A web-based tool called Gauntlet:
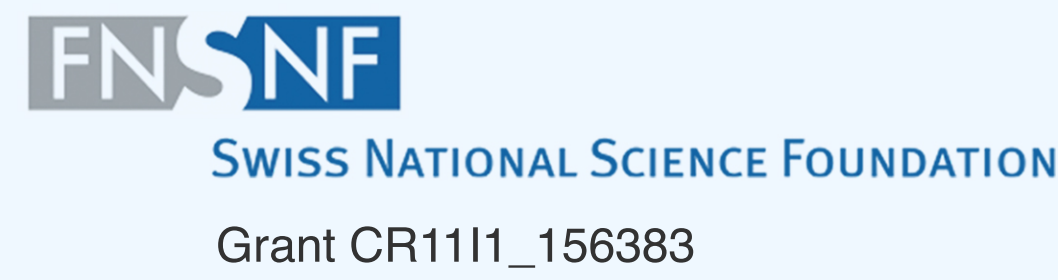# From iterative design to interactive drawings annotation

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Vital-IT High Performance Computing Center

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Links:
Annotation tool (Gauntlet): http://d2d.vital-it.ch
Database (Drawings of gods): http://ddd.unil.ch

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Starting point & requirements

Corpus:
• Over **6'000 digitized drawings of gods produced by children** (5-17 years of age) in different countries (Japan, Russia, Nepal, Switzerland, Holland, Romania, Iran, USA).
