

Giacomo Marinsalta  
Myriam Hofmaier  
Maryna Honcharenko  
Leon Wolff

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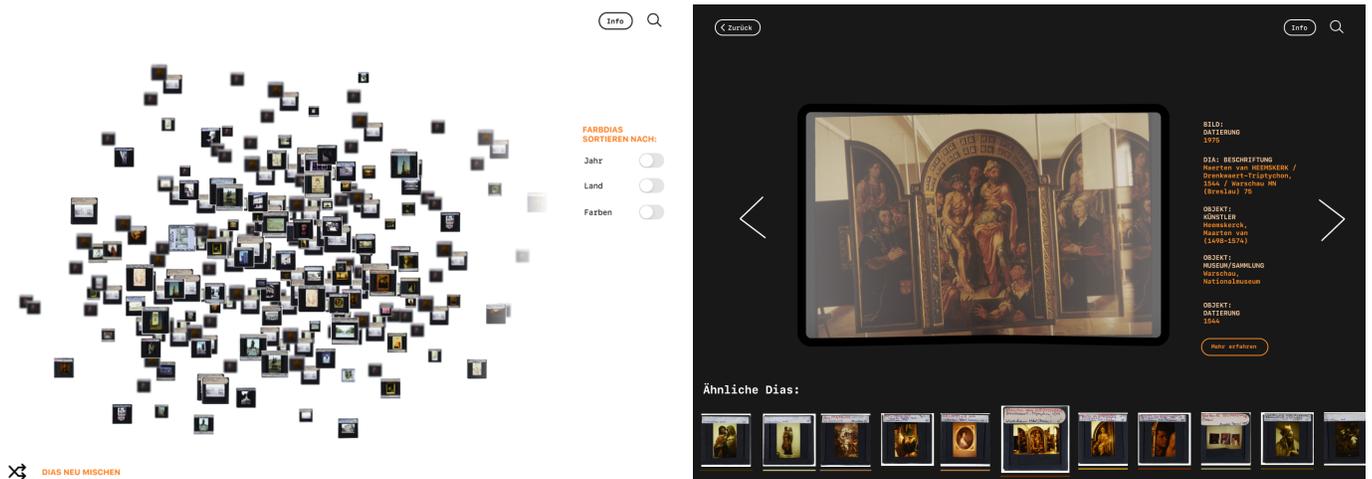
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# Slide in Time: Peter H. Feist's Color Slides Collection

Giacomo Marinsalta, Myriam Hofmaier, Maryna Honcharenko, Leon Wolff



**Fig.1** *Slide in Time* is a visualization project on the color-slide collection of Peter H. Feist. It allows the user to visit the collection over two layers: A cloud-immersive visualization (no filtering is activated) and a detailed screen, reproducing the typical slideshow of projected slides.

**Abstract** — This paper provides an overview of the process of developing a design concept for the digitization of Peter H. Feist's collection of color slides. Color slides degrade over time and therefore rely on digitization to ensure their preservation in the long run. This paper documents and analyses the process of finding a new approach for preserving and displaying color slides. The design concept thematizes color-slides as a medium, and at the same time, it acknowledges the work of Peter H. Feist to find adequate handling of his collection. Peter H. Feist was an art history professor at the Institut für Kunst- und Bildgeschichte (IKB) in the GDR from 1969 until he retired in 1993. By visualizing an overview of his collection, it was possible to express his broad interest in art history as well as his documentary style of taking pictures. Trying to make the visualization appealing, we explore filters based on color analysis to engage a playful approach while also showing the color slide as a medium with its own authenticity.

**Index Terms**— color slides, digitization, info visualization, documentary archive, filters

## 1. INTRODUCTION

In the years following the late 1950s to the mid-1990s, reversal film and slides were considered an affordable and practical solution to create high quality projected images in a technological environment, which couldn't provide other options. No other medium could in fact compete with the advantages of slides, namely to reproduce large-scale images to the typical size of paintings without the imposition of a lot of physical materials [1]. Easy to accumulate and to be manipulated, slides preserved somehow a sort of 'technical innocence' [2]: they found extensive usage for documentation, yet they had little history as an artistic medium per se [1]. As Weidner states in her research *Fading Out: The End of 35mm Transparencies*, nowadays, the slow demise of this analog technology demands a radical shift to be addressed within time-based media conservation: commercial support for reversal film ceases, while their chemicals degrade over time, leaving no trace of the image [1].

Cultural institutions are facing this difficult phase by duplicating slides or converting them into digital formats to preserve those memories, making them easier to access for viewing and sharing. In the digitization and visualization of slide film collections, their documentary extent gains performativity aspects, as their consultation through the interface design grants new levels of interaction, creating new perspectives and relationships between the technology, the content represented, and the user experience.

Managing this cultural heritage means to face their brink of obsolescence, appointing oneself to ensure a mediated access of its documentation to the public, as well as bringing context oftentimes to a heterogeneous corpus of items, whose visualization should convey a coherent and mutual narrative.

In this article, we lead a design study on the visualization of a broad documentary color-slides collection (circa 18,000), shot by the German art historian Peter H. Feist

(29 July 1928 – 26 July 2015), gifted to the Institute for Art and Visual History (Institut für Kunst und Bildgeschichte, shortened IKB) of the Humboldt University of Berlin. As a preminent art theorist and academic professor in the GDR, this archive of pictures reporting sculptures, paintings, architectures, or urban scenarios, allowed him to illustrate lectures as well as documenting studies and journeys. In a reflection process developed in collaboration with the IKB and UCLAB (Urban Complexities Lab) of the University of Applied Sciences Potsdam, we examine the design process, its results, and those challenges aroused in giving visual context and form to a large catalog of (unevenly) repertorised color-slides under parameters such as year, location of the shot and chromatics.

