

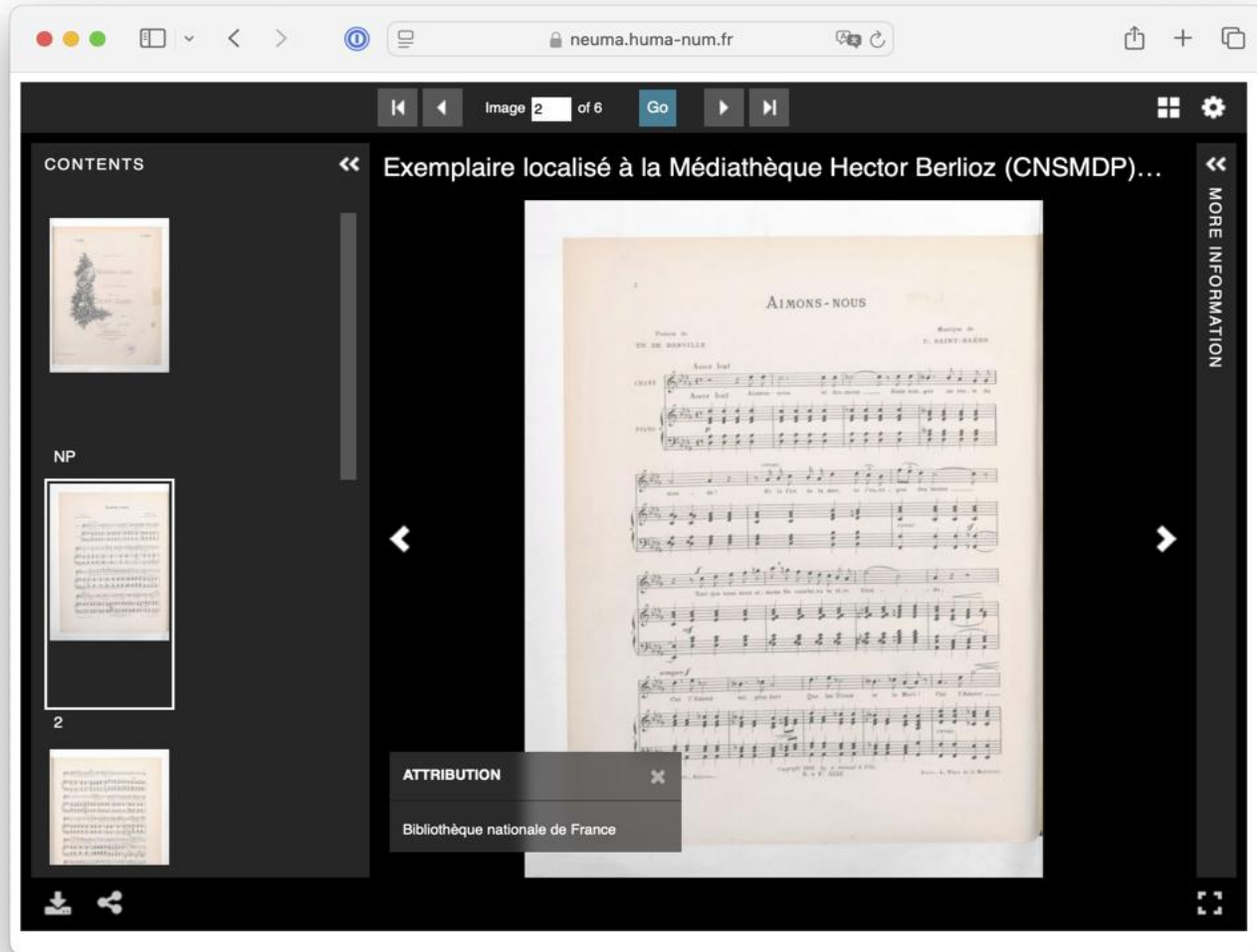
Le projet CollabScore – Numérisation de partitions et applications

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Partenaires :

- Cnam (laboratoire Cédric)
- Univ. Rennes 2 (IRISA)
- Sorbonne Université (IRéMus)
- CNRS/Univ. Lille (Algomus)
- Bibliothèque nationale de France (BnF)
- Fondation Royaumont



Archives de partitions disponibles sous forme d'image

- Mises à disposition via la norme IIIF
- Consultables, référençables, navigables, ...