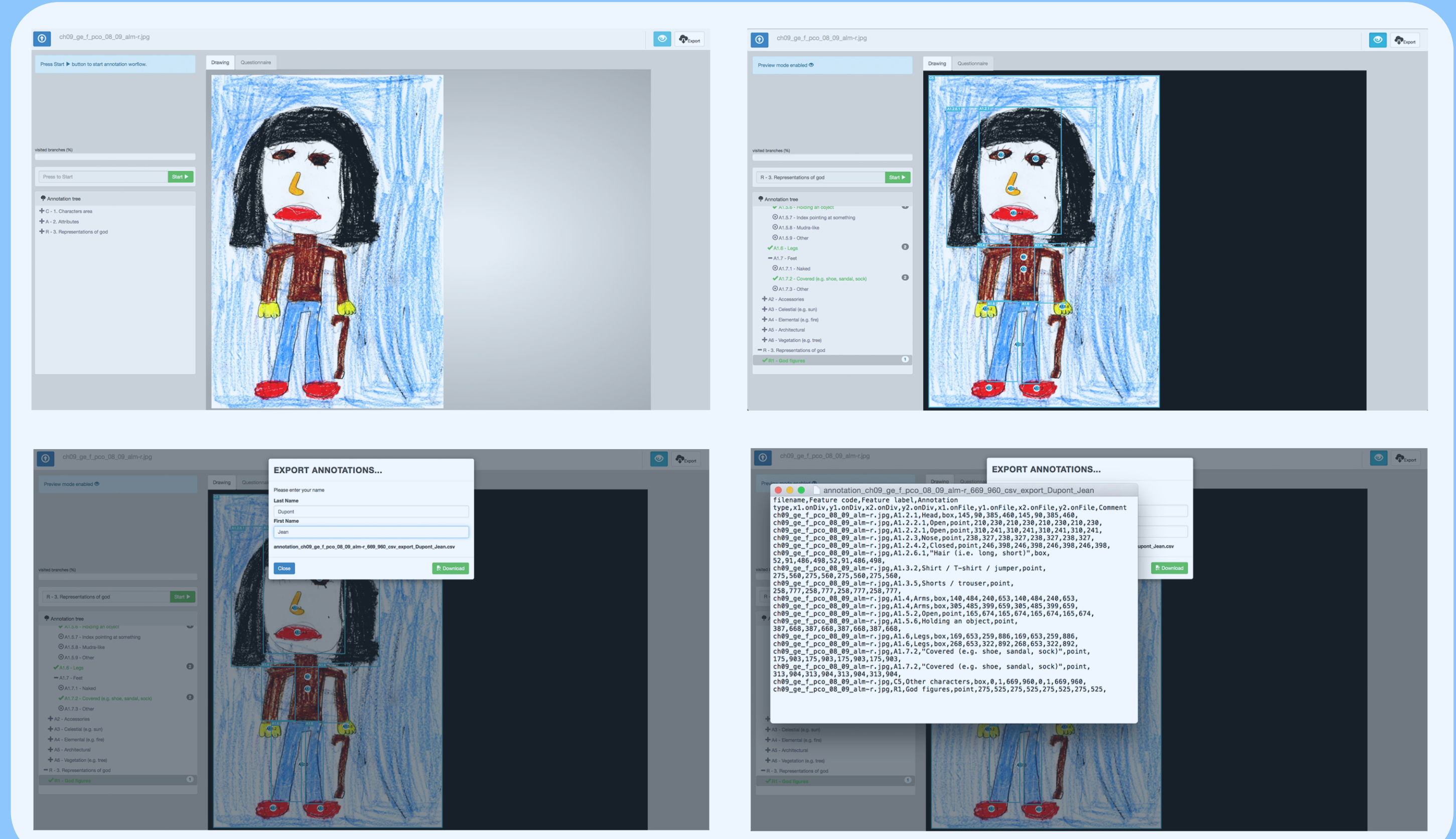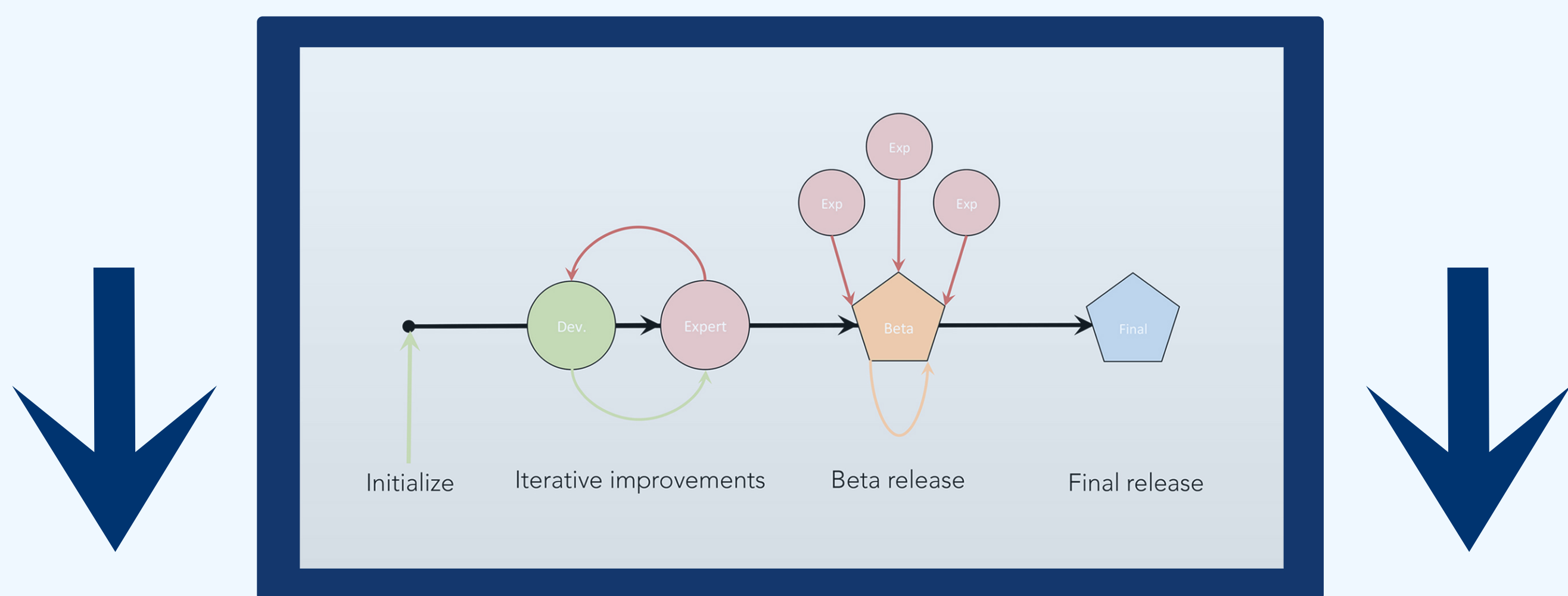• For a description of this project see: Dandarova Robert et al. (under review).

Questions-goals:
• Highlight: **strategies** mirroring **cognitive development** and **culture**; **graphical grammar**.
• Focal points: **nature** of the drawn figures; **interactions** between figures and their surrounding
• For past studies within this project see: Brandt et al. (2009); Dandarova (2013).

Requirements:
• Data-specific: **multi-figure** annotations, **clarity** and **objectivity**.
• Use: **common tool** for **curation** of the drawings; **flexible method** following research questions.