Pursuing speculation on different 'facets' of the 'medium' slide and its original context of usage, our visualization strives to instill a new layer of interpretation and stimulation in displaying the collection. The consultation through our design should provide an interactive and light experience of search and screening, recalling this analog technology, simulating its archiving methodology, while remaining loyal to its original documentary essence. To find relevant design solutions for our visualization, our research moved from the question: How can we show Peter H. Feist's personal color slide collection in a playful and aesthetically pleasing way, adding a new layer of projection to the medium color slide, while also making Feist's broad interest in art history as well as his documentary style visible?

## 2 RELATED WORK

Nowadays, the visual and technical imaginaries belonging to diapositives are still of popular cultural relevance: it suffices to look at some of Instagram's frames and filters washing off the colors of a selfie or to consider their digital derivative, a simple 'slideshow' of different pictures on a website. The evocative effect of reversal film still fascinates: *The Anonymous Project* by Lee Shulman, is an example of a slide collection, striking for its visual storytelling, emphasized for the suggestion of an 'unpolished quality' [3] of images coming from anonymous glimpses of lives. *The Anonymous Project* has indeed a well-curated selection of pictures, succeeding in exhibiting a 'kaleidoscopic diary' [3] of an epoch, which is described more by an aesthetic glance – through comparisons between its subjects – rather than by the technology behind it. As a matter of fact, the digitized collection extracts the films from their cardboard or plastic mount, without providing any documentary background on the slides, which are shown in a grid-structure, organized in groups according to various visual topics.

In our study we try instead to bring forward the documentary background of the collection, willing to stage Feist's lifelong archiving practice, therefore assuming to work with its entire eclectic extent. This makes us confront the need of creating more diverse levels of interaction for the users to get through the large number of items, reflecting on ways to enhance curiosity and supplying different angles of accessibility.

As comprehensively analyzed by Windhager, we try to shift from the habitual grid-based and search-centric interface, assessing approaches for the design to be user-centered, providing the visitors tools to actively adjust the interface through filtering, thus allowing them to unveil the documentary potential of the collection [4]. Endorsing

exploration rather than mere search, the interface design strives to create chances for serendipity and the making of a "generous interface", a concept to which Windhager refers in the visualization of rich cultural heritage collection as, "emphasiz[ing] the importance of overview, orientation, and details on demand", but also "promot[ing] the utilization of multiple (over)views, to form complementary composites that reveal different aspects of a collection" [4].

The suggestive power of the coloring dye represents as in *The Anonymous Project* a salient feature, probably the most characteristic of the medium 'slide', for its specific tones and character of evanescence over time. By looking with interest at this transient condition, we decide to include color as an additional variable to sort through the collection. Although already extensively adopted by cultural collection visualization (like in the *Olivia's Vane Dive Into Color* [5], or the *Art Palette* and *Runway Palette* in the Google Art & Culture Experiment platform [6]), we decide to implement this approach, as capable of bringing another documentary perspective to the archive. As a matter of fact we find that various series of color-slides present uniform coloring dyes, owing to the usage of the same type of film, or being similarly affected by time fading processes. Among different methods for analyzing color, as for example generating color palettes, or extracting the average or dominant color for each slide, we choose the latter as the most appropriate. We aim in effect to assign a single color to each slide, and the dominant color analysis results in a more heterogeneous and vivid color scale. The average color doesn't honor the original chromatic variety of the image. A successful usage of dominant color extraction involves the usage of k-means clustering, a method of vector quantization, which we operate in our analysis through Python and OpenCV [7].

As for contextualizing the cultural background of the collection, our study has mainly drawn from two areas of interest: we enquired primarily on the didactical usage of slide film, especially in humanities studies, to subsequently focus our attention on the character of Peter H. Feist, his contributions to the field of art history and his condition as an academic and intellectual working in the GDR.

According to Nelson thanks to the technology of photography and electric light, thus to reversal film, art history teaching practices began gradually to converge into normative patterns at the end of the XIX century. In fact "art history becomes the illustrated lecture par excellence" [8]. The introduction of this technology brought the possibility to make the artworks present – contemplated now as projections next to each other – granting comparative speculation between two pictures or between their details, enlargements, and variants. As the cinematic motion, the succession of slides, accompanied by the spoken word, participated in producing a "narrative", enhancing a more directed engagement with the artwork, "as a reality that is there" [8].

Slone asserts in 1977 that color-slides allowed teachers the freedom to build classes around the artworks of their interest, making them independent from any pre-existent miscellany of images that happen to be available [9]. The author moreover praises the use of color-slides for teaching art history, although denouncing problems caused by dissemination of information. Art photographers and historians, she suggests, ought to know and handle better the difficulties of photographing artworks in museums, for instance adapting to "abysmal" lighting conditions for color-slides photography, criticizing the "obstreperous stance

adopted by museums" [9], whose policies for external individuals to photograph artworks were seemingly too strict. Slone argues as well about the existence of certain discrepancies of quality between products in the market and of photographic know-how, comparing different institutions producing, duplicating, and selling color-slides to independent or academic users. A closer look at the historical practice of the medium helped us in this way to frame what moved Peter H. Feist's to put together such an extensive catalog of color-slides.

