Media accessibility of digital documents containing visual representations by people with visual impairments

Dragan Ahmetovic

Assistant Professor
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Information access by people with disabilities

Accessing information is a major issue for people with disabilities

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- Special instruments may be needed

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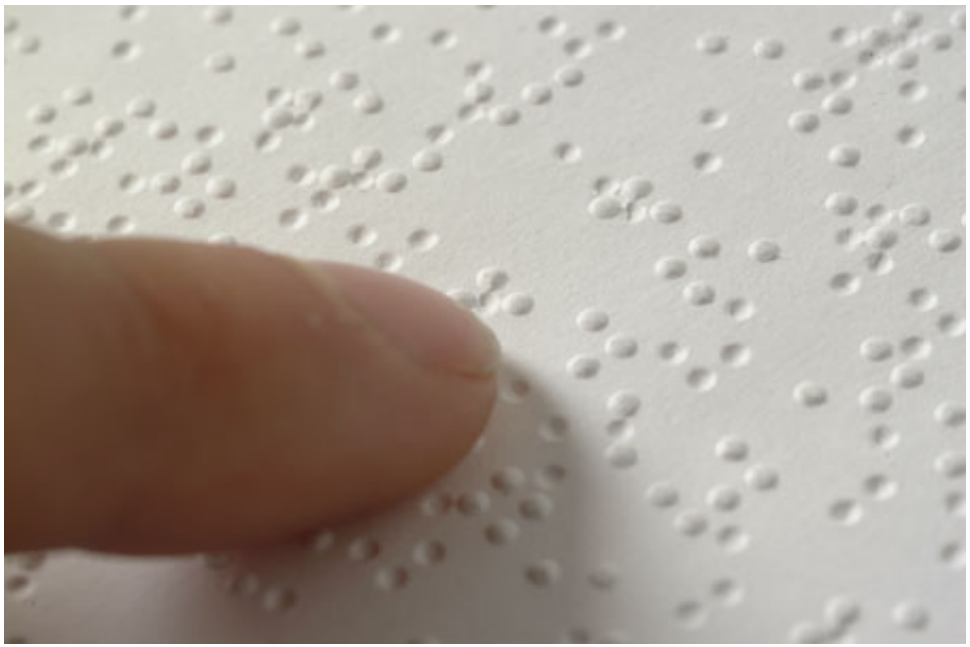

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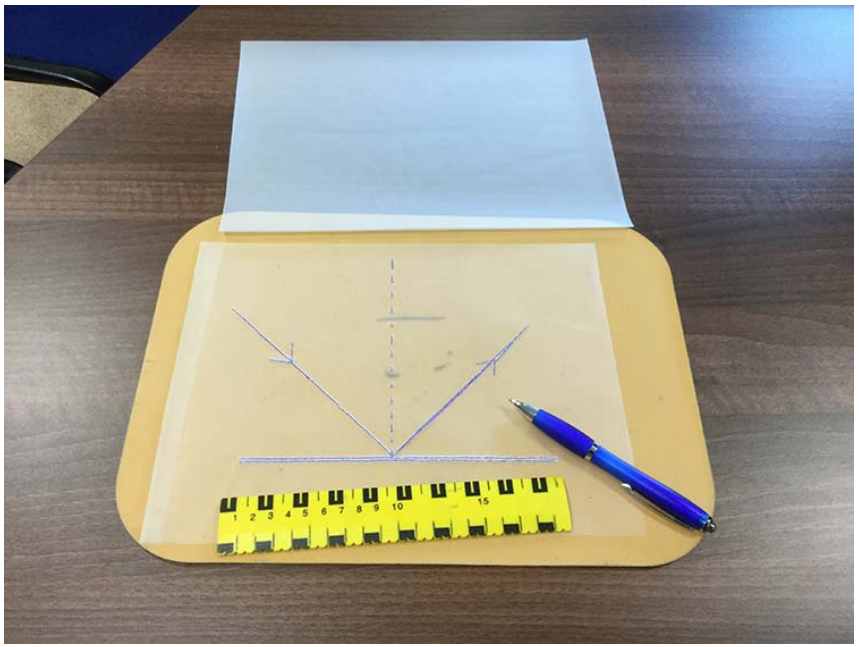

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Advances in standards pave the way towards accessible media

- Web and hypertext documents - W3C-WAI (WCAG, Aria)
- Video (MPEG-21 Digital Item Adaptation)
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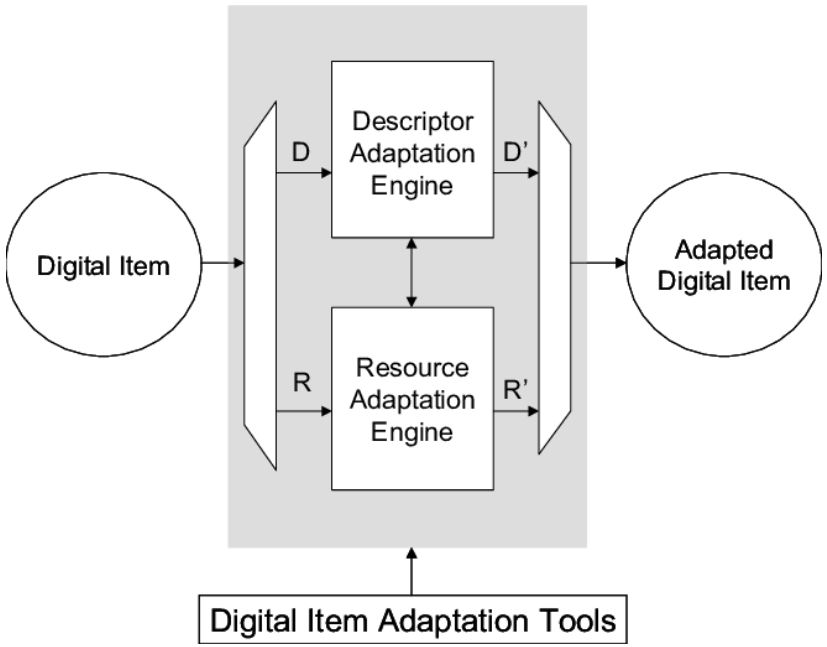
WCAG 2.0