Iterative design process (Nielsen, 1993; figure by Martial Sankar, Vital-IT)

Initialize — Iterative improvements — Beta release — Final release

Collaboration & development

Interdisciplinary collaboration:
• **Social scientists** (psychology; theology) and **computer scientists** (bio-informatics).
• Inter-field **communication**: bringing field-references into the dialogue and building common semantics through language for **special purposes** (LSP; Pavel, 1993).
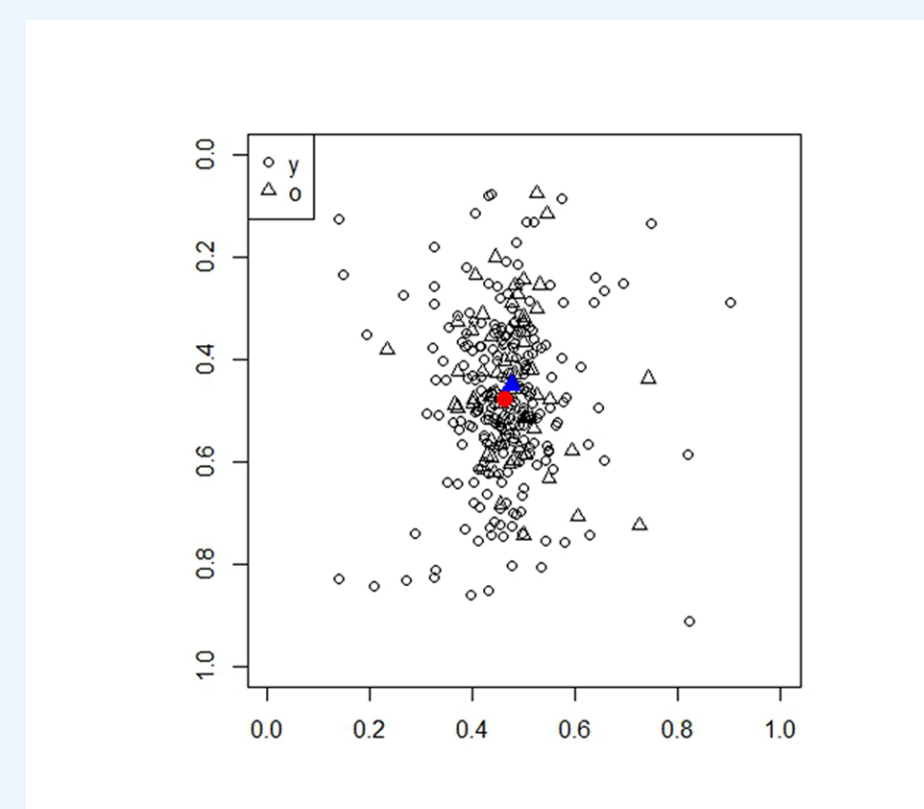
Iterative design: product development:
• **Prototyping**, **testing**, **analyzing**, **refining product** (Nielsen, 1993).
• Expert (social scientist) = user = testing • Beta version *(current state)*.
