CONSORTIUM HUMA-NUM

PROGRAMME D'IDENTIFICATION, CLASSIFICATION, TRAITEMENT D'IMAGES, OBSERVATION ET RECONNAISSANCE DES FORMES PAR L'INTELLIGENCE ARTIFICIELLE

Arkindex, an open-source platform for document image recognition applied to archeology

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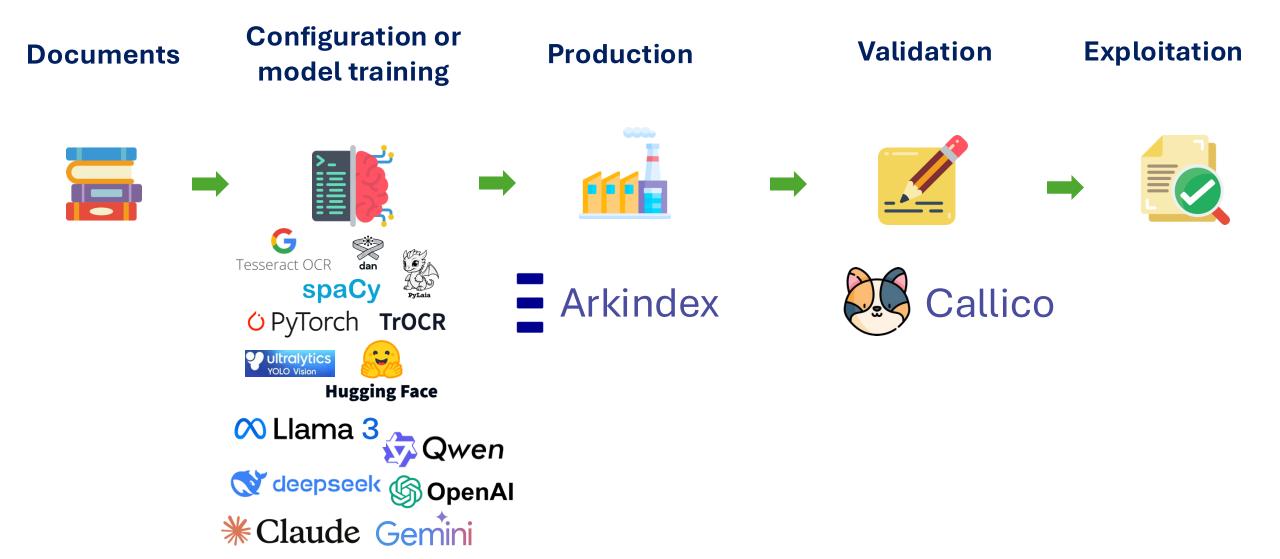


Automatic document processing with AI

Al models can recognize, understand and extract data from historical documents

- The challenges are now:
- How to choose the right model: accurate, easy to run and cheap
- How to model data coming from different sources (meta-data, human annotation, predictions from AI)
- How to process documents at large scale: reliability, completeness, quality control