ARIA



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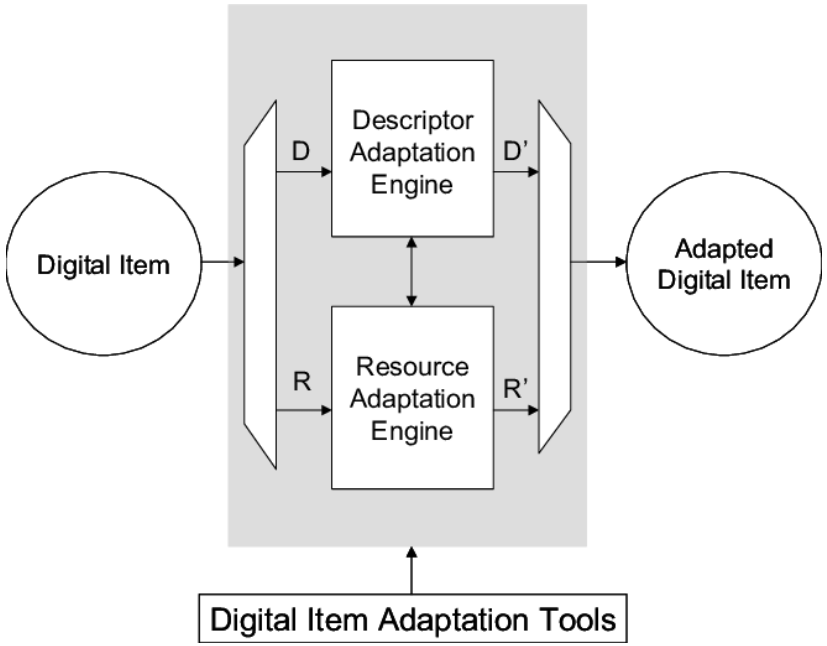

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by John Ollila - Nov 25, 2018 **2 Comments**

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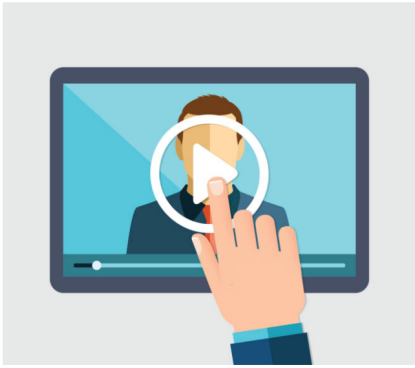
UC Berkeley To Remove More Than 20,000 Online Videos From Public Access In Response To DOJ Captioning Demand

By **Minh N. Vu** on March 13, 2017

POSTED IN DEPARTMENT OF JUSTICE, LAWSUITS, INVESTIGATIONS & SETTLEMENTS, WEBSITE

Seyfarth Synopsis: *Fewer online videos from UC Berkeley will be available to the public as a result of a DOJ demand that the videos have closed captioning.*



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Alternative content: when it's done it is done poorly

- Guaranteeing accessibility is not trivial: Validation $\neq$ Accessibility
- Alternative content, when provided, is often insufficient
- For technical content text may not be able to convey everything

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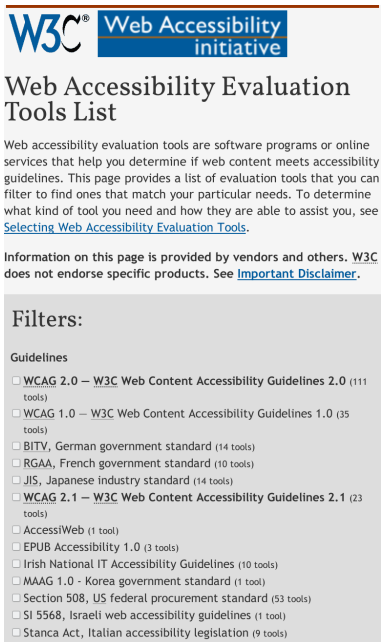

W3C Web Accessibility initiative

Web Accessibility Evaluation Tools List

Web accessibility evaluation tools are software programs or online services that help you determine if web content meets accessibility guidelines. This page provides a list of evaluation tools that you can filter to find ones that match your particular needs. To determine what kind of tool you need and how they are able to assist you, see Selecting Web Accessibility Evaluation Tools.

Information on this page is provided by vendors and others. W3C does not endorse specific products. See Important Disclaimer.

Filters:

Guidelines

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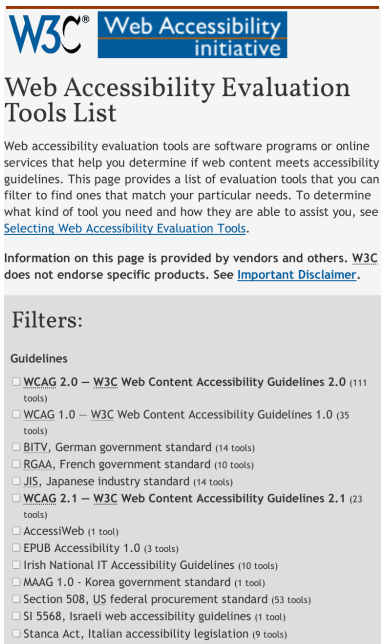