The main reference for our second focus of study has been Feist's autobiography *Main Roads and Own Paths: Review of an Art Historian* [10], in which he recalls the key moments of his life and career, as well as presenting his extraordinarily versatile scientific, social and art-political work. The IKB also provided important background context on the collection, on the role of Feist as a scientific employee in the Institut, on the process of digitization of the slides, and the organization of the archive through relevant information on their website or personal communication.

### 3 DIGITIZING FEIST'S COLOR-SLIDE COLLECTION

In this section we firstly conduct an overview on how the collection has been brought online, to then turn our attention to its historical background, looking parallel at Peter H. Feist's archiving and teaching practices, and role as art historian in the GDR. We contextualize and elaborate on technical aspects regarding the dataset, describing moreover the design process and our research considerations, which have resulted in the layout of our visualization.

#### 3.1 THE COLLECTION AND DIGITIZATION PROCESS

As Weidner formulates, what we call 'slide' "refers to a 35mm photographic positive image comprising chromogenic dyes on a transparent base held inside a plastic or card mount"[1]. The frame allows the transparent film material to "slide from one image to another inside a carousel"[1], projecting it on a surface, mostly a wall or a whiteboard. In contrast to negative film, photochemical reactions produce a positive image. She also points out the etymology behind the terms referring to this technology "as *diapositive*: *dia* [Gr.] (through, between)" or *transparencies*: "Transparent breaks down into *trans* [Lat.] (beyond, across) and *parere* [Lat.] (to appear, be visible, be seen, etc.). All three terms: *slide*, *transparency*, and *dia* describe an ephemeral presence, a state in which a picture is formed, lasts, and disappears" [11].

In 2016 the Media Library of the Institute of Art and Visual History of the Humboldt University was granted by Feist's son over 20,000 slides taken by his father on business and study trips between approx. 1956 and 1996. While the Akademie der Künste received his personal library and materials, which are related to his activity in the academy, his entire bequest related to his academic activity was given to the Humboldt University. Here the written material became part of the university archive whereas the color slide collection was granted to the Media Library of the IKB [12]. Thanks to the funding program of the Service Centre for Digitisation (digiS), the Media Library received funds in 2018 for the digital indexing of his image estate [13].

It is interesting to consider that the collection was built up from original photographs taken by the artist himself on over 100 journeys in Germany and abroad. This body of pictures constituted, at the time, a precious access to unavailable pictorial material in the GDR, as it documents Western European and North American art, which were actually Feist's main areas of research. Reflecting personal research interests, but also suggesting the researcher's scope of movement and a general perspective on art and socialism, the study of the pictorial objects in Feist's slide collection is not only relevant for art studies but gives also insights to other historical cultural studies (history of science, history of everyday life, history of the GDR). As for the themes and subjects documented, the collection divides itself into two halves: on one side it is possible to count on many pictures portraying buildings and urban planning situations in Central Europe, Eastern Europe, Western Europe, the Middle East, India, and the USA. On the other side, Feist immortalized many works of art in painting and sculpture. The extensive collection of paintings from Eastern and South-Eastern Europe is valuable as original and unique documentation material for art in public space, monument conservation, and urbanism in the 1950s to 1990s [13]. With the beginning of the '90s, in the aftermath of the Wall's fall and the German reunification, images of international works of art became so easily accessible that presumably, it seemed superfluous for Feist to continue investing time in broadening this collection [12].

The slides have been stored from 1995 up to 2015 in a dank basement, and in the digitization archiving processes the collection was moved from inadequate containers belonging to Feist, to specially tailored archive boxes for conservation, respecting the division Feist once applied. After being cleaned, the slides have been digitized at high resolution, and parallel, they have been indexed on the database, guided by the inscription Feist systematically reported himself on the slide's mount, writing the artist's name of the object photographed and the date of the shot. The Institut has kept original cardboards separating the sections of Feist's collection, and the current storage in the archive boxes served to create the file name system of the database, composed of the box number and the order [12].

#### 3.2 PETER H. FEIST

Born in 1928 in Warnsdorf, North Bohemia, and dying in 2015 in Berlin, Professor Emeritus of Art History, Peter H. Feist has been a predominant figure of the Institute of Art and Visual History at the Humboldt University of Berlin. After his graduation from high school in 1947, Peter H. Feist attended the Martin Luther University Halle-Wittenberg in Wittenberg, where he studied art history, history as well as classical and oriental archaeology, graduating in 1958.

His socialist political credo and action contributed to the construction of the German Democratic Republic through his research. He joined the SED (Socialist Unity Party of Germany) in 1954, and after his graduation, he moved to Berlin, where he became a senior assistant at the Institute of Art History at the Humboldt University, obtaining in 1966 his habilitation with a topic on French Impressionism. He was appointed lecturer in 1967, professor in 1968, and full professor in 1969 at the Humboldt University. From 1977 onwards he was head of the Department of Art Studies. He has held many positions of responsibility, including being a member of the central board of the Association of Visual Artists of the GDR from 1968 and director of the Institute for

Aesthetics and Art Sciences at the Academy of Sciences of the GDR from 1982, in which he contributed to the publishing of the most important encyclopedias of art history in the German-speaking world, the *Lexikon der Kunst* [14].

