS Studio, the more I realized having two streams wasn't necessary

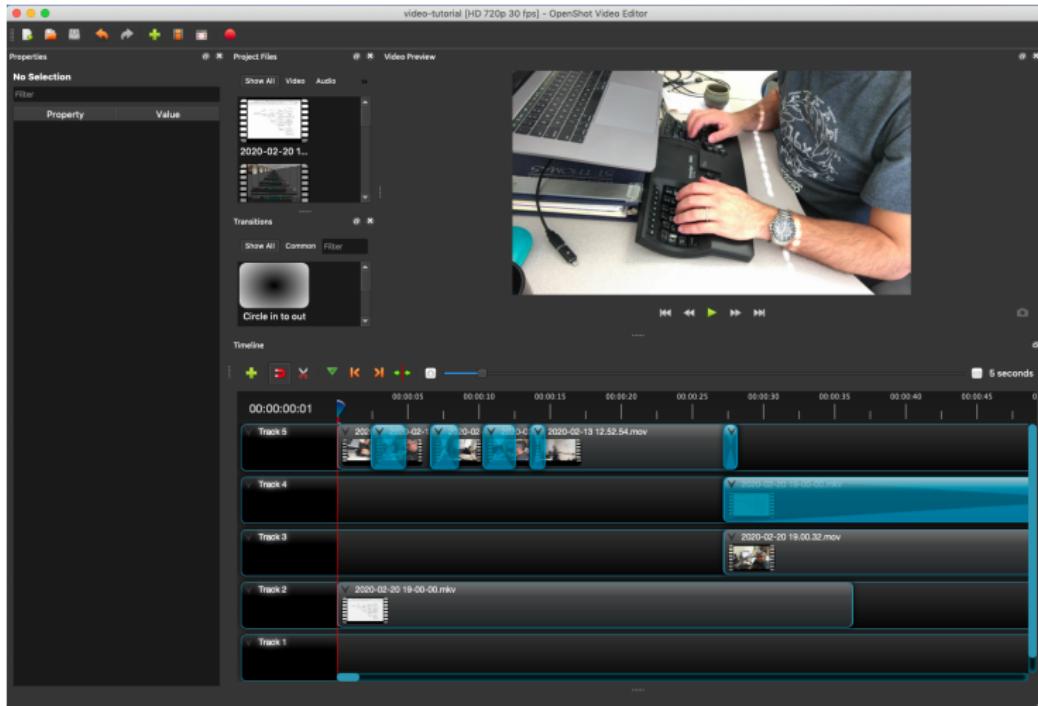
OBS Studio

- Another issue I had was showing the mouse when using window capture (as opposed to screen capture)

Tip:

To record mouse movements, use whole screen capture instead of individual window capture.

OpenShot



OpenShot

- **OpenShot** is an open source video editing tool
- Editing is necessary if...
 - ① you want to mix multiple video sources (e.g., 5-shot sequence)
or
 - ② you want to cut out unnecessary material (i.e., not live or real-time)
- Some editing type features are available when recording live from OBS Studio (e.g., switching from one scene to another)

Smart Phone

- This is needed if you decide to produce B-Roll footage
- Using a file synchronization service like Dropbox can make editing the B-Roll footage from the phone very convenient because it doesn't need to be manually moved to the computer