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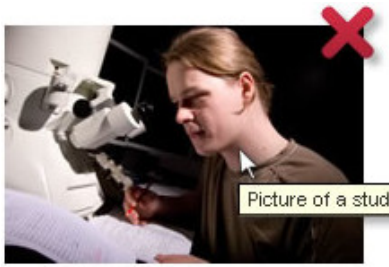

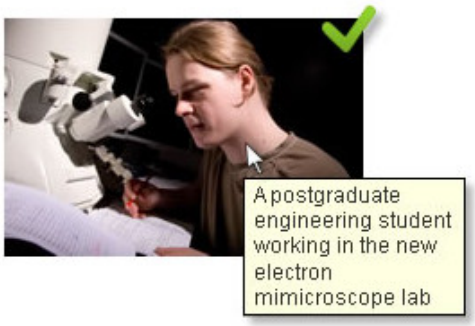

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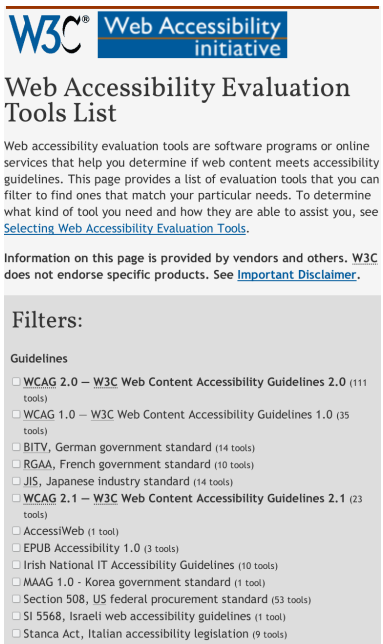

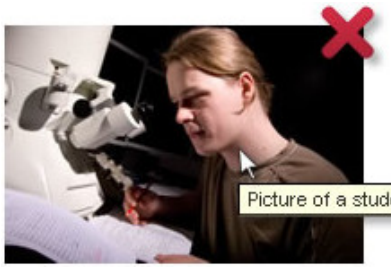

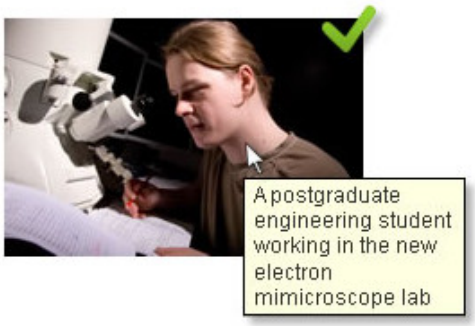

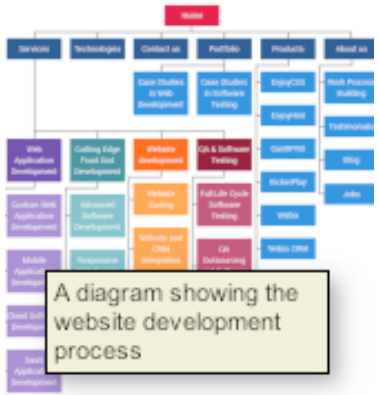

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- Crowdsourcing and on-demand alternative content
- But it is highly dependant on crowdworkers

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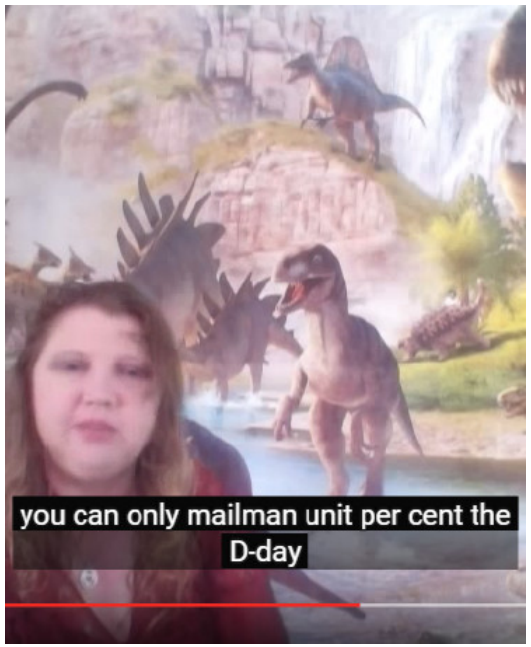

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Our approach: Zero-effort accessibility

Goal: seamlessly produce accessible content during authoring

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Axessibility: a LaTeX Package for Mathematical Formulae Accessibility in PDF Documents

Dragan Ahmetovic, Tiziana Armano, Cristian Bernareggi, Michele Berra, Anna Capietto, Sandro Coriasco, Nadir Murru, Alice Ruighi, Eugenia Taranto

Problem

- Mathematical formulae formatted for visual access
- Manually inserting formulae alternate text is cumbersome
- Resulting alternate text is often incomplete or imprecise
- Many documents are not even partially accessible

A simple formula:

$$\frac{1+\sqrt{5}}{2} \tag{1}$$

1 + 5 2

Axessibility

Axessibility: LaTeX package for PDF documents with accessible math

- Axessibility automatically generates comments in the PDF (as an /ActualText attribute) in correspondence to each formula.
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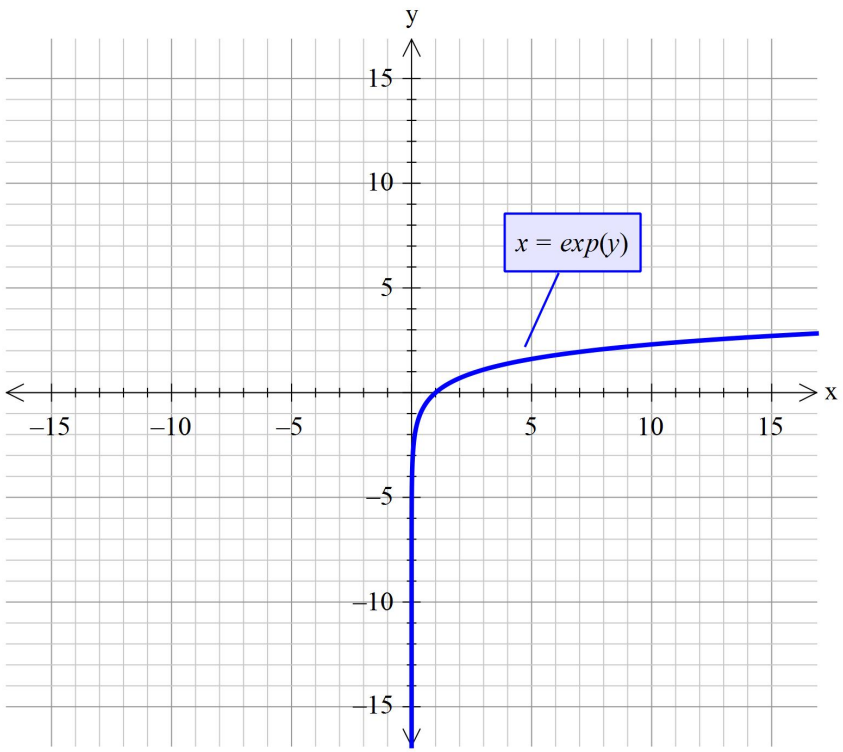
AudioFunctions.web: Multimodal Exploration of Mathematical Function Graphs

Dragan Ahmetovic, Cristian Bernareggi, João Guerreiro, Sergio Mascetti, Anna Capietto

Problem

- Graphical representations commonly used for STEM education
- Graphs convey accurate, global understanding of functions
- Difficult to translate to a format accessible to blind people



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- Exploration with different interfaces based on user needs
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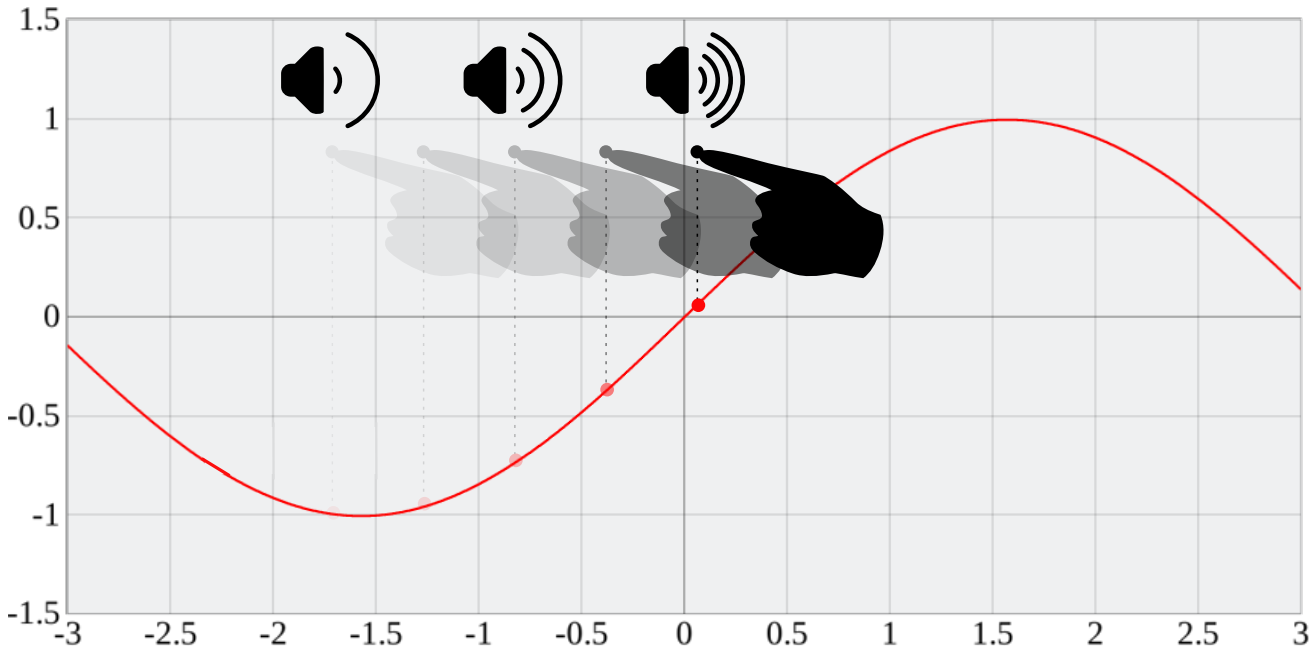

