Support Tools for Hybrid Research, EDIGA Project

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Abstract: In the digital age, where social interactions extend into complex virtual environments, digital ethnographies have become essential methodologies for understanding identity and community formation. However, the integration of diverse data types (textual, visual, and relational) poses significant technological challenges. This paper presents an integrated platform designed to address the fragmentation of tools in qualitative research workflows. The system comprises: (1) a mobile application for multimodal data collection; (2) a digital field diary with collaborative annotation features; (3) an image anonymization tool with automatic face/blurred text detection; and (4) a web portal for unified data visualization and analysis. Developed through an iterative design process with researchers from the EDIGA project, a transnational study on teenage gender identities in digital spaces, the platform solves critical points identified in traditional approaches: data silos in cloud storage, inconsistent file naming, and disconnection between collection and analysis tools. The proposed architecture enables end-to-end management of ethnographic data while maintaining GDPR compliance through built-in anonymization features. The paper contributes both a technical framework for integrated ethnographic tools and practical insights on overcoming interoperability challenges in qualitative research software.

1 INTRODUCTION

This paper presents the design and development of an information system to support researchers working on the EDIGA (Digital Environments and Gender Identities in Adolescence) ethnographic research project (Ediga, 2023). The system aims to facilitate the collection, management, and analysis of data in the field of digital ethnography, ensuring the ethical treatment of sensitive data.

The EDIGA project examines how digital environments influence the gender identities of adolescents in different sociocultural contexts, specifically in Spain, Mexico, and Uruguay. To this end, the project uses digital ethnography, a research methodology focused on the study of the cultural and social practices of individuals and communities in digital spaces (Pink et al., 2019; Barajas and Carreño, 2019). Digital ethnography is based on qualitative methods such as participant observation, structured interviews, and online data analysis, with the aim of examining the dynamics of interaction between individuals and digital technologies, as well as the sociocultural impact of these practices on their daily lives. However, although direct observation of adolescent interactions on social media is a valuable source of information, manual data collection has significant limitations. These include: (1) the demand for intensive human resources to monitor profiles and record relevant activities, and (2) the risk of systematic biases or errors during collection, derived from the subjectivity of the researcher.

To address these challenges, our study explores the potential of automated data extraction techniques combined with the active participation of adolescents through mobile applications. As a main contribution, we present AppEDIGA (Luongo and Colombo, 2021), a platform designed for the collection of data on social media use and exposure, ensuring robust privacy mechanisms. This approach not only increases the efficiency and accuracy of digital ethnographic studies, but also reduces dependence on manual methodologies, enabling proactive and scalable data acquisition directly from study subjects.

The rest of the article is organized as follows: Section 2 presents the proposed mobile application for data collection. Section 3 presents the data manage-

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ment portal, Section 4 presents the general architecture of the system, and Section 5 shows aspects of the implementation and the first results. Section 6 presents a proposed tool for image anonymization. Finally, Section 7 presents some conclusions and lines of future work.

2 MOBILE APPLICATION FOR DATA COLLECTION

Prior to the development of a mobile application for data collection for the EDIGA project, the EDIGA team studied the current social context to find out which social networks were being used by teenagers at that time. It was concluded that the most widely used applications are: Discord, TikTok, and Instagram. Therefore, the functionalities offered by the APIs of these platforms for data extraction were analyzed.

Discord API: In order to use the Discord API, authentication is required. The process includes the use of OAuth2, which requires a valid redirect URI to obtain a code that is then sent in a request to the server to obtain a token (Discord, 2023). With regard to the user, the data obtained is very basic (Discord-gui, 2023): username, email, and other information that indicates usage and interactions on the network but is not intended to provide information about a particular user. Hence, it is not very useful for the intended purpose of the application.

TikTok API: TikTok's official material for developers is designed for embedding videos or sharing links, not for obtaining user information. There are several unofficial APIs, but their use can be risky. If TikTok makes changes to its software structure, it is very likely that these unofficial APIs will stop working.