Document processing workflow



Arkindex: a generic document processing platform

Developed by TEKLIA since 2019 Already used for more than 60 projects

Customization



Scaling up



Open-source



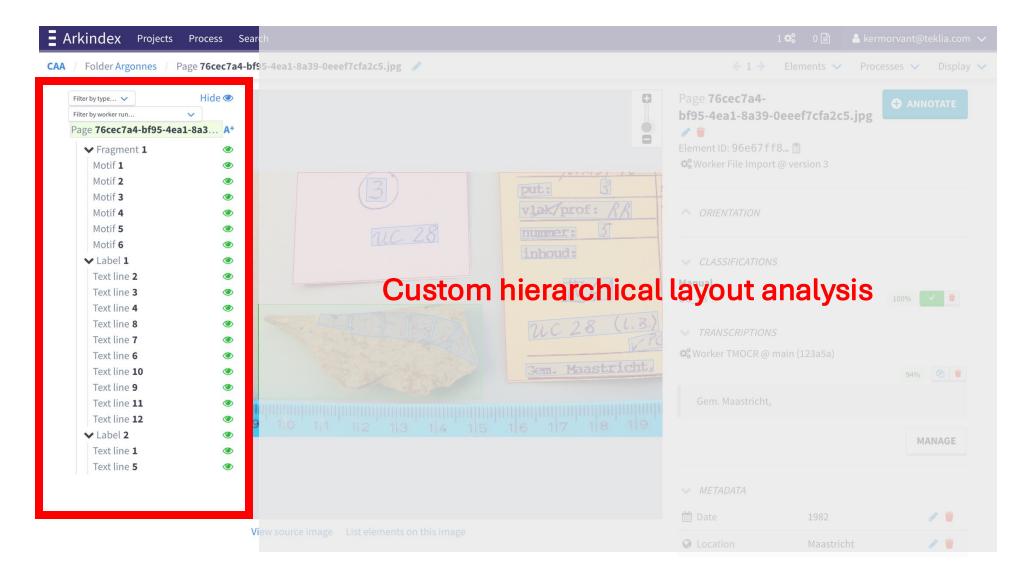
Process all types of documents

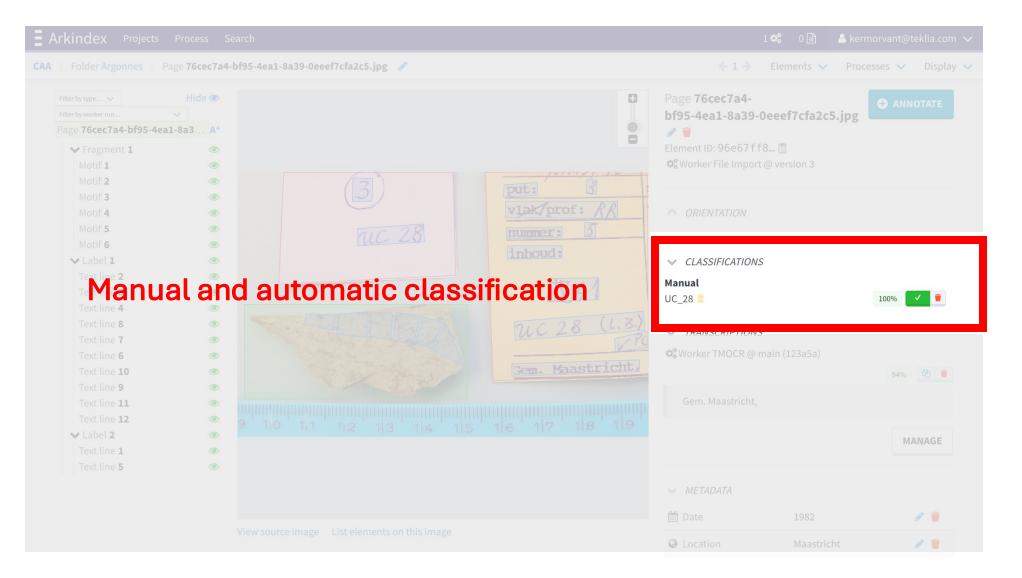
Process 1000 or 10 million pages

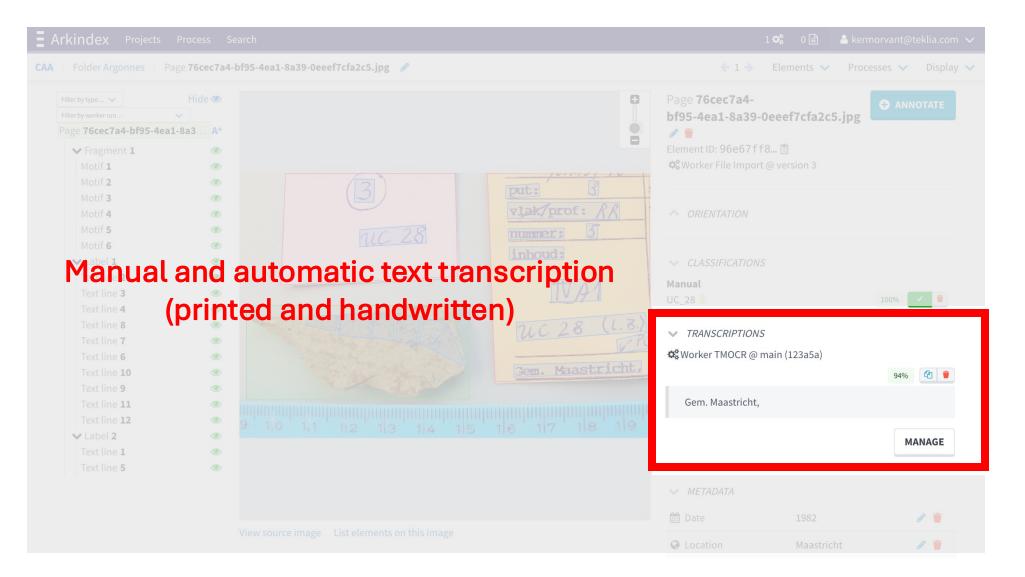
Dissemination and community participation

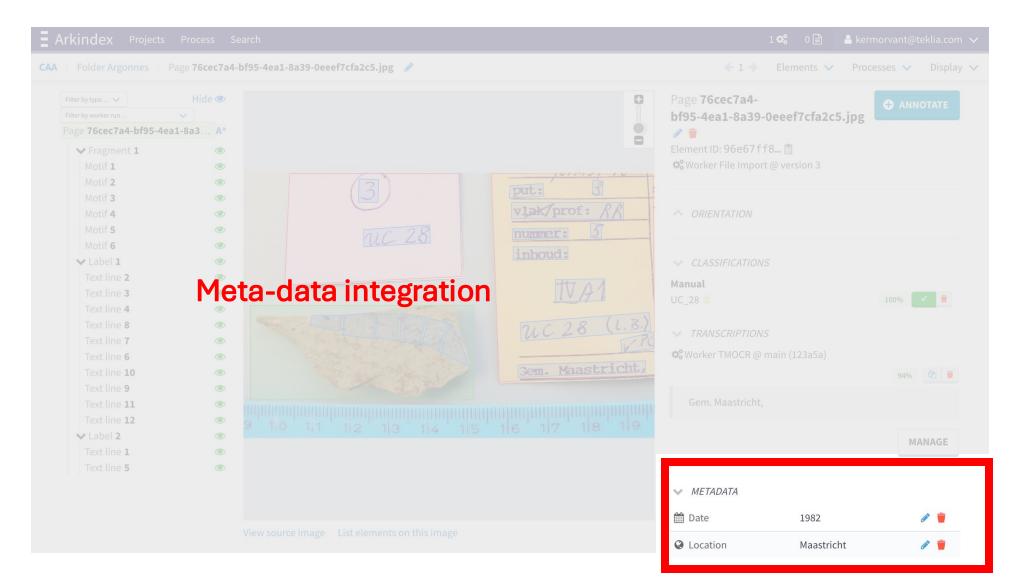