Peut-on faire mieux ?

- Ecouter ? Editer ? Annoter ?
- Lier à d'autres sources ?

Exemples de sources IIIF: Gallica (BnF), Cnam (pour Royaumont)

Premier objectif : de la partition image à la partition éditable

- Par reconnaissance optique de partition (ROP, ou OMR en anglais)
- Editable ? Avec MuseScore, Finale, Dorico, etc.

Deuxième objectif : expérimenter l'édition collaborative

- Comment améliorer le résultat produit par l'OMR ?
- Sans aller jusqu'à la complexité d'un logiciel de gravure

Troisième objectif : lier des sources musicales par la notation

- Comment utiliser la notation comme référence pour lier d'autres sources (textes, audios, vidéos)

Reconnaissance optique de partitions – la méthode CollabScore

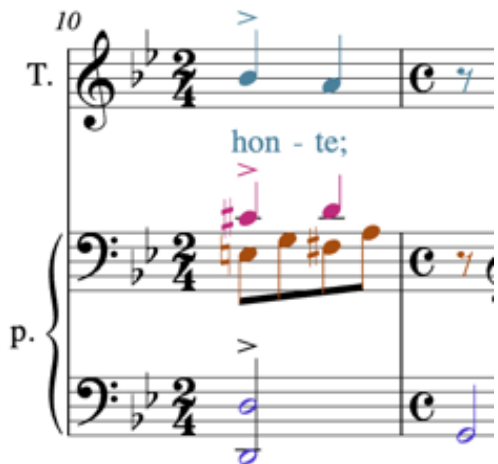
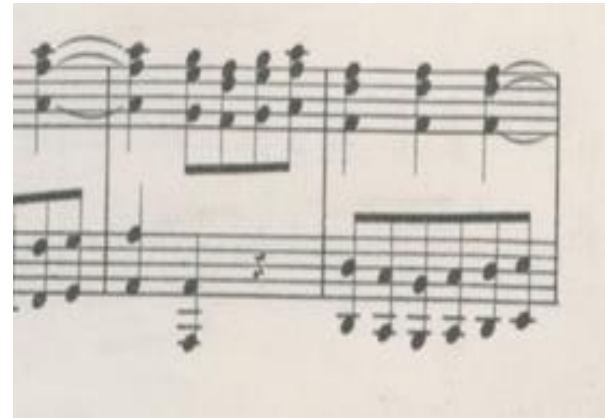
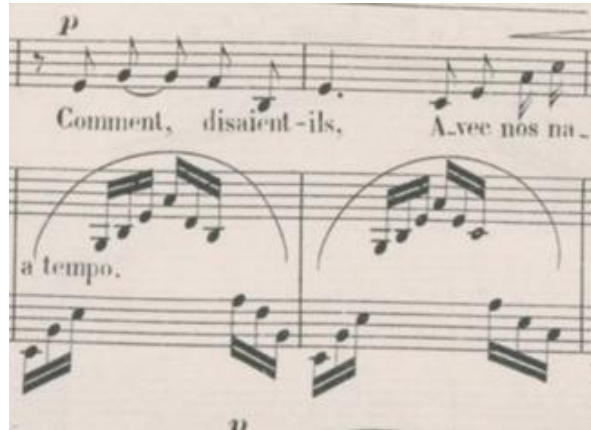
On « apprend » au système IA à reconnaître les symboles

The image displays a musical score with three staves, annotated for symbol recognition. The annotations include:

- Staff 1 (Treble Clef):** Notes are labeled with their rhythmic values: "Noire" (black note), "C" (common time), "dem Soup" (half note), "Croche" (quarter note), and "Blanche" (white note). The lyrics "hon - te; Quand la rumeur sur tous con_certs E_touffe et" are written below the staff. A "cresc." (crescendo) marking is present above the staff.
- Staff 2 (Bass Clef):** Notes are labeled with their rhythmic values: "Noire", "Croche", "Blanche", and "dem Soup". The lyrics "hon - te; Quand la rumeur sur tous con_certs E_touffe et" are written below the staff. A "cresc." (crescendo) marking is present below the staff.
- Staff 3 (Bass Clef):** Notes are labeled with their rhythmic values: "Blanche", "dem Pause" (half rest), "dem Soup", and "Croche". The lyrics "hon - te; Quand la rumeur sur tous con_certs E_touffe et" are written below the staff. A "cresc." (crescendo) marking is present below the staff.

Additional annotations include measure numbers (2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000) and bar lines.

Dans une seconde phase, on applique des règles grammaticales pour construire une notation cohérente



Parties et voix

Voix multi portées

Liaisons inter-systèmes
et inter-pages

Reconnaissance du
texte

(parlant avec une grande agitation)



Oui; c'est i - ci, nous y sommes.