Instagram API: The social network Instagram has two APIs: the Graph API, for business or creator accounts, and the basic display API for regular users. The accounts of the individuals subject to EDIGA's investigation are not businesses, so the second API applies. This API provides restricted information about the user; only some data about the multimedia files that the user has published can be obtained. The information of interest to the project, such as number of followers, likes, among others, is only accessible from the Graph API, which does not apply in this case for the reasons mentioned above. The alternative of scraping directly from the Instagram website was not considered, as scraping violates Instagram's terms of service (item 10 of the terms). On the other hand, the Instagram API does not allow logging in, but rather requires using Facebook login if authentication is desired. Facebook login was therefore implemented, although this implies some limitations to the project: first, it is necessary to have the Facebook application on the device. Second, since the intention is to use Facebook information to obtain an Instagram session, it is necessary for the teenager to link their Instagram and Facebook accounts. These two restrictions mean that users must take action to participate in the project, which is a risk because it may not happen, and therefore the expected data could not be obtained. In order to obtain information from the API, it is necessary to have permission from Instagram so that the application to be developed can request the relevant permissions from the user (application review). This process requires the application to be in an advanced state, as it is necessary to upload the application in its near-final version and create a screenshot video showing exactly how the data will be used, among other elements (Instagram-gui, 2023). Given the characteristics of the EDIGA project, this option was ruled out.

Despite the limitations encountered, it can be concluded that Instagram is the network that has an API available to query some of the data that users upload to their accounts. Instagram is a primarily visual social network where users can post photos and short videos, apply effects to them, and also interact with other people's posts through comments, messages, and emoticons such as likes and dislikes.

As a result of this analysis, the EDIGA project decided to work with Instagram, and a series of forms were defined in advance as a source of quantitative and qualitative data collection. These forms were designed for teenagers between the ages of 13 and 17 and included an informed consent clause whereby, if they so wished, participants agreed to have their Instagram accounts monitored by an assigned researcher who would make observations about the subject's behavior on the social network. These were referred to as "friend accounts," and were necessary because they allow the researchers to view the teenagers' activity even if their profiles are private. In addition, it was decided to supplement the observations of Instagram accounts with a mobile application (AppEDIGA) whose main functionality is to automate the process of collecting data from study participants through forms designed to be answered at different stages of the research. Through the use of the application in the background, information regarding the time spent on Instagram is captured. This data is uploaded directly to a relational database.

The application was used by research teams in Mexico and Spain, which together collected around 450 records, 400 of which came from Mexico and the

rest from Spain. In addition, 50 images were voluntarily submitted. The fact that the second and third forms were not mandatory meant that the number of responses decreased, with just over 100 for the intermediate form and 33 for the final form. Most of the data entered came from Mexico because the researchers held a face-to-face meeting where they explained the app installation process to the teenagers and answered the most common questions.

3 DATA COLLECTION WITHIN THE EDIGA PROJECT

One of the most critical stages in digital ethnographic research is fieldwork, where the behavior of study subjects on social media is analyzed. During this phase, qualitative data is generated through systematic observations and field notes, which require specialized tools for organization and analysis. In the case of the EDIGA team, this process relied on Microsoft Teams for collaborative file management and Atlas.ti (AtlasTI, 2024) for qualitative data processing. However, this approach had significant limitations: (1) the lack of a unified standard in the naming and categorization of attached images, which led to inconsistencies among researchers, and (2) the absence of a defined methodology for integrating quantitative data from the project's mobile application (AppEDIGA) with qualitative observations.

In particular, the data generated by the mobile application were not centrally accessible, forcing the team to query the database directly. This fragmentation between the qualitative and quantitative components made data triangulation and comprehensive analysis difficult.

To address these challenges, PortalEDIGA was designed, a unified platform that allows for: (1) standardized collection of qualitative data (observations, field diaries, and metadata), (2) qualitative analysis assisted by computational tools, and (3) visualization of quantitative metrics in real time. This integration not only optimizes methodological consistency but also facilitates interoperability between the qualitative and quantitative dimensions of the research.

3.1 Functional Requirements

This section describes the five categories of functional requirements that were identified and later guided the implementation of PortalEDIGA.