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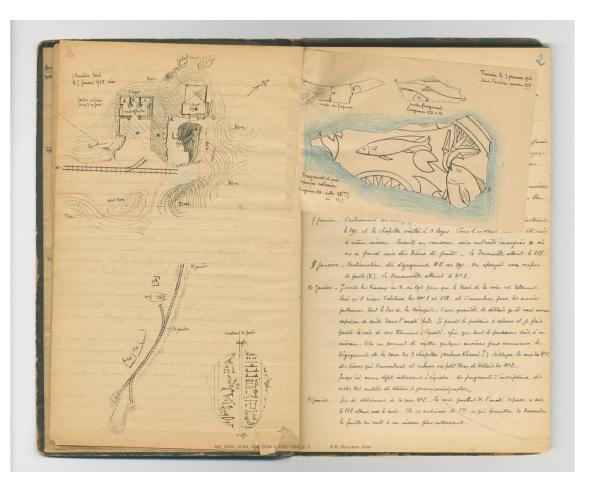




B. Bruyère's handwritten excavation journals

Journals of excavations by Egyptologist Bernard Bruyère from 1922 to 1951 at Deir el-Medina, on the left bank of Thebes

A lot of information, drawings of objects and surveys of monuments were not included in the published reports and are only available in the handwritten journals.





