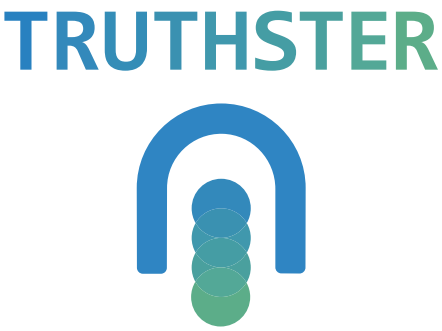
TRUTHSTER

WHITE PAPER

An easy-to-use tool for
certified media content creation



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EXECUTIVE SUMMARY

Journalists and other media professionals currently lack specific and effective tools to **certify the authenticity and integrity of the content produced**, as well as to collect consent easily from their sources for using their personal data or copyright license.

Individuals who are interviewed are often **unaware of their rights (including to personal data protection) and incapable of exercising them** or incapacitated to raise legal claims.

The Truthster application aims to develop an integrated platform to support media professionals in certifying media content created through interaction with a user (e.g., an interview) and generating semi-automated legal disclaimers and licenses.

The aim of this white paper is first to provide an overview of the context that shapes the work of journalists (section 1) and of the technological tools currently available to support their work (section 2), and then to highlight the features of the new solution developed within Truthster (section 3) and to explain to current and prospective customers the users' needs that this solution aims to address (section 4) and the business model proposed (section 5).

1. THE CONTEXT

In the data-driven society and data-driven economy, trust on information is crucial. In general, better tools and procedures are needed to make sure that information shared – especially online – is trustworthy.

Among the many challenges faced by present day journalism, are the need to certify the content produced and the duty to collect consent from the source.
Journalists are a targeted profession, both physically (e.g., war reporters killed or injured in war zones) and socially (e.g., censorship, aggression at street protests, lawsuits). Despite the vulnerability of individuals, journalism is at the core of fair public debate and of the information society in general. To tackle disinformation and to preserve democratic societies, it is crucial to support the professionals involved in public communication.

Information Communication Technologies (ICTs) represent both extraordinary opportunities and concerning threats for journalists. On the one hand, they expand the possibility of collecting sources of information, analysing data and disseminating news to a wider public, even bypassing governmental censorship, in a way that was unthinkable before the rise of the Internet; on the other, they create competition with other sources of information, undermining the credibility of online communication (influencers, bloggers, entertainers of any sort), while the automation of news generation (stock exchange reports, sport chronicles) tends to circumvent human intervention, challenging human authorship as an essential requisite of any news. Communicating today means integrating heterogeneous components (texts, images and videos) in coherent messages. The legal protection of such a complex content is an additional effort that many are unable to address. Furthermore, in many cases, journalists are not the authors of the materials which accompany the news so, before releasing their contributions, they need to perform a thorough legal compliance concerning copyright ownership, rights of portrayal and privacy.

Current challenges concerning journalists' media releases can be classified into three categories:

- Personal identification and professional qualification by the reporters.
- Legal compliance, especially related to:
    - Copyright licensing, in terms of both verification of legal ownership for the materials used and enforcement against infringements for the materials produced.

— Rights of portrayal and other personal image-related rights.

— Personal Data protection.

— Accountability, i.e., providing proof of compliance to "interested person", third parties (publishers, courts) and the public.

Freedom of expression, censorship and disinformation

In general, journalists embody the freedom of the press, which consists in collecting information from their sources and releasing it to the public in the form of news. The legitimation of such activity is rooted in Western culture as expressed in many official documents, such as the Universal Declaration of Human Rights (article 19) [1] , the European Convention on Human Rights (article 10) [2] and the Charter of Fundamental Rights of the European Union (article 11) [3]. The legal framework regulating the activity of journalists takes into consideration such principles granting specific guarantees in terms of protection of confidentiality of the sources and exclusion from liability arising from the news lawfully published.

The respect of fundamental rights, including not only the right to private life and to data protection but also to freedom of expression and to an effective remedy, represent a cornerstone of the legal framework that governs information sharing in democratic societies. One of the aims of Truthster is to deepen understanding of the human rights implications of the use of blockchain technology in journalism, and to propose some solutions to embed the protection of fundamental rights within its technological products.

Tackling disinformation

The fact that our democratic societies are highly dependent on the ability to produce, share and consume trustworthy information from a wide variety of sources is noticeably acknowledged by the European Commission [4].

What is "disinformation"?

The European Commission has defined disinformation as «verifiably false or misleading information that is created, presented and disseminated for economic gain or to intentionally deceive the public, and may cause public harm. Public harm comprises threats to democratic political and policy-making processes as well as public goods such as the protection of EU citizens' health, the environment or security» COM(2018) 236 final

While, on the one hand, democracy in Europe rests on the existence of free and independent media, on the other, ICTs are profoundly changing the way traditional and new media produce and distribute information and the ways in

[1] https://www.un.org/en/about-us/universal-declaration-of-human-rights/
[2] https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=005/
[3] https://eur-lex.europa.eu/eli/treaty/char_2012/oj/
[4] COM (2018) 236 final, Communication on Tackling online disinformation: a European Approach, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0236/
[5] https://digital-strategy.ec.europa.eu/en/library/2018-code-practice-disinformation/

which users are engaged in the production of information. Not only governments and digital platforms, but each media creator, in other terms, is at the forefront of the battle against disinformation, and every user can be held hostage by propaganda. In order to address this issue, EU institutions released a Code of Practice on Disinformation in 2018 [5], which was revisited in 2022 with the EU Strengthened Code of Practice on Disinformation [6]. This initiative aims at encouraging stakeholders to adopt a set of measures to empower content creators and users by ensuring the safe design of the architecture of their systems, and by providing them "with tools to assess the provenance and edit history or authenticity or accuracy of digital content". The EU is committed to foster the development of new methods and tools to contain the spreading of disinformation, by financing research and innovation projects [7].