In terms of **User Administration**, the goal is to be able to: create new researcher users and assign roles (administrator/researcher), edit researcher user roles, and view a list of all registered researcher users.

For **Session**, the goal is for a researcher to be able to: log in with a username and password and log out.

For **Subjects**, researchers should be able to: view a list of subjects and their aliases, Instagram username, age, gender, and country; search for a subject by Instagram username or alias; filter subjects by age, gender, and country; create a new subject with an alias, age, country, gender, and Instagram username; edit all subject data; and delete a subject.

With regard to **Subject Profile**, researchers should be able to: view a subject's profile with all their activity in the AppEDIGA; view the gallery with all the photos that the subject uploaded through the application; add a comment to an image uploaded by the subject; view a list of all comments made about the subject along with their creation date and the user who made them. They can also create a comment for a subject, attach a photo, and indicate the title, type of post, number of likes, number of comments, date and time of publication, whether it contains music and what kind, and the text of the comment. Delete a comment, view a list of field diary entries for the subject, create a new field diary entry, reference photos uploaded to the portal and save the creation date, delete a field diary entry. Download a field diary entry in docx format Edit a field diary entry and save the edit date, add tags for all images on the portal. When adding a new tag, it must be saved for later use, receive suggestions when tagging an image, export images with blurred areas so that subjects and places are not recognizable.

3.2 Non-Functional Requirements

This section describes the non-functional requirements defined in conjunction with the researchers.

Free open source software, throughout development, the use of free and open source software is prioritized. Among its advantages are freedom of customization, ease of integration, access to source code, and no additional costs to the project.

Economical infrastructure, the EDIGA team expressed interest in keeping costs low without affecting the performance and operation of the system. Spanish language: since all EDIGA researchers are from Spanish-speaking countries (Uruguay, Mexico, and Spain), the language of the portal must be Spanish.

Web adaptability, implement the web portal in a responsive manner (ability of HTML code to adapt to different device screen sizes). That is, ensure its proper functioning on mobile and desktop devices.

Security and privacy, the research handles sensitive data and has a confidentiality agreement with

the subjects. In order to comply with this agreement, handling data securely is a fundamental requirement.

Concurrency, ensure proper functioning with multiple users using the system in parallel without affecting its performance.

Usability, it is important to ensure the usability of the system through a user-friendly and intuitive interface that can be operated without the need for training or support.

4 DESIGN AND TOOLS

This section presents the proposed solution that meets most of the requirements detailed in the previous sections.

The portal architecture was divided into five main modules: the mobile application, the web application, the mobile server, the web server, and the database. These are shown in Figure 1.

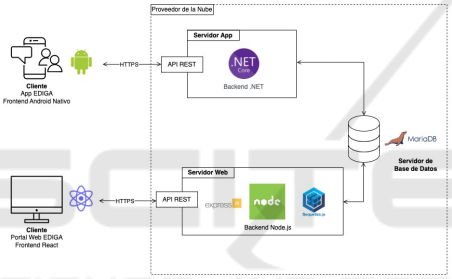

Figure 1: Architecture of the field diary system for EDIGA.

This architecture is a variation of the classic three-layer Client/Server architecture, which consists of two servers, one for each type of client, mobile and web, and a shared database. This type of architecture involves three main types of components: servers, clients that use the services offered by the servers, and database servers that store the data.

4.1 Relational Model

For the web portal, we decided to work on the same relational database used by the mobile application, since it had to consume the data collected by the application and at the same time store new data generated by the researchers. The entities of the relational database are briefly described in this section.