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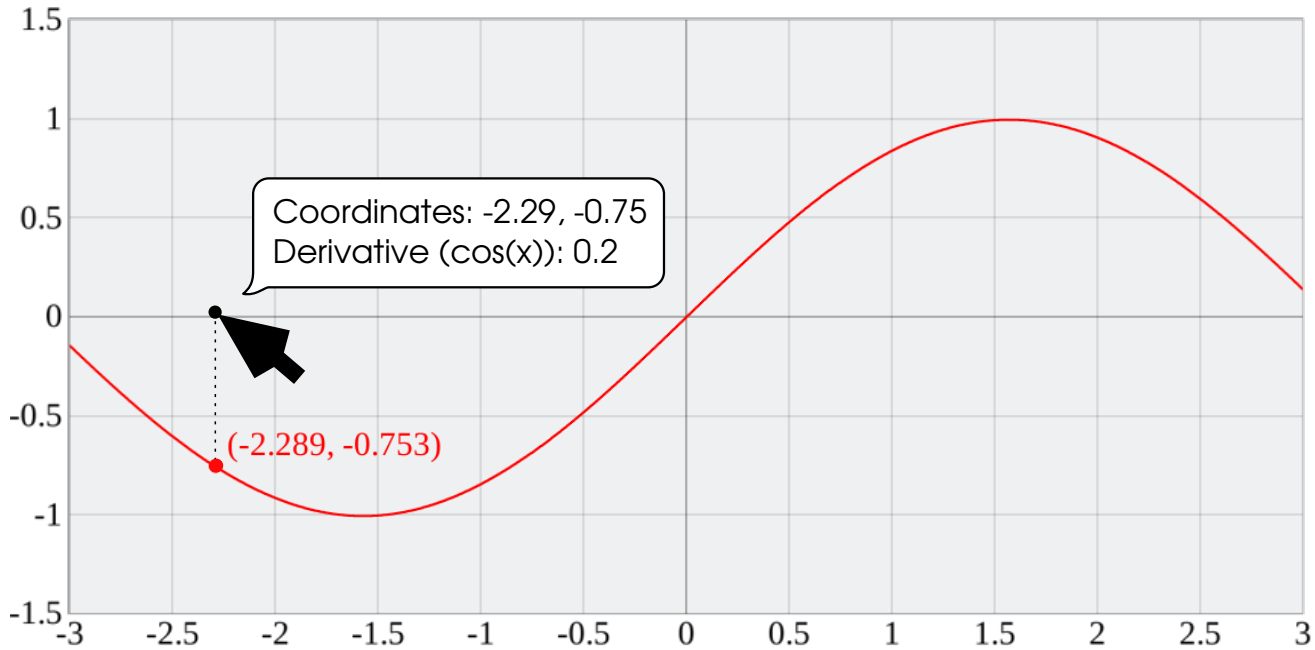

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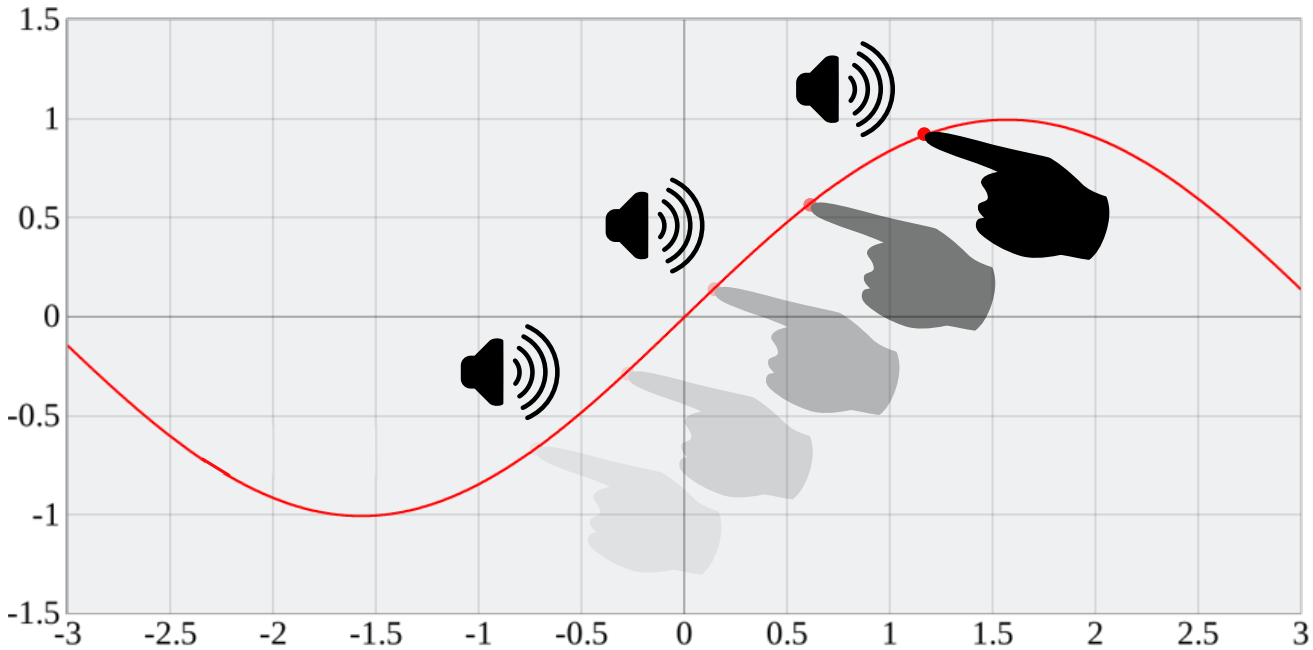