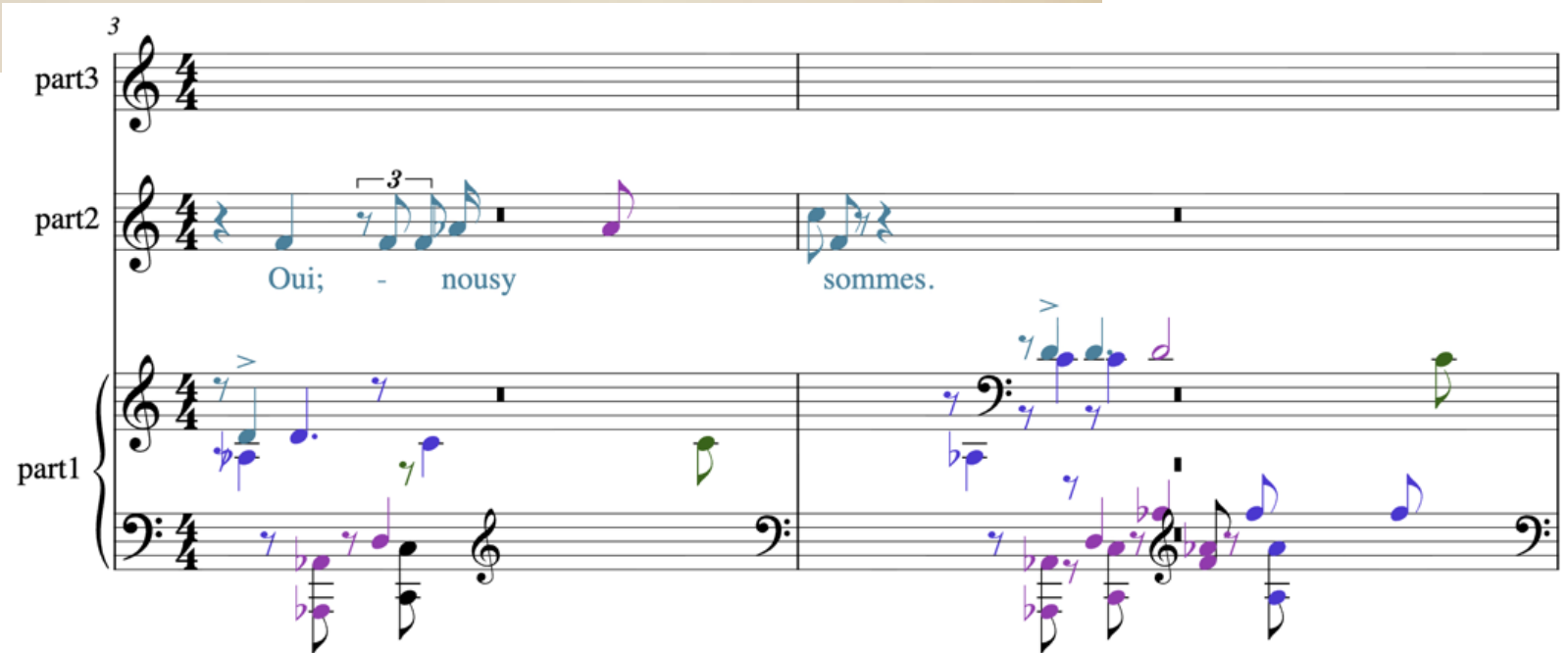
3

part3

part2

Oui; - nousy sommes.

part1



A handwritten musical score on aged paper. It features three staves: a vocal line at the top, a piano right-hand line in the middle, and a piano left-hand line at the bottom. The vocal line includes the word "Ossia" and several "ah!" exclamations. The piano part includes the words "ti" and "na!". The notation is complex, with many beamed notes and slurs.

A modern musical notation for a single part labeled "part1". It consists of a single staff with a treble clef. The notation is simplified, showing only the vocal line with "ah!" exclamations. The notes are blue.

A modern musical notation for three parts labeled "part1", "part2", and "part3". It consists of three staves. The top staff is for "part3" and is empty. The middle staff is for "part2" and contains a vocal line with "na!" and "Ah!" exclamations. The bottom staff is for "part1" and contains a piano accompaniment. The notation is simplified, showing only the essential notes and lyrics. The notes are blue.

The screenshot shows a web browser window with the URL collabscore.cnam.fr/projects/element/f50dce29-c696-465f-886e-668d29602d97/vue. The browser has several tabs open, including 'WoRMS 202', '[Danse mac', 'gregchapm', 'OneDrive', 'Disponibilit', 'Jurys.xlsx', 'Callico - Bro', and 'front'. The main content area displays a side-by-side comparison of a musical score for 'DANS LES COINS BLEUS' by C. SAINT-SAËNS. On the left is a scanned image of the original score, and on the right is a digital, editable version of the same score. The digital version shows the vocal line (Chant) and piano accompaniment (Piano) with lyrics in French. The lyrics include: 'Dans les coins bleus par-se-més d'or (Sans trop le di - re) Il faut qu'on cache âme et trés - sor, Et doux mar - -ty - re. Quand tout dé - borde en l'u - ni - vers, Quand nul n'a'. The digital score includes a 'Page 1' indicator and navigation buttons.

On a établi une correspondance entre l'image et la partition.

À partir de là on peut éditer, écouter, comparer, extraire des parties ou des incipits.

Démonstration

L'édition collaborative

Le résultat étant loin d'être parfait, nous visons à le compléter en proposant des campagnes de correction.

- Une « campagne » est une liste de « tâches », spécifiques, chacune réalisable en quelques minutes (au plus)
- Chaque tâche est proposée sous la forme d'une interface la plus intuitive possible
- On enregistre les actions d'édition et on les cumule pour corriger la résultat « brut » de l'OMR

Une campagne-test a été menée à la BnF sur les données Gallica en juillet 25

The screenshot shows a web browser window with the URL `http://localhost:8080/projects/campaign/df11f006-7b6d-493a-95b6-88b88b3a576f/my-tasks/`. The page is titled "Mes tâches sur la campagne 'Phase 2 test'" and shows a progress bar at 9% completed (1/11). The page is divided into four columns, each displaying a musical score snippet and its associated task information.

Titre	État	Pages	Actions
Dans les coins bleus	Validée	4 pages	Changer l'annotation
Avril, poésie de Rémy Belleau. Ch...	En attente	5 pages	Annoter
L'Amour blessé. Poésie de Ronsar...	En attente	5 pages	Annoter
L'Amant malheureux. Poésie de R...	En attente	5 pages	Annoter

Callico Projects / Saint-Saëns / Tasks Instrumentation 1 / Annotation Opus [La sérénité] philippe.rigaux

Pages

1

2

3

LA SÉRÉNITÉ

Poésie extraite de Contes Blancs
de Madame MARIE BARBIER

Musique de
C. SAINT-SAËNS

Assez lent, très calme, sans nuances.