- **User:** This entity is inherited from the existing database design used by the ediga-app. Before the development of the web portal, it only hosted subjects registered through the mobile application, storing an identifier and their country of origin. Once the development of the portal began, it was also used to store subjects who are manually registered by researchers through the web portal.
- **UserRegisterInfo:** This entity stores subject registration data, such as gender, age, and Instagram username. Like the User entity, it is inherited from the mobile application and stores information about subjects registered through the ediga-app and entered through the web portal.
- **MiddleFormAnswers and EndFormAnswers:** Entities inherited from the ediga-app model. They store the subjects' responses to the mid- and end-of-research process forms. These responses are consumed by the web portal and displayed in each subject's profile.
- **DailyUsage:** Entity inherited from the ediga-app model. Stores the daily use of Instagram for each subject registered in the application. The portal consumes this data and displays it on its general metrics screen.
- **Photo:** Entity inherited from the ediga-app model. Stores images shared by the user during the research process, along with their answers to a series of three questions about that image.
- **EdigaUser:** Models the users of the ediga-app, i.e., the researchers. Among the users of the portal, there are administrator users who have permissions to register and/or delete other users, as well as assign roles to them.
- **Observation:** Represents the observations that researchers create about the subjects' posts. These observations can be either about images uploaded through the ediga app, in which case they are linked to them through the `photo_id` attribute, or about posts that subjects made on Instagram. In the latter case, attributes such as `likes`, `comments`, and `type` are used to record the particularities of each post. Each observation has a free text field in which the researcher records any comments they deem relevant about the subject and the publication in question.
- **DiaryEntry:** Represents entries to the *Field Diary* section, in which each researcher can enter notes on the daily fieldwork they carry out throughout the research.

4.2 Tools

For the implementation of the frontend (the part of a program that a user can access directly) of the web portal, it was decided to use the React library. This is an open-source library used when building interfaces. Through the use of JavaScript, it offers a robust

working environment for programming and facilities for generating dynamic user interfaces. For the implementation of the interface, Material (MUI, 2023), React's user interface component library, was used. For some functionalities, it was necessary to add a text editor, ReactQuill (Reactquill, 2023) was chosen. For requirements related to exporting the subject list and field diary, it was necessary to use libraries that would allow this information to be downloaded in docx and xlsx/csv format (an XML-based file format enabled for Excel 2007 to 2013 macros, and CSV (Comma Separated Values) The backend was implemented as a REST API (API, 2023).

5 IMPLEMENTATION AND RESULTS

The structure of the web portal follows the layout of a control panel. There is a vertical menu on the left side of the screen with the following options: Metrics, Subjects, Administrator Section, and Log Out. There are two types of users who can access the web portal: those with an administrator role, who have access to all menu options, and users with a researcher role, who can access all options except the Administrator Section, see Figure 2.

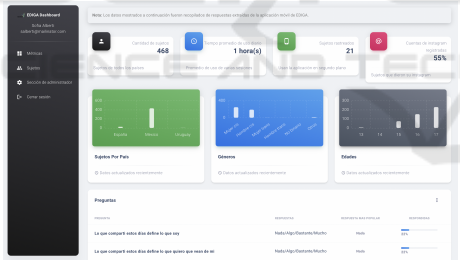

Figure 2: Panel layout.

5.1 Web Portal Access

When accessing the web portal for the first time, the login screen is displayed. To log in, the user must enter their email address and password. An administrator user was created in the database so that different researcher users could then be created through it. Researchers are stored in the EdigaUser table, and each password is encrypted using the bcrypt library (Bycript, 2023), which implements the Blowfish block cipher algorithm (Schneier, 1994). This algorithm has a good level of protection against attacks and has been used by Linux distributions such as SUSE Linux and OpenBSD.

5.2 Metrics

The home page is the metrics page. It displays data corresponding to those subjects who use the mobile application, such as the number of subjects per country, gender, and age, as well as the most common responses to the different questions asked. All data collected through the mobile application is used as quantitative data.

5.3 Subjects

The Subjects section lists all participants, including those created using the mobile app and those created by researchers on the portal. The list of subjects can be filtered by registration data (age, gender, and country) and allows searching by alias or Instagram account. A file in xlsx or csv format can be downloaded with the data shown in the list, either with or without filters applied. This file includes the registration information and intermediate and final responses that the research subjects entered in the mobile application. The xlsx library, mentioned above, was used to implement this functionality. Since not all participants agree to use the mobile app or have an Android phone to install it, subject creation and editing features were added to the panel. The fields requested are the same as those requested by the mobile app, with the addition of the alias field. When creating or editing a subject, the following checks are performed: uniqueness of the Instagram user (if provided) and that the basic data is not empty. If these conditions are not met, the registration or editing cannot be completed. In addition, it is possible to delete a subject from the editing screen.