B. Bruyère's handwritten excavation journals

<u>Automatic</u> <u>transcription (</u>HTR) of 1000 handwritten pages

<u>Manual illustration</u> <u>detection and</u> <u>annotation (meta-</u> data)

Indexing and search

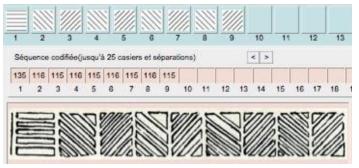
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Identification of Argonne roller-stamped motifs

Late Antique Argonne ware was produced on a massive scale in Northwestern Europe between the 4th and 6th centuries.

The roller-embossed decoration allows for the identification of production sites and workshops, and provides elements of dating.

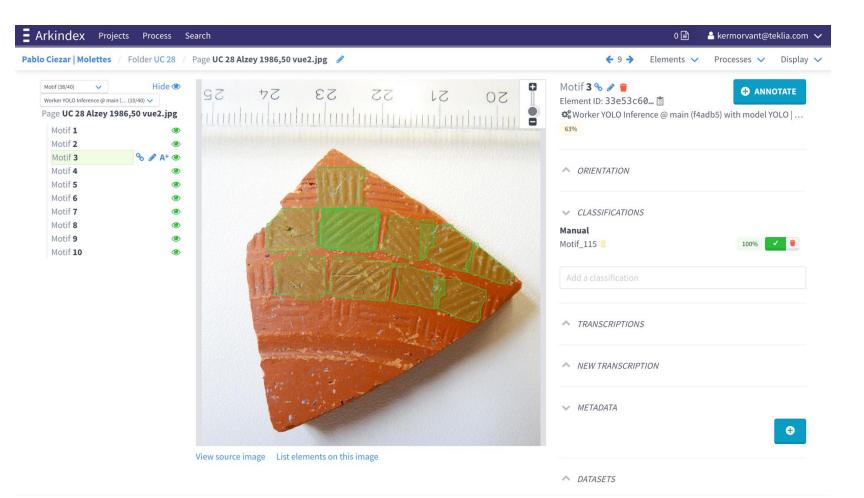




AGAIN Identification of Argonne roller-stamped motifs

<u>Detection of the</u> <u>motifs</u>: image segmentation algorithm (YOLO), stored as image element

<u>Type of motif</u>: classification on the detected element



Information extraction from Celtic coin catalogues

A vast amount of information on coins is available in paper publications.

CNRS PSL

These publications contain descriptive, geographical and bibliographical information in semi-structured form.

33. Quart de statère, c. 7.50 g, 60 %, deuxième siècle avant J.-C.

- Buste Aurige dans un bige; dessous tête de face Barrandon, J.-N., Aubin, G., Benusiglio, J., Hiernard, J., Nony, D., Scheers, S., 1994, L'or gaulois, le trésor de
- Darmanon, 1-N., Nuon, O., Demanguo, J., Hueman, J., Norty, D., Scarees, S., 1999, L or guants, te i Chrvareaux et les monayages de la facode atlantique, Paris. Neuroux (Indee)', Monnies gan decouverte se roulites, Equipe 34 du CNRS, Laboratoire d'archelogie de Féciel Normals supérieure, p. 138-Nash, D., 1978, Settlement & Coinage in Central Gaul. e. 200-50 BC, BAR IS 39, Oxford. nale supérieure, p. 138-151
- BN 3646A (1.74) (Nash, 1978, série A, p. 95)