Chant

Part2

Part1

Piano

Part1

Part2

Part1

Part1

Part2

Part1

Part1

Je

puis l'in-al-té-ri-ble i-ma-gé De la pai-sible é-ter-ni-té, Sans com-

men-cement et sans â-ge, J'ai pour nom la Sé-ré-ni-té.

Instrument Intitulé

2 Choisi Intitulé 2

1 Choisi Intitulé 1

Valider et passer à la page 2/3

► Instructions

► Explications détaillées

The screenshot displays the Callico web application interface, which is designed for reading and interacting with musical scores. The interface is divided into several sections:

- Header:** The top bar includes the Callico logo, navigation links (Projets, Neuma, Tâches, Autre test phase 2, Annotation Opus [Dans les coins bleus]), and a user profile (philippe.lecnam).
- Score Viewer:** The main area shows a musical score for "DANS LES COINS BLEUS" by C. SAINT-SAËNS. The score is displayed in a large, clear font, with the title and composer's name prominently shown. The score includes vocal parts (CHANT) and piano accompaniment (PIANO).
- Navigation and Interaction:** On the left side, there is a vertical list of thumbnails representing different pages or sections of the score. A purple box highlights the first thumbnail. Below the thumbnails, there are numbered buttons (1, 2, 3, 4) for navigating between different parts of the score.
- Playback Controls:** In the center, there is a large play button (a black triangle) for starting the audio playback of the score.
- Annotations and Markers:** On the right side, there are circular markers with labels "Descend." and "Monter" (Up/Down) and an "OK" button, likely used for navigating between different parts of the score or for marking specific points.
- Page Information:** At the bottom right, there is a section for page information, including "Page 1/4" and a button "Valider et passer à la page 2/4".
- Footer:** The bottom of the interface shows the version number "Version 0.6.4" and the text "Construit par Teklia - Documentation".