Feist's activities and honors helped to give recognition to art history in the regime, preventing the subject to wither away as a bygone remnant of a bourgeois heritage that was not genuinely designed to educate the "new man", envisioned by the socialist ideology [14]. Thus, his professional vocation and mission often led him to fight through serious conflicts with the leadership of the SED. As a respected scientist who was loyal to the state, he was also allowed to travel to Western countries. He traveled a lot for his scientific work and always had his camera with him. Consistently over time, while taking part in conference trips or official missions, Feist photographed works of art in museums as well as architecture and everyday life on the street [14].

German Romanesque, French Impressionism, and 20th-century sculpture represented his main scientific focuses of study and his art theoretical discussion brought to the publication in 1966 of the *Prinzipien und Methoden marxistischer Kunstwissenschaft: Versuch eines Abriss* ("Principles and Methods of Marxist Art Studies: Attempt of an Overview"), in which he promoted the application of the Marxist method in scientific work to the study of art history [14].

### 3.3 DATASET

Peter H. Feist used to arrange personally the collection, and in doing so, he has created a—quite typical for an art-historical picture archive—basic division in architecture and other forms of art. He sorted the slides according to places (only a partial subdivision has been divided according to his journeys), and the remaining works of art, i.e. important movable art objects, according to genres or epochs. Feist managed in this way to create a small archive of art history at home, starting with ancient times and ending with the art of his present days in the GDR [12].

As sorting the slides according to his travel routes lacked exact information such as details about when and in which journey he had followed specific routes, the Institut cataloged the items into places, according to their geographical location. Since almost all of the recordings are dated, digital filtering made it easy to get any order out of them, as the chronological order or the frequency in which he travelled [12]. Here the autobiography has been a parallel support to trace his journeys abroad.

By the amount of metadata, the Institut repertorised all the entries under two groups: Entry Level I — minimal and Entry Level II — basic data. Entry Level II indicates that the data such as labels, picture subject, date of shooting is available (amounting to a number of circa 18,000 items). For the minimal data entries following information is defined: which subcollection the slide belongs to, the photographer (Feist), and the copyright (CC). A reduced dataset for our visualization work would exclude copyrighted works of art (belonging to the second half of 1900), personal pictures and slides Feist bought and therefore whose rights haven't been clarified, reducing the number of overall slides eligible to be shown (around 16,000). An interesting add to metadata, although unevenly spread through the database, is geodata. Many pictures including architecture and monuments have

been linked in the database to geographical coordinates, referring to authority files such as Wikidata (whose references report information, for instance, on the artist who created the object, or under which artistic style it could be historically classified.) As for the indexation of spatial references of where the slides have been shot, the database has revealed inconsistencies in the separation between town and country. A homogenization of the spatial terms would therefore still be required.

For our visualization we have cleaned the dataset, selecting only those items under Entry Level 2. We removed unnecessary variables and invalid data, dividing the category of time and place into components, as well as standardizing inconsistent local data. In doing this, we have used R Studio, being eventually capable to use real data for our visualization design.

Feist's collection is already available on the website of the Institut [15], on the image archive platform Prometheus [16] and will be soon released on other similar online archives, such as the one of the German Digital Library and of the project Bildhauerei in Berlin.

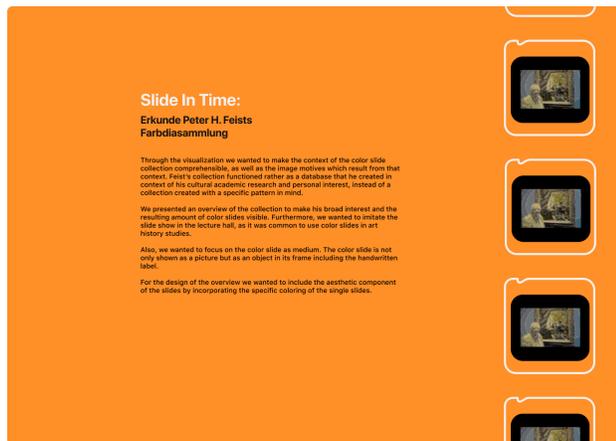
### 3.4 DESIGN PROCESS

Basal criteria such as time (date of recording) or location (where the shot has been taken) have been considered the bedrock for our visualization. In order to bring up creative ideas and enquire how to combine a documentary viewpoint with a more playful visualization experience and interactive design, we structure our research on the methodology of the Design Thinking Process, a five-stage model proposed by Hasso-Plattner Institute of Design at Stanford (d.school), an authoritative voice in the teaching of Design Thinking [13]. The process involves five stages: Empathize, Define (the problem), Ideate, Prototype, and Test. This method is employed in the resolution of blurry or undefined complex problems, "by understanding the human needs in question, by re-framing the problem in human-centric ways, by creating many ideas in brainstorming sessions and finally by adopting a hands-on approach in prototyping and testing" [17].

The first phase saw our study observe, engage, and 'empathize' with the IKB, on their experience and their motivations for the visualization of Feist's collection. The analysis of the database and the historical contextualization of the slide film technology as well as the reading of Feist's biography let us gain a deeper understanding of the material and the content of the collection. After cumulating this information and confronting ourselves with our partner institution, we moved forward to the next step, that is to say, defining the core problems encountered up to this point.