58

- Muret-Chabouillet (Arvernes) 3647 (1.85) (Nash, 1978, série A, p. 95) Muret-Chabouillet (J.Emoviques) 4548 (1.85) Muret-Chabouillet 6417 (1.81; Au 59.0 %, Ag 29 %; Cu 12 %) (Nash, 1978, p. 82, D2, p. 83) (Barrandon, J.-N., etc.,
- Muret-Chabouillet 6418 (1.95; Au 56.9 %; Ag 32.0 %; Cu 11 %) (Nash, 1978, p. 82, D2, p. 83) (Barrandon, J.-N.,
- Matrick Cantonniate 0418 (1):23; 412 30:5 %; 43 54.5 %; bit 11 %)(1):000, 517 %; 43 54.5 %; 52 64.5

- A. Y. (Vienne) Muret-Chabouillet 6-20 (J.38); Au 61, 4 %; Ag 29.2 %; Cu 9, 4 %) (Nath, (Barrandon, J.-N., etc., 1994)
 Tr. & Lavvoux (Indre) (Barrandon, J.-N., etc., 1994) (Fisher, B., Buchsenschutz, O., 1987)
 Tr. & Rezé (Loire-Atlantique) (J.91) (Barrandon, J.-N., etc., 1994)
 Viente Cahn, avril 1953, 1566 (J.80) (Nash, 1978, série A, p. 55)

Carnyx

34. Statère, c. 7.50 g, deuxième siècle avant J.-C. Buste, devant fleuron cheval à gauche; dessous tête de personnage tenant un énorme carnyx

Blanchet, A., 1905, Traité des monnales gauloises, Paris, p. 290, fig. 164. Nash, D., 1978, Settlement & Coinage in Central Gaul, c. 200-50 BC, BAR IS 39, Oxford.

Muret-Chabouillet (Lémoviques) 4551 (7.22) (Nash, 1978, p. 59, B1) (voir planche La Tour) (voir planche photographique)

ARGENT DU 2^E SIÈCLE

Corney 35. Monnaie d'argent, c. 2.30 g, deuxième siècle avant J.-C. cheval à gauche; dessous buste Buste tenant un carnyx Nash, D., 1978, Settlement & Coinage in Central Gaul, c. 200-50 BC, BAR IS 39, Oxford. MAN 3018 (1.86) (Nash, 1978, p. 59, B2) Péronne (coll. Danicourt) 151 (2.19; 1) (voir planche photographique) Vienne 215 (2.19) (Dembski, G., 1998)

Buste à gauche tenant un carnyx Allen, D., Kent, J., Mays, M., 1990, Catalogue of the Celtic coins in the Bristish Museum with supplement material from other British Collections, II, Silver coins of North Italy, South and Central France, Switzerland and South Germany, Londres. Switzerana ana sona vermaiy, Joanes. Banchet, A., 1965, Traité des mornaies gualoises, Paris, p. 290, fig. 165. Dembisi, G., 1998, Minten der Keiten, Sammiungskataloge des Kunsthistorischen Maseums, I, Vienne. Haselgrove, C., 1978, Supplementary gozetteer of find-spots of Cellic coins in Britain, 1977, Londres. Hiernard, J., 1982, 'Corbio et la voute de l'étain', Bulletin de la société des antiquaires de l'ouest et des musées de Poitiers, 16, p. 497-578. Muret-Chabouillet (Lémoviques) 4552 (2.17) (Nash, 1978, p. 60, B2) (voir planche La Tour) Muret-Chabouillet (Léminiques) 4553 (2.27) (Nash, 1978, p. 66, B2) (voir planche photographique) Tr. & 7 (Charentes-Maritimes) (information L6 forum Celtic Coin) Tr. à Hod Hill (Dorset, Grande-Bretagne) (2.18) (Allen, D., Keni, J., Mays, M., 1990, S181) (Haselgrove, C., 1978) (Hiernard, J., 1982)

cheval à gauche; dessous buste

- (Hiernard, J., 1982) Tr. à Nimes (ABT, p. 290, fig. 164) Tr. à Nimes (ABT, p. 290, fig. 164)