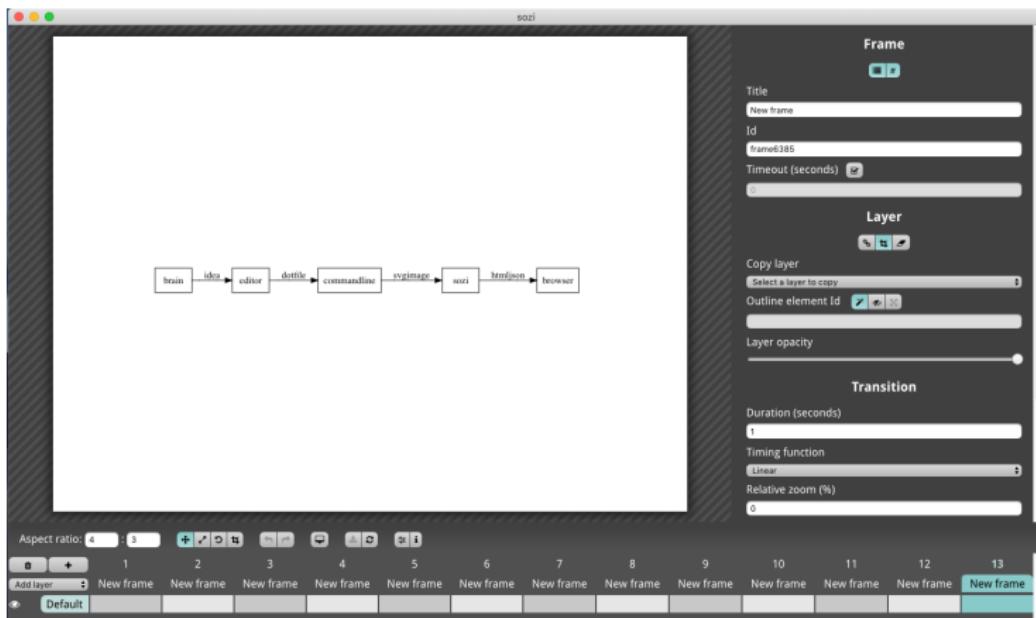
Tripod



Tripod

- A tripod will help with B-Roll footage if you are producing the video by yourself
- There are many options for “selfie” type tripods for phones
 - Comes with Bluetooth remotes for starting/stopping recording
 - ~\$25

Sozi



Sozi

- **Sozi** creates animated diagrams from SVG images for snazzy presentations
 - Given SVG image(s) create animations that pan, zoom, and rotate using the images as layers
- Open source version of Prezi
 - User interface takes some getting used to: good candidate for a video tutorial
- See demo video tutorial @ t=769

Graphviz

- Graphviz is an open source graph visualization system
- Generates graph diagrams from a declarative specification
- Used to create the SVG input to Sozi
- Consists of a graph specification language, DOT, and command line tools to generate/render output graphs
 - Also useful in the L^AT_EX toolchain
- See demo video tutorial @ t=204

Graphviz

The screenshot shows a Mac OS X desktop environment with several open windows. In the top dock, there are four terminal windows labeled 'bash', 'emacs-26.2', 'ec2-user@ip-172...', and 'emacs-26.2'. Below the dock, an Emacs buffer titled '1. emacs-26.2' is visible, containing the following code:

```
# brain -> idea -> editor -> dotfile -> commandline ->
# svgimage -> sozi -> htmljson -> browser

digraph sozi {
    rankdir = LR
    node [shape = record]

    brain -> editor [Label="idea"]
    editor -> commandline [Label="dotfile"]
    commandline -> sozi [Label="svgimage"]
    sozi -> browser [Label="htmljson"]

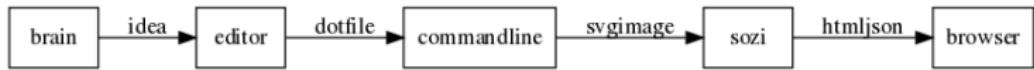
}
```

The bottom of the screen shows a Mac OS X menu bar with the following items: -UU-:----F1 sozi-process.dot All L1 Git-master (Fundame

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\LaTeX/Beamer

- \LaTeX and Beamer were used for this presentation slides
- Fits more with the online lecture format but could also be used for video tutorial format
 - E.g., switch between the main screen (tutorial subject) and the slide deck
 - The slide deck can help keep a video tutorial on track

Acknowledgements

- Matthew Lynn: visual effects specialist
- Melissa Loudon, Andrew Li: citizen journalism inspiration
- Eric Level: teaching and classroom video
- SCaLE organizers, esp. A/V team

Conclusion

- It's fun and not difficult to make video tutorials with open source tools
- I hope that this presentation makes it easier to see a general lay of the land and one specific end-to-end example

Discussion Topics

- Related experiences to share
- Questions
- Opinions:
 - Is extra footage apart from screen capture useful (e.g. talking head)?
 - Video tutorials vs text/readme
- If there's time, we can watch [the demo video](#) or drill down into specific topics