A closer look at the database let us understand, in fact, that our study had to go through concrete limitations, considering the above-mentioned indexation inconsistencies and the difficulty to grasp the heterogeneity of a very large database. The collection documents an equally eclectic range of artworks, prompting to refer to various topics, such as slide film as documentary and illustrative technology, art history teaching practices in GDR, or Feist's research interests. It has been clear then that any visualization on the base of an art historical narrative would have represented an elaborate task. Time constraints and the difficulty to approach subjectively the collection made a hypothetical curatorial work, built through relations of objects, or the

travel routes of Feist, a rather specialist task we couldn't embark on. Also we had to had grant easier access to potential beginner users interested in culture, making them able to appreciate an overview of the collection, with its documentary appeal, while having the possibility to zoom into single slides, performing a search through filtering, providing chances for serendipity.



**Fig.2** Slide in Time: A short introductory text on the collection and the character of Peter H. Feist.

In order to contemplate new relationships interweaved by the slides and to gain creative visual approaches for our ideations [18], we led an online collaging workshop, involving four employees of the IKB and its Media Library. The aim of the activity was to create collages out of 50 randomly chosen slides (presented with their inscription information and metadata), trying to reflect on the semantic connections or similarities between the images, and on those details normally undisclosed by categories, like time or space terms. The workshop showed that in the free association of images or portions of images, most of the participants (us included) were more captivated by the content of the slides, than their formal criteria. This suggested to us that there was an interest in approaching the visualization in a more aesthetical way. In the Define phase, we started to gather ideas, functions, and features that could help us solving our research question, interrogating ways to mediate between an informative approach, making Feist's documentary art history contribution tangible, and a playful one, bringing a new layer of projection to the medium of the slides, capable of carrying an entertaining aspect to stimulate the curiosity of the visitors. This 'renewed' projection of the medium of the slide makes us contemplate it under three levels of interpretation: as media object (glass, lettering), as photo

(blurred image, interesting details, discolored film) and as a pictorial object (interesting street scenes, a possible unknown work of art).

In this perspective, a significant feature of the collection is the double nature, in which the medium slide is cataloged. It is possible to screen each item in two versions: a view of the whole slide with the frame and inscription, and a high-resolution digital copy of the actual film. This visual combination recalls the practice of showing two pictures at one time, considered the hallmark of the art history's illustrative method. Even before the advent of slide film and photography, in the mid-nineteenth century, there was notice of lectures comparing two large drawings. By the beginning of the XX century, projections had become conventional and this comparative approach became substantial in art history lecturing. If Wölfflin [19] is credited to be the initiator of this practice, Goldschmidt has to be remembered for his "skioptikon", a specific slide projector, in which two glass slides could be projected next to one another, with the possibility of being changed independently of one another. It is interesting to note how this represented a shift in the analysis of art history artworks, as Goldschmidt puts it: "This seemed to me unconditionally necessary to the comparative observations of the students, since when one sees images one after the other, one only holds the very coarse stylistic differences" [20]. The slide technology was especially praised, as the visual and verbal interpretations would merge. More flexible than the linear structure of a book, slides lectures entailed the fusion of visual and verbal argumentations, whose narrative effects owe something to the rise of a "screen practice" [3], born with cinema. "Like lecturers accompanying the panorama or the magic lantern, the silent film narrator stood beside the images and offered commentary in ways that were culturally specific and adapted from local customs of telling stories with pictures" [21].

The visual juxtaposition given by the double view of the medium slide becomes preponderant for our design study (Fig.1), as it allows contextualizing the technology of slides in the historical development of art history lecture, serving as an educational reference, yet constituting an aesthetically interesting form to present the collection to the visitors.

Another interesting topic that has influenced our visual reflection has been the way in which slide libraries are ordered. It is important to note that the pictures were not in a fixed order, as it is usual to see with art historical slide libraries, but were rather grouped into sections (e.g. in the case of locations, all the pictures of a city; in the case of art epochs and genres, the works of one artist), always separated by a small cardboard. This meant that there were no numbered individual divisions, as it is often the case with photographers who file their slides by number. Within the departments, the pictures did not have a fixed order. The departments were also not fixed in size once and for all, but could grow as needed (e.g. if many new slides of the artist were added, the department grew by putting them in front of the next cardboard – to do this, there was always some space left in the drawers or at some point, everything had to be moved around [12].

The art of ordering slides in an archive with its specificities and the look of Feist's drawer recalling the form of a grid have been two particular aspects that have inspired our final prototype. The visual emulation of the slide storage represents a good resolution to, on one side refer to documentary archiving practices, and on the other recreate

the experience of a search through the collection, structuring the presentations of the slides as if they were seen in a collector's drawer.

Furthermore, what emerged from the workshop was the importance of the own aesthetics of color-slides, given by their frame and their color toning. The chromatic interest was turned to the colors of the cast, as a possible aspect to trace how film design changed over the years, but also to the toning of the pictures, changing through different types of film, but mostly changing over time, as excess light, heat, and moisture affect the dye color layers in the slides. Three layers of dyes make up color film, produced by the yellow, cyan, and magenta portions of the color spectrum. They do not affect the layers equally, therefore most slides will have a faded color shift toward either a red or blue hue. The least stable film in the dark is the yellow layer, which is why faded color films frequently have a pinkish hue to them. Once the color faded, it is difficult to restore it, aside from some digital reconstruction processes. The best way to preserve color-slides from fading is hence to keep them in cold storage. The colder the temperature, the longer the slides will last. Touching the film with fingers also encourages fungus growth. The use of different types of cleaners to remove fingerprints will also cause the slides to degrade faster [22].