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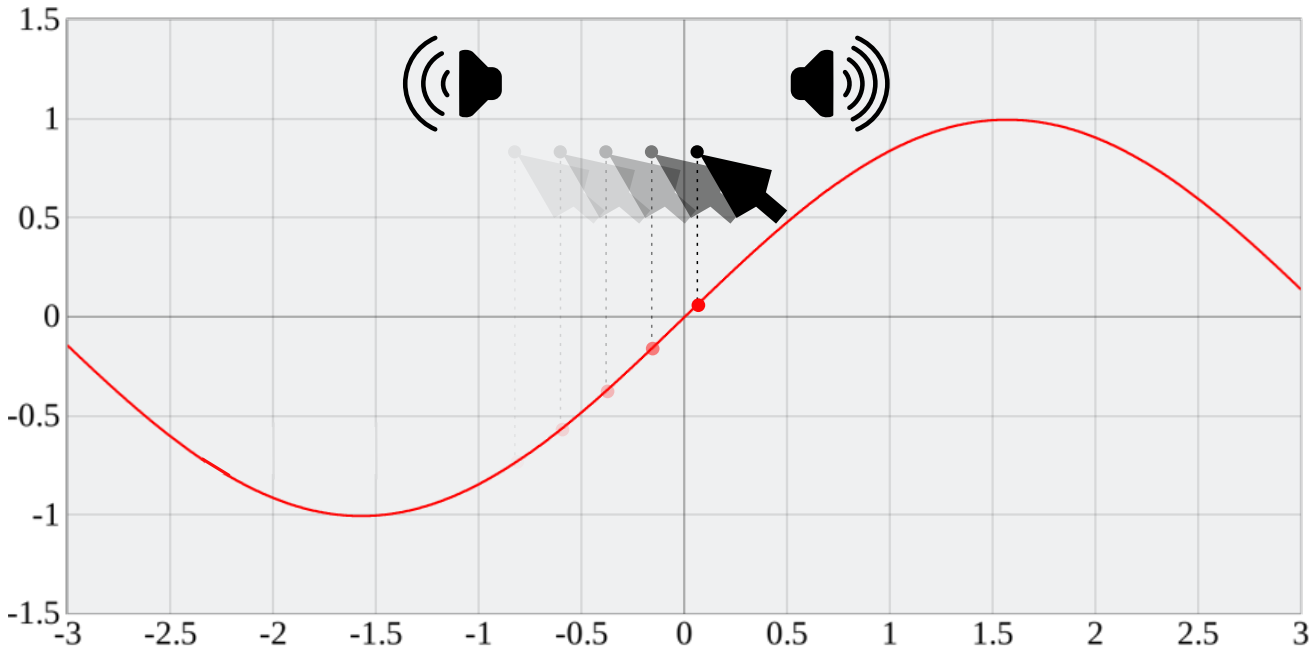

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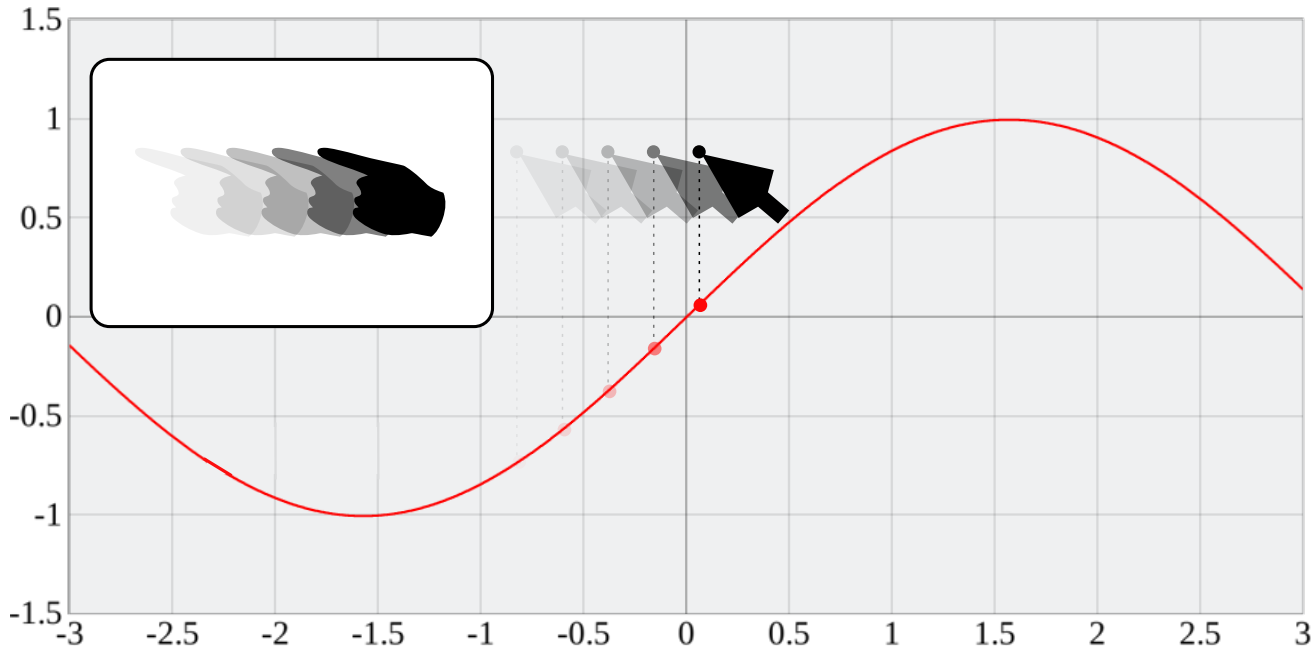