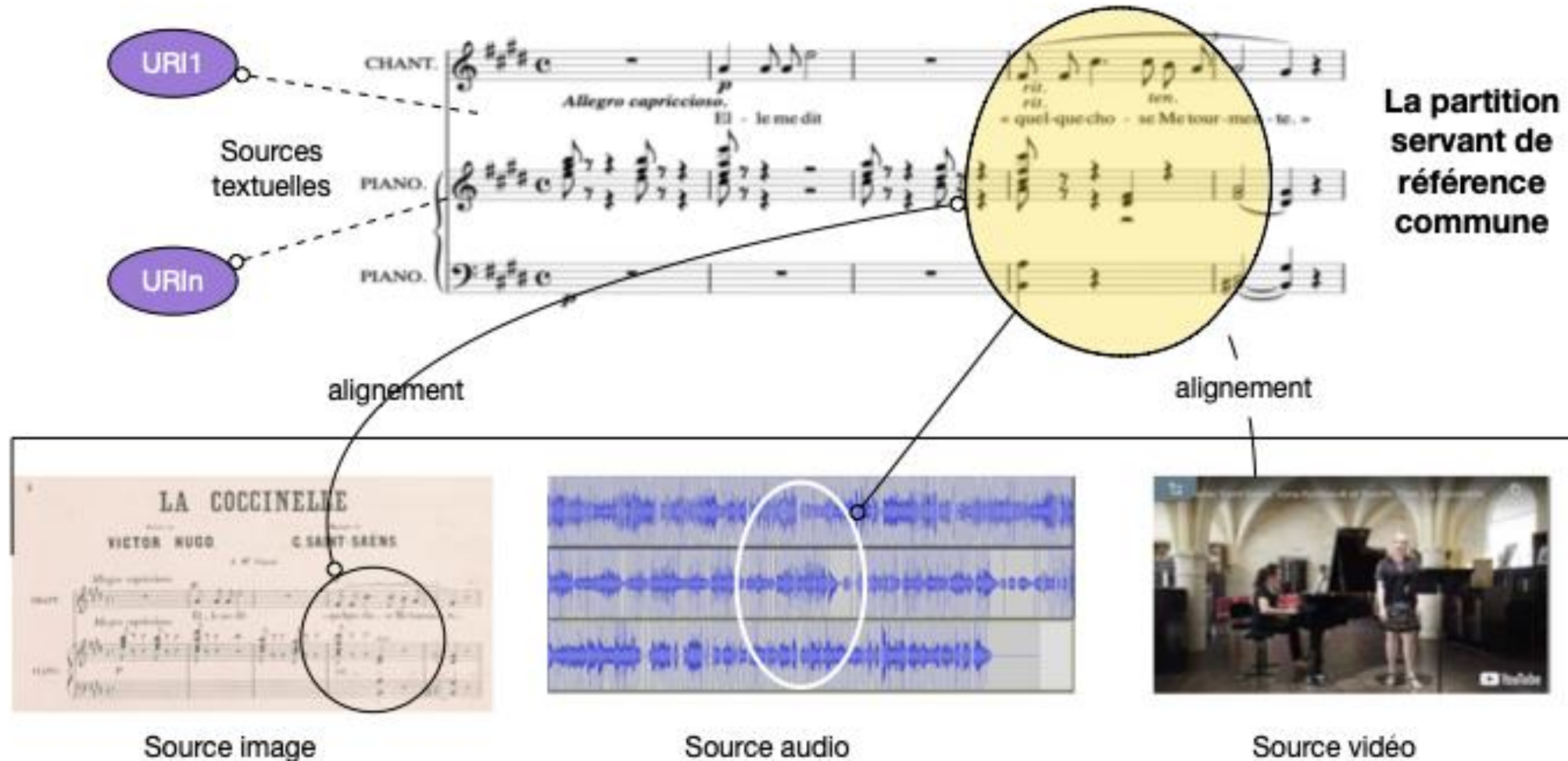
The screenshot shows a web browser window displaying the Callico interface for musical score annotation. The browser address bar shows the URL: `http://localhost:8080/annotation/01609fae-ca75-47b0-931a-caa2bc530408/annotate/music-objects/??st`. The interface is titled "CollabScore" and includes navigation links for "Projets", "CollabScore", "Tâches Phase 3 local", and "Annotation Opus [Guitare]". The user is identified as "Philippe LeCnam".

The main workspace is divided into three sections:

- Pages:** A sidebar on the left showing three thumbnails of musical score pages, numbered 1, 2, and 3. Page 1 is highlighted with a purple border.
- Score View:** The central area displays a scanned musical score for guitar. The title is "GUITARE" by Victor Hugo, with a subtitle "C. SAINT-SAËNS". The score includes piano and guitar parts. A circular annotation tool is overlaid on the score, with labels for "Hauteur" (Pitch), "Durée" (Duration), "Altérer" (Alter), and "OK".
- Tasks Panel:** A sidebar on the right titled "Tâches" (Tasks). It shows "Page 1/3" and navigation buttons "Préc." and "Suiv.". A button "Récupérer la partition" (Retrieve the score) is present. Below this, a section titled "Phase 3 : Objets musicaux" (Phase 3: Musical objects) contains a green button "Valider cette page" (Validate this page). Further down, a section titled "Liste des erreurs trouvées dans cette page" (List of errors found on this page) states: "Aucune erreur n'a été détectée sur cette page, mais rien de vous empêche de vérifier par vous-mêmes" (No error was detected on this page, but nothing prevents you from checking by yourself).

At the bottom of the interface, the version "Version 0.6.5-rc1" is displayed on the left, and the text "Construit par Cnam on the Teklia Callico project. - Documentation" is on the right.