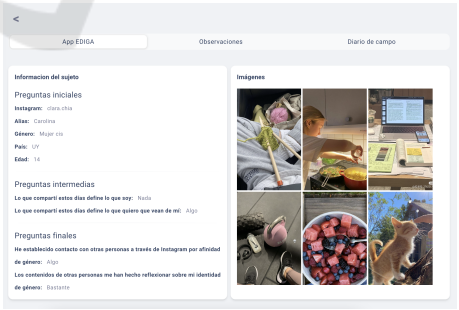

Figure 3: Subject profile.

By selecting one of the subjects, you can access their profile, which is divided into three tabs, Figure 3. The first is the ediga-app, which displays the initial, intermediate, and final responses that have been entered into the mobile application, along with a gallery of images that were voluntarily uploaded by the subjects also through the application. The images can be

viewed individually. In this view, it is possible to create an observation related to the image, allowing the researcher to write a title and an observation in the text editor. The editor is obtained from the ReactQuill library, mentioned above. The comment created will be found in the list of comments made on the subject (a feature explained later). When returning to the profile, the Comments tab can be selected, which lists all the comments made on images or specific comments that the researcher made on the research subject, Figure 4.

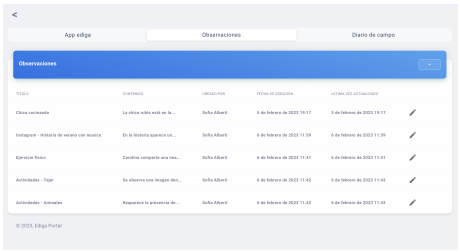

Figure 4: List of observations created for a subject.

The functions for viewing, adding, deleting, and editing observations are implemented. For specific observations, in conjunction with the researchers, it was considered important to be able to record the type of publication on which the observation was made, the number of likes and comments, the date it was published, and, if it contained music, to record certain data about it, such as the author and lyrics, Illustration 6. It is also possible to upload an image associated with the observation, which will be saved in Base64 format in the database. By editing an observation, the researcher has the possibility of deleting it.

The last tab in the subject's profile is the field diary, with all the entries that have been made. In this view, it is possible to create, view, edit, and delete a field diary entry. When creating an entry, as in the case of the observation, the researcher is presented with a free text field. This functionality was created with the intention of allowing researchers to express the conclusions they reach based on their observations. ReactQuill is again used as the editor, and its main advantage is the ability to cross-reference other observations or any page within or outside the portal that you want to refer to. This way, if you reach a conclusion based on a certain observation, the latter can be easily referenced and, when accessed, opens in a new tab. It also allows to upload images and videos that enrich the research.

The view, edit, and modify options also allow users to download the text of the field entry along with all its components in docx format. This is done using the library mentioned earlier in the description of technologies, html-docx-js, which transforms the content into Word Processing ML (markup language). This allows researchers to migrate entries to their personal devices or continue analysis from AtlasTI.

5.4 Researcher Administration

Only researchers with an administrator role have access to the administrator section. This section lists the different researchers with their role and country. In this view, a researcher can be deleted by clicking on the trash can icon. For double confirmation, this icon will change to a button with the word delete, and once clicked, the researcher will be deleted. In this view, the registration and editing of a researcher has been implemented, which consists of a form that includes the entry of a name, email, password, selection of the country to which they belong, and the role to be assigned, either researcher or administrator.

5.5 Platform Deployment

For the deployment of the web portal, work was done on automating the compilation process, updating the database, downloading and updating dependencies, creating deployable packages, and making the server available, with the intention of orienting the project toward continuous integration and continuous delivery (CI/CD).

6 IMAGE ANONYMIZATION

Anonymization is the act of removing any reference to the identity of entities or individuals in specific data, it involves removing information that could identify a specific individual.