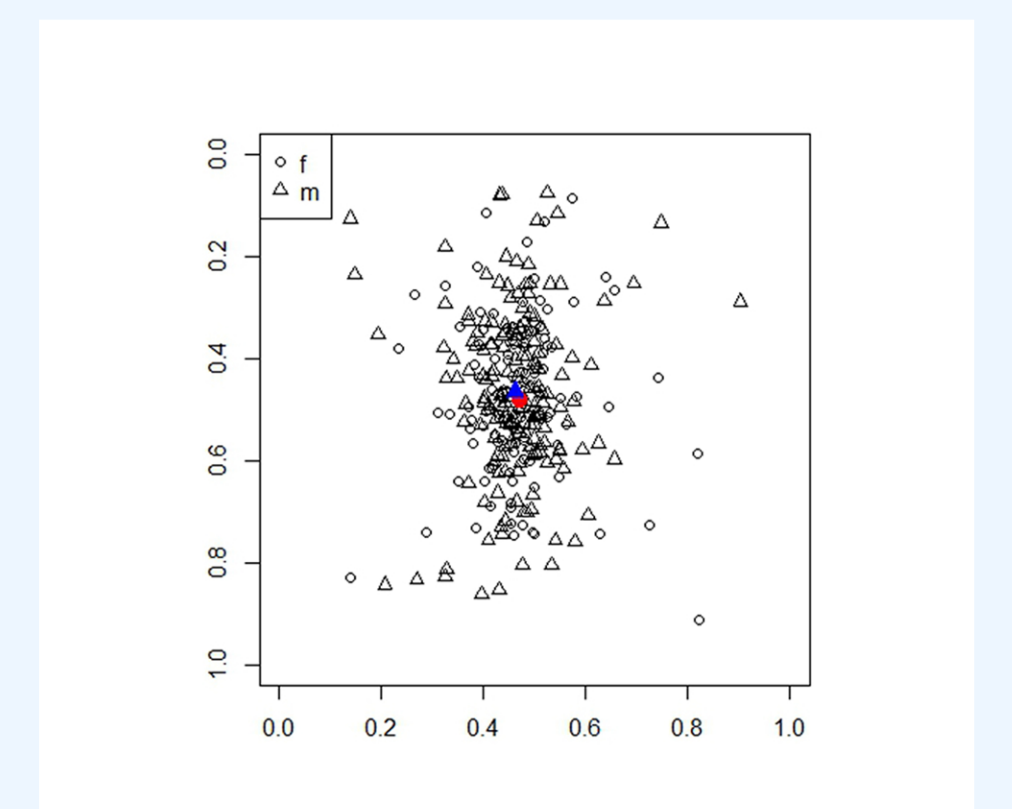
Mutual influence:
• Software **functionalities** ⬌ research **questions** • Decrease in the number of features-labels: ≈ 100 vs. > 600 • Subjective and comprehensive (see McCarthy et al., 2004) annotations ⬌ more **objective** and **summary** ones.
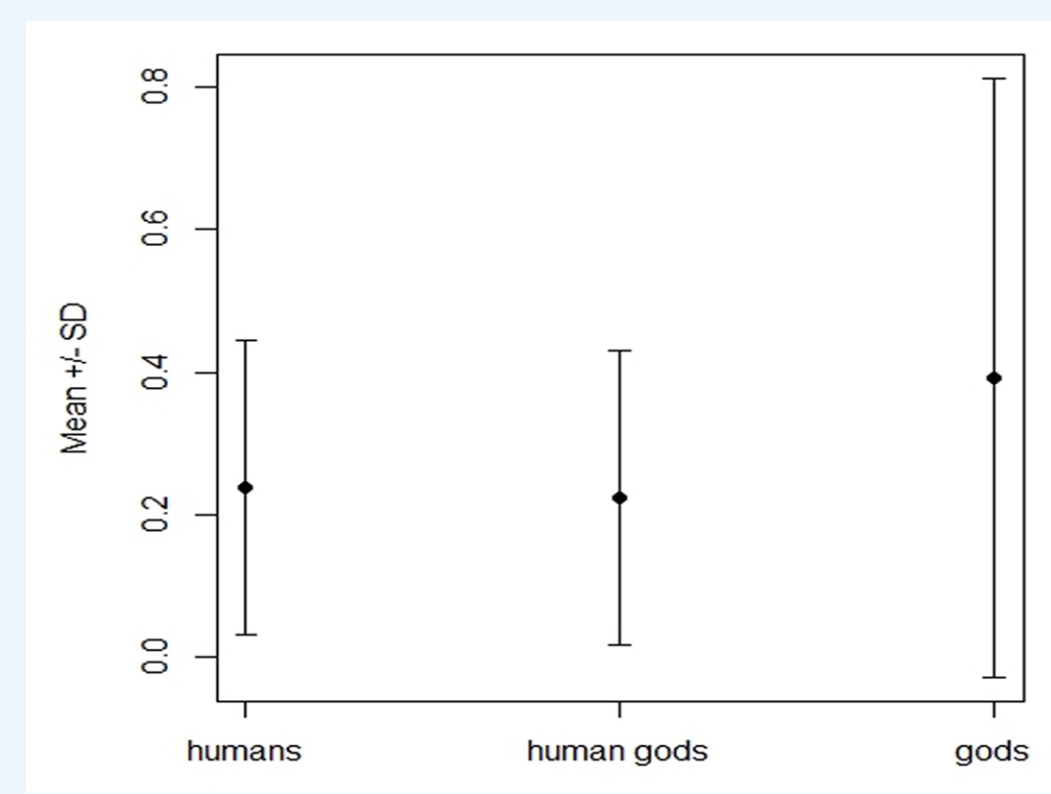
Re-defining the needs // practical issues:
• Suitable **alternatives** were found (e.g., guided sequence) where practical issues persisted (e.g., decisional path with exclusive choices) • **Benefits** from collaborative **interdisciplinary** work could be observed • Example: use of an annotation tree designed in Excel and converted to JSON for web display.