Mise en correspondance de sources



Notion de partition « pivot » : les éléments de la notation (mesure, notes...) servent de référence commune aux autres sources

The screenshot shows a web browser window with the URL `dezrann.net/sync/collabscore/all-collabscore-saintsaens-ref-C079_0?audio=1&sync=0`. The interface features a top audio waveform and a musical score below it. The score includes a vocal line (CHANT.) and two piano accompaniment lines (PIANO.). The vocal line has lyrics: "El - le me dit « quel-que cho - se Me tour - men - te. »". The tempo markings are "Allegro capriccioso.", "rit. rit.", "ten.", and "a temp a temp". The interface includes a left sidebar with various tools (search, zoom, etc.) and a bottom control bar with buttons for "MODIFIER", "BATTRE", and "CACHER", along with a timeline for "Temps musical (onset)" and "Temps audio (s)".

CHANT. *Allegro capriccioso.* *p* *rit. rit.* *ten.* *a temp a temp*
El - le me dit « quel-que cho - se Me tour - men - te. »

PIANO. *p*

MODIFIER
BATTRE
CACHER

Temps musical (onset) Temps audio (s)

Démonstration

The screenshot displays a music player interface with two synchronized musical scores. The left window, titled "Scan (Partition imprimée (BnF))", shows the score for "LA COCCINELLE" by Victor Hugo and C. Saint-Saëns. The right window, titled "Scan (Partition de référence, mise en page)", shows a reference score. Both windows display the same musical notation, including vocal lines (CHANT) and piano accompaniment (PIANO). The interface includes a browser window at the top, a toolbar with various icons, and a video player at the bottom right showing a live performance of the piece. The video player has a play button and a volume icon.

LA COCCINELLE

Paroles de VICTOR HUGO. Musique de C. SAINT-SAËNS.

A M^r Copaud.

CHANT. *Allegro capriccioso.* *p* *rit.* *ten.*
El - le me dit « quel-que cho - se Me tour-men - te. »

PIANO. *p*

a tempo. *pp*
et j'a-per-çus Son cou de neige, et, des-sus, Un pe-tit in-sec-te

a tempo. *pp*
ro se. un peu retenu. J'aurais dû mais sageoufou, Aseizeans, onestfa - rou - che,

un peu retenu.

Démonstration

The screenshot displays the 'Theseus Viewer' web application. The browser address bar shows the URL: `theseusviewer.org/?iif-content=https://neuma.huma-num.fr/rest/collections/all%3Acollabsc`. The page title is 'Combined manifest 1'. On the left, a sidebar contains navigation links: 'Accueil', 'À propos de cet article', 'Afficher les annotations', 'Partager cet article', and 'Lien du manifeste IIIF'. The main content area shows a musical score titled 'AIMONS-NOUS' by TS. DE BANVILLE and C. SAINT-SAËNS. The score is displayed on a video player interface, with a red box highlighting a specific section of the music. The video player controls at the bottom show a progress bar at 0:00 / 4:17.

Démonstration

Conclusion

En résumé ...

- OMR, améliorable et généralisable
- Proposition d'une édition collaborative dédiée à la notation
- Dispositif de synchronisation de source, compatible IIIF

En perspective

- Des améliorations de toutes sortes, notamment sur l'OMR
- Ajout des vidéos dans les manifestes de synchronisation IIIF
- Automatisation de l'alignement partition / audio

Important : journées de pratique et d'approfondissement à Royaumont les 3-4 novembre. Il reste quelques places.

Merci !

Quelques liens

- Nos collections de partitions omérisées : <https://neuma.humanum.fr/home/corpus/all:collabscore:saintsaens-ref/>
- L'interface d'écoute/visualisation : <https://collabscore.cnam.fr/projects/element/f50dce29-c696-465f-886e-668d29602d97/vue>
- La plate-forme collaborative : <https://collabscore.cnam.fr/>
- Synchronisation : <http://dezrann.net/gallica/bpt6k1162049x>