The EDIGA research project works with images uploaded by participants via the mobile app or imported by the EDIGA team. Researchers have access to the Instagram accounts of participants who have given their consent to be followed. There, they observe the participants' behavior on social media, taking screenshots of their posts on the home screen, stories, live videos, and comments. These screenshots can be imported to the web portal in order to record observations about them. These images often contain the subject's face, the faces of other people, parts of their bodies, as well as identifiable physical locations, such as street signs or recognizable buildingsAt the end of the investigation, the EDIGA team must publish the results of the work carried out, presenting the evidence of the process and a set of the images studied with their corresponding observations. When pre-

senting them, it is necessary to edit these images in order to protect the privacy of the subjects, ensuring that they are not identifiable, but without losing the essence of the image.

A key aspect of achieving automatic anonymization of an image is the detection of the object or section relevant to this process. To understand how current tools with this functionality work, this section studies academic publications, selecting and highlighting the most widely used object detection models. This allows them to be compared based on scientific publications and community support. Some comparisons are made using comparative tables present in each scientific publication, since, in general, the same data sets are used for the evaluations.

The essential requirements for the anonymization tool include aspects of Session, User Configuration, Manual Anonymization, and Automatic Anonymization. It is necessary for researchers registered on the platform to be able to log in and log out at any time to ensure account privacy. Authenticated researchers must be able to modify their user data to keep their accounts up to date. Authenticated researchers must be able to upload image sets from the file system to apply selectable obfuscation filters and send the processed images to the server, as well as have options to download the anonymized images and save them. There should be the possibility of automatic anonymization by uploading a set of images from the file system to automatically apply obfuscation methods to areas that a trained model considers to be regions of interest, as well as the ability to download them.

The architecture of the anonymization tool is organized into three main modules: the web application, the server, and the database. These are shown in Figure 5.

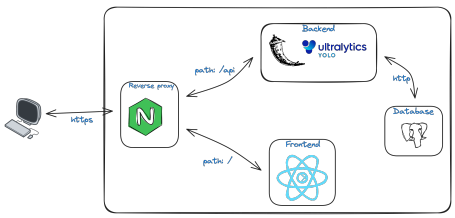

Figure 5: Architecture diagram of the anonymization tool.

For face detection in images, the YOLO (You Only Look Once) algorithm (Redmon et al., 2015) was used, known for its high accuracy and speed in object detection tasks. YOLO was integrated with OpenCV (Opencv, 2023), an open-source library specializing in image processing, to apply different anonymization methods, such as blurring, pixelation, and region blocking. In addition, ONNX Runtime (ONNXRuntime, 2024) was used to run the machine learning model. The prototype was also designed to be deployed in both local and in cloud environments.

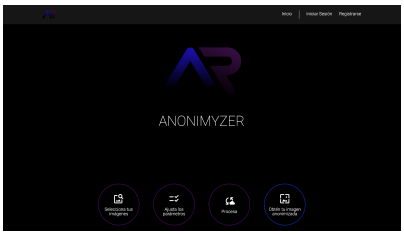

Figure 6: Interface of the anonymization tool “Anonimyzer”.

In terms of evaluation, the tool underwent various tests that demonstrated its ease of use, efficiency, and security. The integration of different technologies and tools made it possible to develop a robust solution that meets the requirements offering an effective and ethical way to anonymize images for use in social research, see Figure 7.

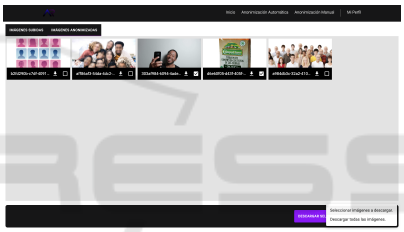

Figure 7: Example of image anonymization with the “Anonymizer” tool.

The strengths of the tool include the ability to handle large volumes of data, flexibility to integrate with other tools, and the possibility of deployment in both local and cloud environments, offering scalability and remote accessibility while preserving the privacy of individuals and maintaining the data for research.

7 CONCLUSIONS AND FUTURE LINES OF WORK

The system developed within the framework of the EDIGA Project shows the inherent complexity of collecting data on social media, mainly due to privacy policies that restrict access to detailed information about users. These structural limitations, common on platforms such as Facebook, make it necessary to establish institutional agreements with service providers to access relevant data, which constitutes a significant challenge in digital social research.