These particular aspects regarding coloring and its deterioration processes constituted an ulterior point of reference for our visualization research. Various series of pictures in the collection present similar dyeing characteristics or have been affected by the appearance of microbiotic stains. These aspects have been regarded as exciting artifacts, as both documentary and aesthetic approaches converge in their visual examination. This is why we reckoned color could represent an ulterior parameter, that could be crossed with time and/or space filtering criteria, in order to enhance the detection of chromatic assonances or altering processes in the collection, possibly allowing to spot patterns or new relations among the slides or more generally bringing a playful approach to the visualization.

Although we first focused our attention on the average color, we soon realized that a data visualization featuring this type of analysis wouldn't be much revelatory. The chromatics of the slides lacking vividness, the calculation of average color would generally result in drab tones. For this reason, we turn our attention to a data visualization that would exploit the expedient of the slides' dominant color, intended as the most prevalent color in the image.

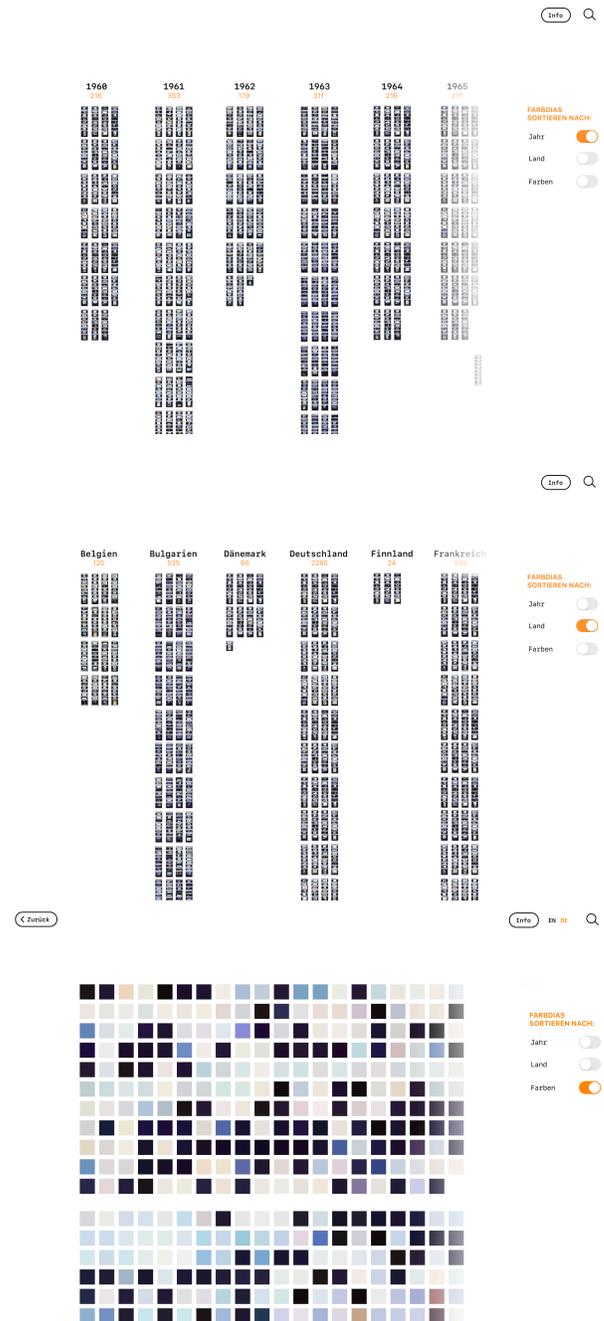
#### 4 SLIDE IN TIME: EXPLORING PETER H. FEIST'S COLOR SLIDE COLLECTION

After having detailed the major steps and considerations in our design process, we analyze the approach we have embraced throughout the different stages of our research. We present moreover the prototype, in its different functionalities and levels of interaction.

##### 4.1 DESIGN APPROACH

Synthesizing our observations on the collection induced us to concentrate our visualization approach on the color slide technology as a constitutive medium itself. The frames

of the slides as well as their coloring were also relevant aspects we intended questioning in our visualization.



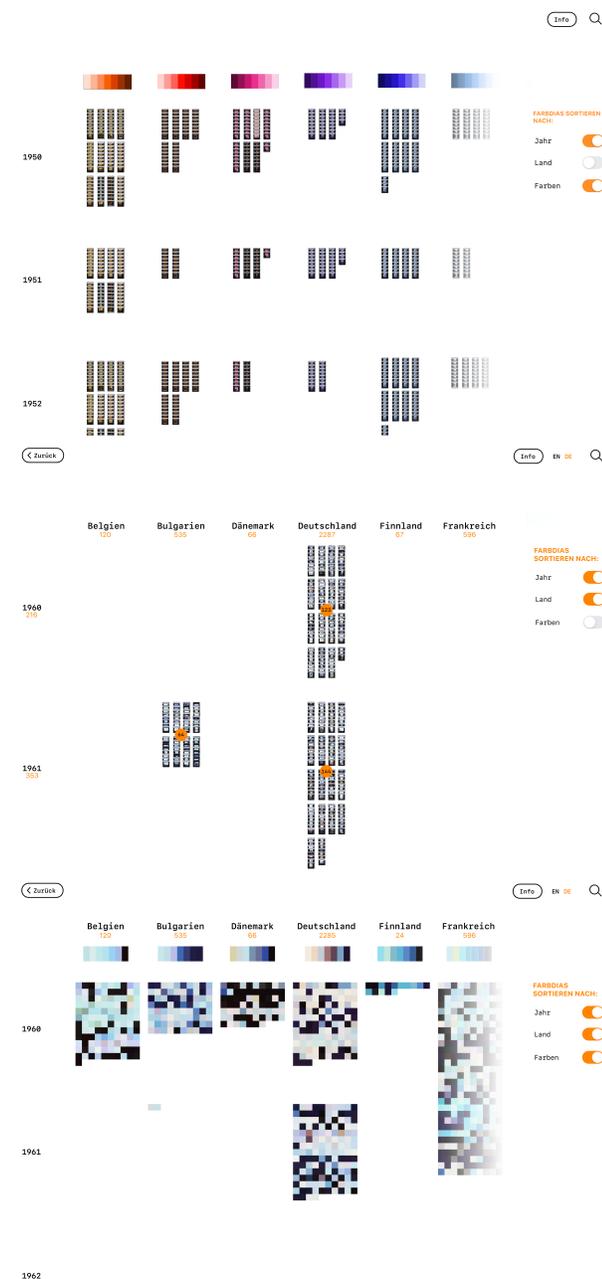
**Fig.3** Slide in Time: Visualization screens showing the passage from the cloud-immersive visualization to the filtered ones, once activated separately by either the 'Year', the 'Country' and the 'Color' parameters.