Functionalities

User experience:
• User-friendly
• **Guided** annotation
• **Interactive** interface
• Available for Chrome (≥ 44.0) and Firefox (≥ 41.0.2)

Scientific relevance:
• **Fast**
• **Flexible**
• **Accurate**
• Research-friendly

Approach:
• Import: **any image file** in jpeg or png format.
• **Annotation tree**: guided annotation with predefined features.
• Tools at hand: **point**, **box** • Comment box for free-text comments • Guided sequence or dropdown menu • Feature-specific reset and preview • Export: **multiple export** in csv format file per annotated image.

Output

First wave annotations:
• Sub-project on anthropomorphism: guidelines were provided to annotate human-related features
• Sample: Total N ≈ 500; Switzerland N ≈ 350; Japan N = 143 *(ongoing)*.
• Annotations by social scientists from our research team • Analyses by Christelle Cocco (UNIL).

Preliminary results:
• **Centers of mass** and **occupancy** of figures depending.
• Data: **labels** (from data curation) and **metadata** (i.e. age and sex of participants, culture).
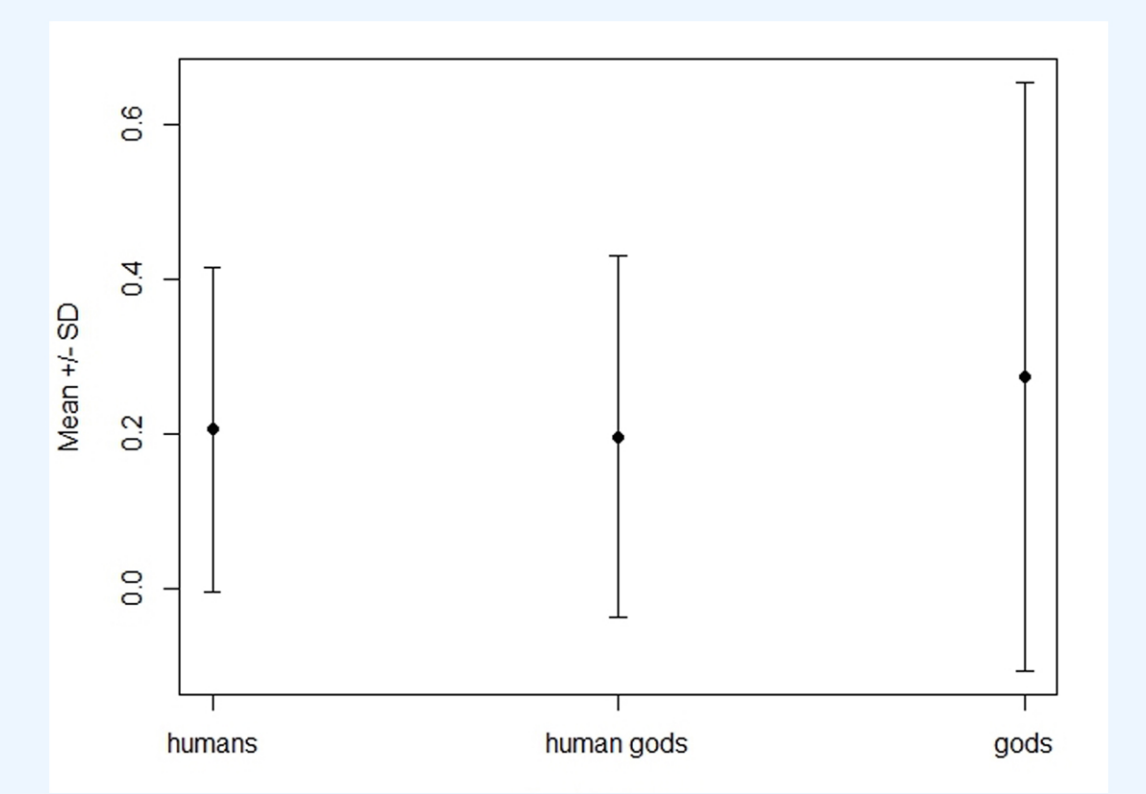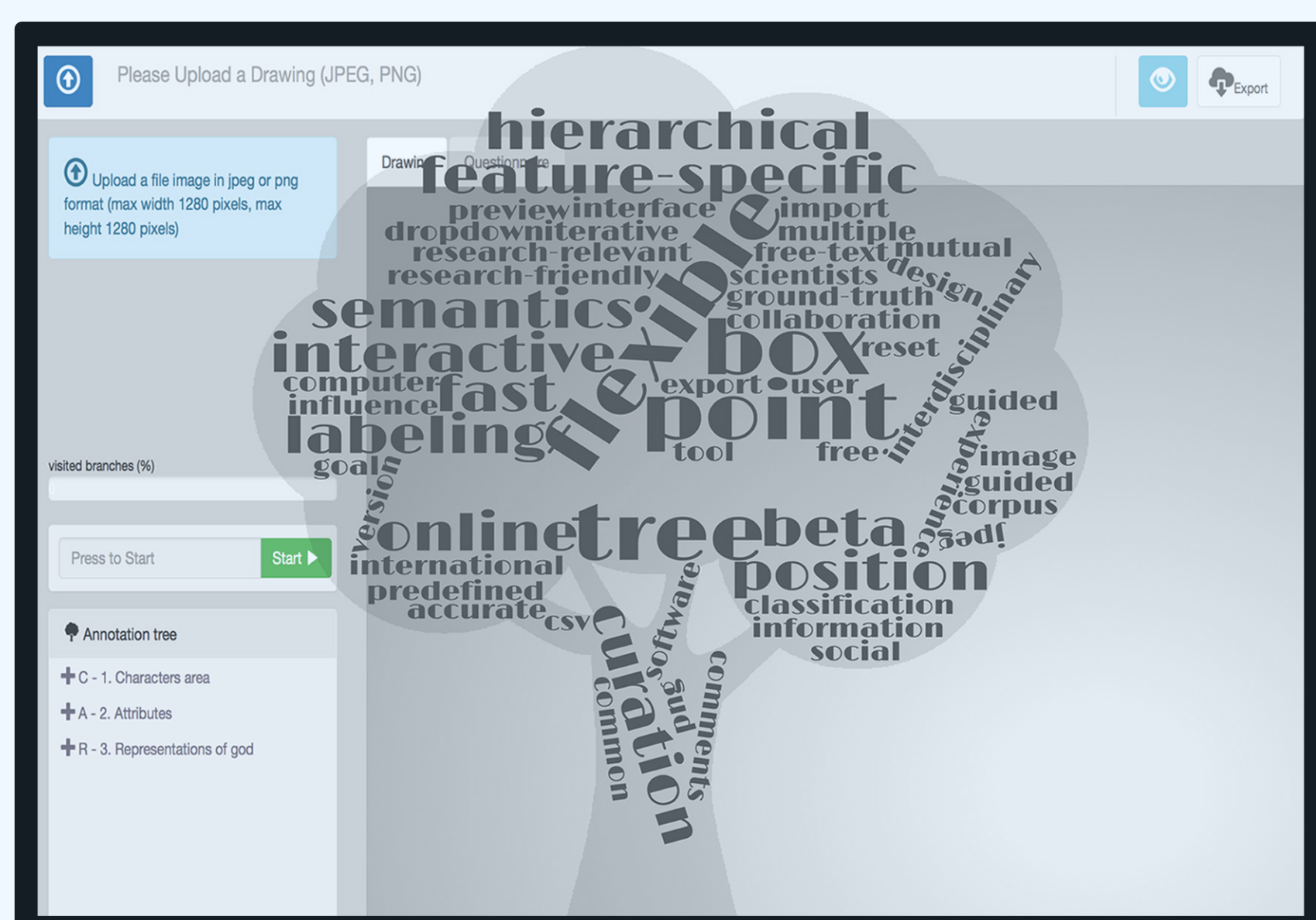

Centers of mass of god figures in Switzerland depending on age of participants

Centers of mass of god figures in Switzerland depending on sex of participants

Occupancy of figures in Japan

Occupancy of figures in Switzerland

Next steps

Data processing and analysis:
• Processing: data filtering and shaping.
• Analysis: classification (e.g., cluster analysis, machine learning).

Interface development:
• Backend and plug into upcoming new database of the project (rdf-based).
• Refinement of the annotation tree.
• Extra tools: segment (for specific features – e.g., arms, legs).
• Individual deployment of annotation tree for (high research management flexibility).
• Visual design.

Mixed methods:
• Ground truth for machine vision (MV): e.g., color analysis.
• MV tested on the present material without curation of data: Konyushkova et al. (in preparation).

Interdisciplinary work:
• Continue to revise members' original views and benefit from diversity of competences beyond challenges due to specialization and discipline boundaries (Gardy & Brinkman, 2003; Ruecker & Radzikowska, 2008).

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