Faced with these restrictions, our team implemented an alternative solution by developing a mobile

application that allows for the proactive collection of data directly from the study subjects. This methodological approach proved particularly effective in the Mexican context, where researchers conducted face-to-face sessions to: (1) facilitate the installation of the application, (2) explain the research objectives, and (3) address concerns.

The iterative incremental development allowed for feedback at different stages of development by researchers through demonstrations, guided presentations, and usability tests. The latter were conducted with a small number of researchers to obtain an initial idea of the product's conformity. For proper validation, it would be necessary to increase the number of users testing the portal in production in order to obtain suggestions for subsequent iterations. The technologies used met the initial requirement of being free and open source. They were tailored to development needs and were easy for the team to adopt. The architecture planned during the design of the solution was implemented using services such as CodePipeline to comply with the CI/CD method.

Most of the functional requirements were met, and a step-by-step deployment guide was generated, which may be useful for future projects. The platform is considered adaptable to projects on different topics that share characteristics such as the entry and analysis of qualitative data and the management of information entered by external means, such as the mobile application.

As a side result of the implementation, the achievements in terms of interdisciplinary work between the technical development team and EDIGA researchers stand out. There was a clear contrast between the beginning and the end of the project. Thanks to the collaboration of the two teams, greater interest in the development of the portal was generated, and researchers began to participate more actively in proposing new functionalities. Bringing researchers closer to this type of technology is a valuable result and opens the door to the development of new tools.

The complementary modules for labeling and data cleaning are considered essential for the future development of the platform, as they complement the solution developed in this project.

In addition, training of facial detection algorithms should continue using real images from the EDIGA study. This would help to obtain more accurate results and avoid errors. Finally, as future work in this area of research, the functionality could be extended to other types of images where it is necessary to hide parts of the body, street names, or identifiable physical locations.

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REFERENCES

API, R. (2023). Microsoft. best practices for restful api design. https://learn.microsoft.com/en-us/azure/architecture/best-practices/api-design.

AtlasTI (2024). AtlasTI. https://atlasti.com/es/.

Barajas, K. B. and Carreño, N. P. (2019). Desafíos de la etnografía digital en el trabajo de campo onlife. *Virtualis*, 10(18):134–151.

Bycript (2023). Bycript. https://www.npmjs.com/package/bcrypt.

Discord (2023). Discord developer portal, documentation, reference, guild object (2021). https://discord.com/developers/docs/resources/guild#guild-object.

Discord-gui (2023). Discord: Discord developer portal, documentation, reference, user object (2021). https://discord.com/developers/docs/resources/user#user-object.

Ediga (2023). Proyecto EDIGA: Entornos Digitales e Identidades de Género en la Adolescencia. http://stellae.usc.es/ediga/.

Instagram-gui (2023). Facebook: Contenido multimedia de instagram - plataforma de instagram (2021). https://developers.facebook.com/docs/instagram-api/reference/ig-media.

Luongo, V. and Colombo, L. (2021). Aplicación para proyecto ediga. Proyecto de grado. Facultad de Ingeniería, Universidad de la República (Uruguay).

MUI (2023). MUI: React component library. https://mui.com/.

ONNXRuntime (2024). ONNX Runtime. https://onnxruntime.ai/index.html.

Opencv (2023). Opencv. https://opencv.org/.

Pink, S., Horst, H., Postill, J., Hjorth, L., Lewis, T., and Tacchi, J. (2019). *Etnografía digital*. Ediciones Morata.

Reactquill (2023). Reactquill. https://github.com/zenoamaro/react-quill.

Redmon, J., Divvala, S., Girshick, R., and Farhadi, A. (2015). You only look once: Unified, real-time object detection. cite arxiv:1506.02640.

Schneier, B. (1994). Description of a new variable-length key, 64-bit block cipher (blowfish). In Anderson, R., editor, *Fast Software Encryption*, pages 191–204, Berlin, Heidelberg. Springer Berlin Heidelberg.