If slides suffered from what has been defined as "technical innocence" [2], the new level of projection that our visualization aimed to grant meant letting the visitor appreciate the medium slide through its different layers of interpretation, contextualizing its usage and role in the teaching of art history.

Disregarding either a visual narrative for an in-depth and guided art-focused visit or the correlation between Feist's research and his travel routes, our focus relied mainly on the

medium of the slide, making it the main character of our visual speculation. Moreover, taking into account the very niche field of Feist's studies and the difficulty to grasp the peculiarities of each of the over 16,000 slides, we consider of paramount importance to grant intuitive access to the whole collection. Following Shneiderman's visualization seeking mantra 'overview first, zoom and filter, then details on demand' [23], our ideas meet in providing both an overall overview of the collection and a detailed screen, featuring the 'projection' of each slide. In this way, a scalable exploration performed by the choice of search refinement filters such as time, space, and dominant color, would grant a flexible, accessible, and dynamic experiment of quest, without precluding the large cultural heritage visualization to represent an efficient tool for the academic visual research of the IKB.

## 4.2 PROTOTYPE



**Fig.4** *Slide in Time* grants the user to visualize Feist's collection matching three different filters, here combined differently.

The 35mm slide transparency is a hybrid medium that belongs on a continuum between still photography and motion picture film, matching qualities of both technologies. Slides thoroughly reproduce real colors and constitute a versatile high-resolution positive photograph. A 35mm slide can be in fact magnified by a factor of 100 (from 35mm to 3,500 mm) maintaining a good resolution on the projected image [1]. Capable of gliding thanks to its mount, a slide suggests already by its noun, an action of movement, a dynamic that permeates our visualization. The title we chose for the collection *Slide in Time*, also intends to create a link to the aspect that slides originate from a past time, being testimonials of specific visual practices, as well as of Feist's documentary contribution and engagement for the teaching art history in the GDR.

The collection's visualization opens up with a pop-up screen with the title, and a sub-title inciting the user to enter the collection. Through the button "Info" on the upper right side of the main interface screen, the user can access a text, giving informative context to the collection, making it comprehensible. We reckoned this concise introductory text (Fig. 2) could grant an ample understanding for the visitor to make sense of the essence of the collection: Feist's broad interest in art history and his documentary style when taking pictures. One could always read this text in a second moment, as it is included as a clickable separate section, popping up in front of the visualization screen, consultable whenever the user feels like it.

The initial and unfiltered interface visualization presents a cloud of scattered slides: up to 50 slides are shown to the user (Fig. 1 left). A button allowing the user to shuffle the slides is positioned under the pile visualized. With this first screen, we aimed to get the users' attention, without confronting them with the massive quantity of slides composing the collection. Both the immersive cloud and the shuffle visual options aim to disrupt the archive sorting practices, granting sprightly access and first intuitive approach to the collection. No prior knowledge is here required to explore the slides.

On the right side of the same screen, the visitors can find three switchable filters, whose function is to bring a more structured overview of the slides to the user. The filter 'Year' and 'Country' enable the users to look for specific places or dates. Filtering by country represents common cultural access for users, and the crossing with the chronological variable, makes Feist's travels traceable. The filter 'Color' permits the user to browse visually the collection, through minimal design, representing each picture through their dominant color. It is possible to select and activate one, two, or three filters simultaneously: Feist's collection is therefore visualized into seven different screens, depending on the combination of the filters (Fig.3 and Fig.4). This will grant the visitor to make choices, and the flexibility to look at the collection under different perspectives.

The user will scroll horizontally or vertically to see the slides. If more filters were combined, clusters of slides would appear, ordering themselves as in a fictional drawer through the screen. If one hovers a set of slides, an indication of their number will appear, making quantities visible. This feature has been regarded as tangible quantitative information, useful for a documentary analysis and comparison of the collection's items, in contemplating questions such, how many slides Feist has taken in a certain country or in a

certain year, or what dominant dyeing is to be found in the matching of the three filters.