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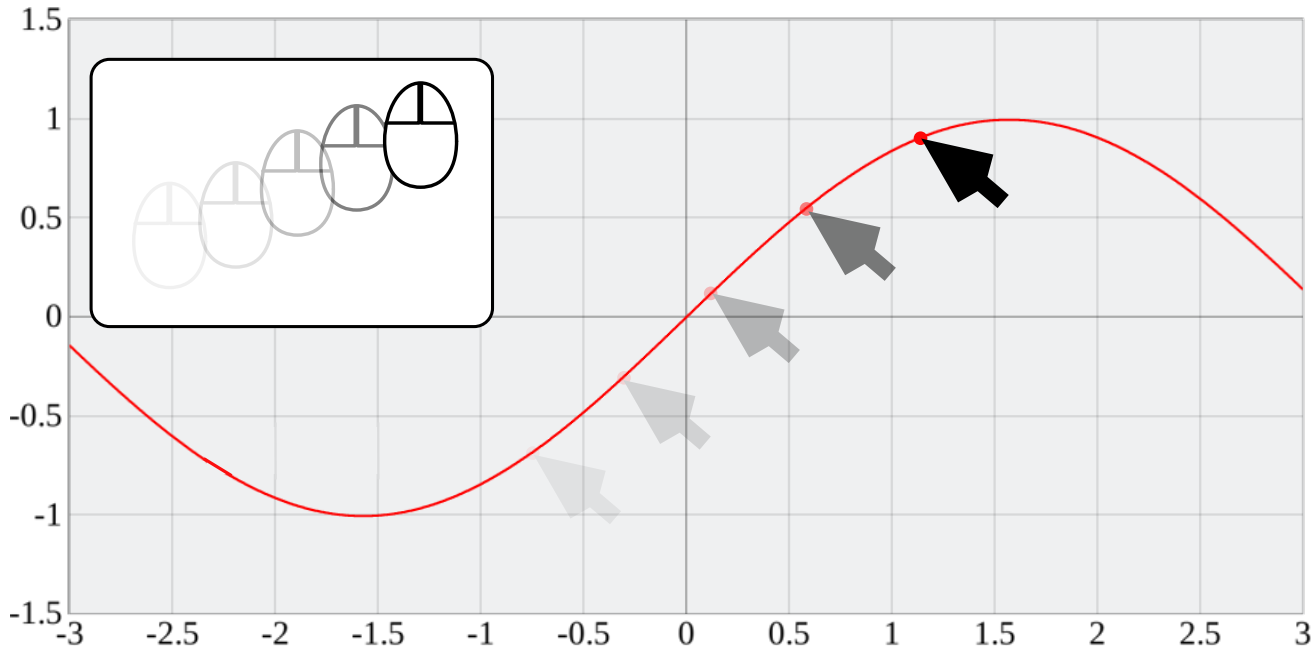

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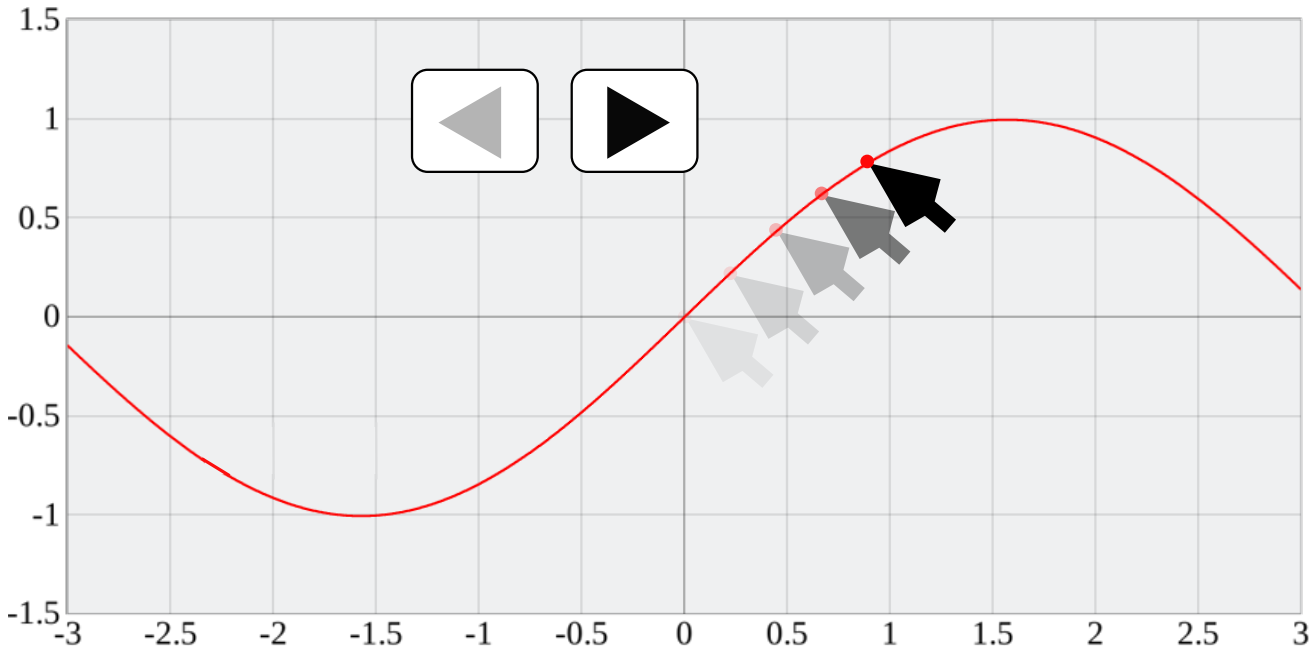

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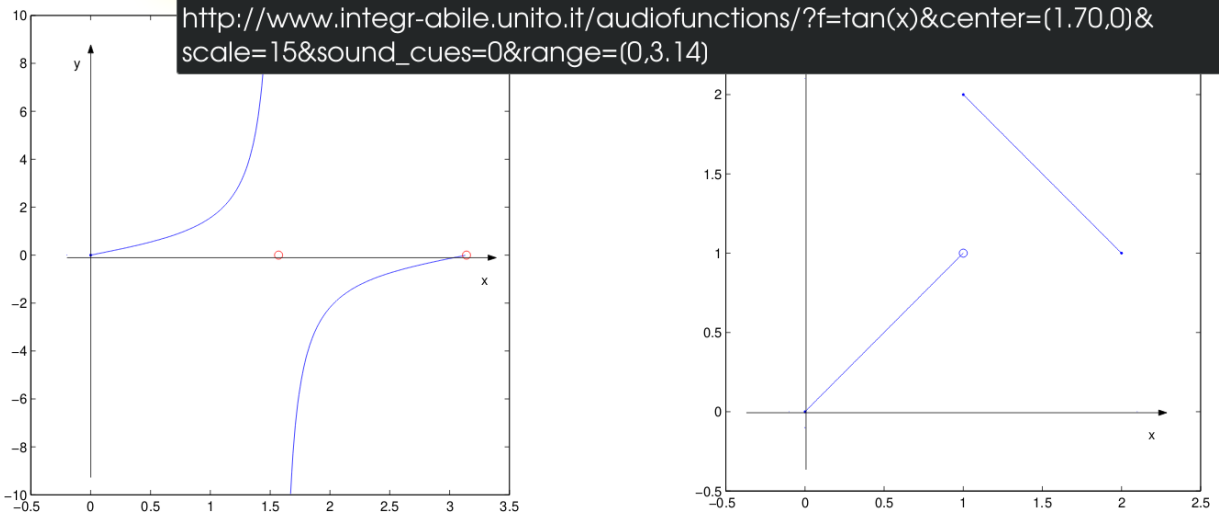
Figura 1.4: Funzioni iniettive ma non monotone