36. Monnaie d'argent, c. 2.30 g, deuxième siècle avant J.-C.

Tête coupée

37. Monnaie d'argent, c. 2.30 g, 95 %, fin deuxième siècle avant J.-C. cheval, dessus tête; dessous annelet centré Buste Allen, D., Kent, J., Mays, M., 1990, Catalogue of the Celtic coins in the Bristish Museum with supplement material from other British Collections, II, Silver coins of North Italy, South and Central France, witzerland and South Germany, Londres. Antignac, J.-L., Lombard, R., 1988, "Chronique des chantiers, Notre-Dame-de-Bécharie, Chapelle, Travauo d'archéologie limousine, 8, p. 153. Barrandon, J.-N., Aubin, G., Benusiglio, J., Hiernard, J., Nony, D., Scheers, S., 1994, L'or gaulois, le trésor de Chevanceaux et les monnayages de la facade atlantique, Paris. Blanchet, A., 1905, Traité des monnaies gauloises, Paris, p. 290, fig. 166 Bost, J.-P., Nony, D., Tronche, P., 1975, "Les monnaies des fouilles des Bouchauds à Rouillac (Charente) en 1974", Bulletin de la société française de numismatique, p. 775-778. Carte archéologique de la Gaule, La Corrèze, G. Lintz, Paris, 1992. Carte archéologique de la Gaule, La Creuse, D. Dussot, Paris, 1989. Carte archéologique de la Gaule, Le Cantal, M. Provost, Paris, 1996 Colbert de Beaulieu, J.-B., 1978, "Le point sur les monnaies gauloises des Lémovices", Revue archéologique du Collecti uz posulaciji, i - 69, i - 170, i - 69 jonis na se centre da la France, 17, p. 151-154. Corpus des trésors montainers antiques de la Prance, 1, Poiton-Charentes, Limuuin, Paris, 1982. Minad, P-4, 1979, 'Monailes guidouse d'agent découvertes à Margerides (Corrèce)', Revue archéologique du centre de la France, 18, p. 45-48. centre de la France, 16, p. 43-94. Kahl, D., 1978, Sealment & Coinage in Central Gaul, c. 200-50 BC, BAR IS 39, Oxford. Roche, J.-L., 1983, "Chronique numismatique". Cabiers à arabéologie et Alistoire du Berry, 69, p. 35-42. Santher, C., Guerra, M. P., Barrandon, J.-N., Hiernard, J. 1996, "Les momaises burgent du centre-ouest de la Gaule, premiers résultats d'analyses^{*}, Revue nunismatique, p. 7-27. Scheers, S., 1987, La numismatique d'Alesia, quelques précisions^{*}, Mélanges offerts au docteur Colbert de Beaulieu, Paris, p. 743-752. Tronche, P., 1992, "Les monnaies des Bouchauds", in "Le sanctuaire gallo-romain des Bouchauds (Charente)" Aquitania, 10, p. 182-191 Cambridge (2.13) (Allen, D., Kent, J., Mays, M., 1990, S404) Prankfurt am Main 63 (2:14) Glasgow (2:17) (Allen, D., Kent, J., Mays, M., 1990, S407) (Nash, 1978, p. 290) Glasgow (2:18) (Allen, D., Kent, J., Mays, M., 1990, S405) (Nash, 1978, p. 290) Hunte rian, III, W Gaul 2 5 (2.12) (Nash, 1978, p. 290) Limoges 3 (1.99) Londres 507 (2.16) (Allen, D., Kent, J., Mays, M., 1990) (Nash, 1978, p. 290) 59

COOPOC CNRS PSL Information extraction from Celtic coin catalogues

OCR and Structured information extraction using multimodal Large Language Models (vLLM)

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Scaling-up processing

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Processing workflow definition

Distributed processing (multiple servers, HPC)

FEKLIA's open-source software suite for document processing

Arkindex Document processing

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Open-source

HuggingFace Models and datasets

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