If the users click onto any object-slide, either on the cloud visualization as on the filtered ones, they will access a detailed view, displaying a slideshow. The background changes from light to dark, in order to recall a darkened room, a setting, which promoted a closer, more intimate relationship with the image on the screen. The double view that was characteristic of the illustrative method in slide lecturing, doesn't compare in our visualization two different pictures, yet it turns its combined glance to the same object-slide, juxtaposed as a slide and as a projected picture on the same screen. The detailed view constitutes here a sliding visualization (**Fig.1 right**), where at the bottom the user can see the slides with their mount and inscription, following in a row, whereas on the foreground, one can see the respective projection. The order of the slides is here dependent on the location in the visualization of the object-slide clicked. The order in the row would be casual and limited to 50 slides if the user clicks on a particular slide from the immersive cloud. The sequence of slides will reflect otherwise the order in which they appeared in the clusters, combined by the 7 different choices of crossing the three filters.

On the right side of the image projected, one can read the metadata of each image, which also includes a link to Wikidata. It could eventually include a link to the original database of the collection, transposing the user to the classical catalog made by the IKB. The search option on the right upper side of the screen permits one to look for more specific information, such as names. It allows the user to find artworks from a specific artist, or possibly a museum where pictures have been taken. It is an interesting function for a particular sparkle of interest for a beginner user, whereas it could represent possibly an effective tool for an expert user, who has specific research stakes (**Fig.5**). As the database has been written in German language, and as the collection regards a documentary work of a German academic art historian, we choose German as the main language for the visualization.



**Fig.5** *Slide in Time*: Screen about textual search through the Search-tool, here an example reporting results from the entry "Rijksmuseum".

## 5 DISCUSSION

Through our visualization of Feist's slide collection, we intend to pay homage to a life-long project of documentation. The collection's bulk and our time constraints though made it ambitious to carry out a thorough curatorial study, which has also been discouraged by the partner institution itself. As a matter of fact, *Slide in Time* doesn't reveal the possible network of relationships that the pictures could build one another, neither within Feist's research nor with a specific art

historical interest of the user. There is little space for side stories or background information on the purpose of their documentation. We think nevertheless that it is possible to integrate relevant comments through the interfaces or next to the projection in the detailed view, as a way to provide more narrative points of contact with Feist's biography, with its theories and teaching practices, or even about slides technology. These contextual knots could as well find their places in the visualizations sorted through time and space, which can be reworked into more playful variants. Their current version though ensures good usability and easy entry points for beginner users, providing extended features for the more expert ones.

If on one side our visualization design aims to provide every kind of visitor with intelligible tools to skim down the prodigious quantity of items in the collection, on the other, it plods along in granting surprising elements throughout its interfaces. The search lacks obvious entertainment factors accompanying the user through the different layers of the visualization. In *Slide in Time*, a scientific documentary visualization subjugates a more narrative-based one. Implementing a curated scheme of visit through the collection actually belonged to our first research ideas. These have been reappraised though, seeing the obstacles presented by the handling of the dataset and our will to visualize the entire collection, without discriminating any of its sections. It hasn't been easy in fact to find a compromise between a holistic visualization approach, willing to resume and let appreciate the integrality of Feist's documentary archive, and a more detail-oriented look at the items, commenting and conjoining the pictures under a biographical or art-historical perspective.

In order to bring forward the documentary approach we foster, it would have also been interesting to label correctly countries with the names they had at the time of the shot. The actual database establishes an inventory of locations under countries' current names. Instead of showing Russia, we would prefer using "Soviet Union", re-contextualizing the pictures in their historical moments. The difference between GDR and FRG is compelling, as Feist was between the very few allowed to travel abroad, and its pictures originate in a time where the two states looked at art in a completely different understanding. The unavailability of the entire dataset as downloadable diapositives put our design study in front of different hurdles: the main one has been having a solid cognition of the entirety of the collection. Implementing color analysis was not practical due to its calculating methods and the need to scale down the sampling to 6,000 slides. This means we have concrete feedback of the range on the slides' dominant color only from a portion of the collection. Nevertheless, our scope being to honor a lifetime archiving practice, we assume and intend working with the whole extent of the collection, giving paramount importance to the eclectic range of topics represented, without wanting to cut down any sections or focusing only on a group of slides.

Finally, we think it would be interesting to feature other languages, with priority on English, so that the collection could be addressed to a larger public.

## 6 CONCLUSION

With the scope of providing an additional level of visualization over the chronologic and spatial references, given (more or less) consistently from the dataset, our study

relies on resources contextualizing color analysis techniques for data visualization. This aesthetic approach, taking into account the dominant color of the pictures, seeks to integrate and empower the strong documentary character of the collection, by revealing new patterns that chromatics establishes within time and space.

On the whole, our visualization attempts to dignify the medium of the slide and to contemplate its multi-layered technology, reproducing visually the important quantity of the slides in the collection, its aesthetics, its archiving methodology, or its context of usage in art history lectures. In *Slide in Time*, the documentary nature of the items becomes interactive, weaving visual relationships through time, color, and space. Our slideshow visualization recalls the "performative triangle" [8] of the slide lecture, consisting of image, audience, and speaker. The voice of Feist speaks vividly through his documentary style and the interest of his research, making it appealing to analyze these aspects in relation to the images in verbal or reading form. This would give roundness to the art historian's voice in the triangle. Included as an additional component to this grouped interaction, the object of the medium slide 'slides' and moves through the screens, no more hidden by its own projection.

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## AUTHORS:

**Giacomo Marinsalta** (M.A.) European Media Studies, **Myriam Hofmaier** (BA.) Arts Management and Cultural Work; **Maryna Honcharenko** (B.A.) Interface Design; and **Leon Wolff** (B.A.) Interface Design.