(a) Funzione tangente

(b) Funzione definita a tratti

http://www.integr-abile.unito.it/audiofunctions/?f=tan(x)&center=(1.70,0)&scale=15&sound_cues=0&range=(0,3.14)



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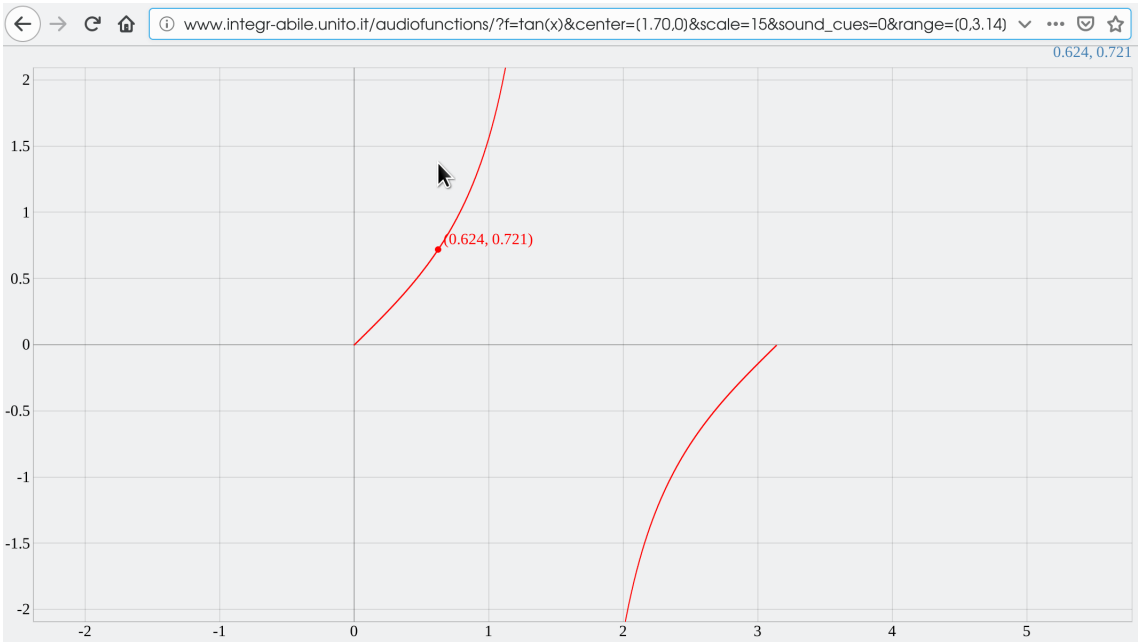

Future of the accessible media

Roadmap for the future

- Support semantic representations of content
- Explore different ways to present and personalize the content
- Consider information about context, user abilities, knowledge
- Next goal: zero-effort accessibility of lecture videos

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- Consider information about context, user abilities, knowledge
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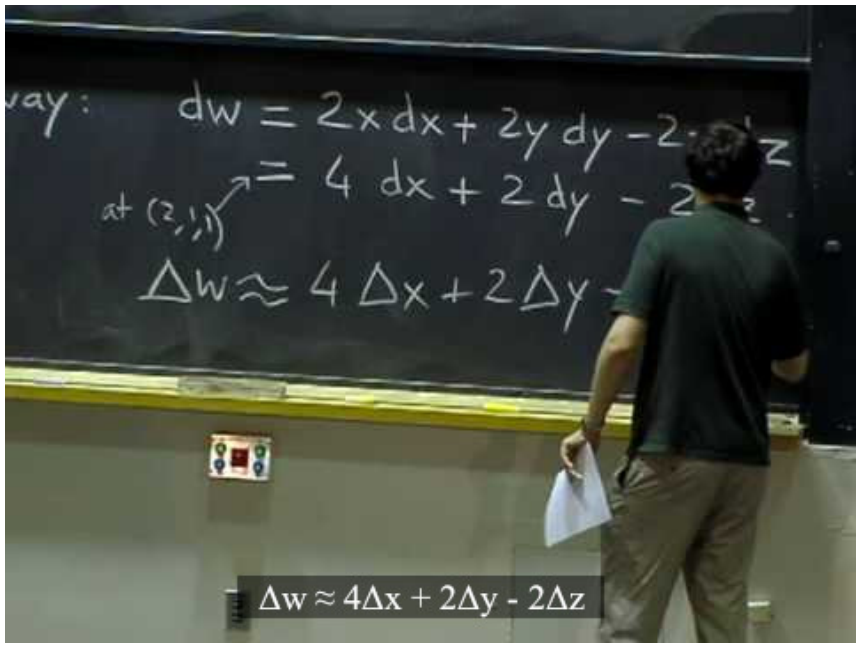

Future of the accessible media

What can be done in terms of standardization

- Support zero-effort accessibility by providing standards for the entire accessibility authoring process
- More weight to open standards, tools and integration with existing document authoring best practices

Accessing visual information embedded in digital documents for people with visual impairments

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