Legal issues for media professionals

As regards the regulation of information concerning individuals, currently the legal framework in the European Union is based on the Regulation (EU) 679/2016 (henceforth "GDPR") [8], which establishes rights for data subjects and obligations for data processors and controllers. Of course, even journalists, publishers and general media creators must abide with such provisions, yet it is noteworthy that in this sector Member States are entitled to establish specific provisions, which have to be notified to the EU Commission [9].

Article 85 GDPR on reconciling processing and freedom of information

1. Member States shall by law reconcile the right to the protection of personal data pursuant to this Regulation with the right to freedom of expression and information, including processing for journalistic purposes and the purposes of academic, artistic or literary expression.

2. For processing carried out for journalistic purposes or the purpose of academic, artistic or literary expression, Member States shall provide for exemptions or derogations from Chapter II (principles), Chapter III (rights of the data subject), Chapter IV (controller and processor), Chapter V (transfer of personal data to third countries or international organisations), Chapter VI (independent supervisory authorities), Chapter VII (cooperation and consistency) and Chapter IX (specific data processing situations) if they are necessary to reconcile the right to the protection of personal data with the freedom of expression and information.

3. Each Member State shall notify to the Commission the provisions of its law which it has adopted pursuant to paragraph 2 and, without delay, any subsequent amendment law or amendment affecting them.

The two-level combination of EU and national discipline has several consequences:

— The balance between interviewer and interviewee can be different in each Member State, so the interviewer should be aware of the existence of possible different provisions when working abroad.
— There is uncertainty on the identification of the applicable legal system, generat-

ing possible conflicts. As a general principle of consumer law, the interviewer should consider the citizenship of the interviewee when collecting information from her/him, since it is a general principle that the individual should have the higher level of protection available, yet the GDPR is rooted in the Country of the data controller. — The provisions can change over time at a national level, possibly unbeknownst to the journalist.
Another relevant topic for the project is the definition of what is considered as "consent" under the GDPR.

Article 4 (11) GDPR Definitions
"Consent" of the data subject means any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her [...]

On the concept of consent, the European Data Protection Board (EDPB) has released a specific guideline containing detailed instructions referring to the "statement or by a clear affirmative action" [10]. Essentially, the data subject has to be put in charge of the decision concerning her/his own data, and this expression of will has to be unambiguous and suitable to be documented. For example, the consent is invalid if expressed via pre-ticked opt-in boxes or mere silence (tacit consent as in simple prosecution of using a given service or a website), or using the same action used to agree to a contract (lack of specification). To be valid, a consent does not necessarily have to be written – since it can also be oral (recorded) and can also be expressed through a physical motion "as long as clear information is provided, and it is clear that the motion in question signifies agreement to a specific request".
Furthermore, whenever explicit consent is required [11], a two-stage verification: "I agree" + SMS/mail link or verification code can be put in place.
Furthermore, journalists, publishers and media creators must abide with provisions regulating the processing of personal data, even if in this sector specific provisions are established at the national level for reconciling personal data protection with the free flow of information.

[6] https://digital-strategy.ec.europa.eu/en/library/2022-strengthened-code-practice-disinformation/
[7] Joint Communication, Action Plan against Disinformation, JOIN/2018/36 final, https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:52018JC0036/
[8] https://eur-lex.europa.eu/eli/reg/2016/679/oj/
[9] https://ec.europa.eu/info/law/law-topic/data-protection/data-protection-eu/eu-countries-gdpr-specific-notifications_en/
[10] https://edpb.europa.eu/our-work-tools/our-documents/guidelines/guidelines-052020-consent-under-regulation-2016679_en/
[11] According to the GDPR, an "explicit consent" is required only for processing of special category of data (Article 9 GDPR) and personal profiling (article 22 GDPR). See also Opinion 15/2011 on the definition of consent, adopted on 13 July 2011.

2. TOOLS CURRENTLY AVAILABLE

Media professionals (reporters, in particular) require easy-to-use digital tools, allowing them to optimize content production and release.

More specifically, the field of journalism is centered around the creation and distribution of news that can be trusted, so that the public can make informed choices. The declining public trust in the news media and the polarization of news audiences may have profound effects on the public sphere [12].

Initiatives at an international level

Several projects exist that are aimed at enhancing trust in data and news:

— Trusted Data Initiative [13] is a partnership founded by the BBC that aims at building audience trust and at finding solutions to tackle the challenges of disinformation.
— TRUST Project [14] is an international consortium of news organizations building standards of transparency and working with technology platforms to affirm and amplify journalism's commitment to transparency, accuracy, inclusion and fairness.

Platforms providing certification services

There are many services available online which are aimed at certifying some features or characteristics of media content.

— WordProof [15] provides a tool to address copyright infringements generating timestamps of online content and automating the generation of claims.
— LegalEye [16] aims at certifying online content for forensic purposes (e.g., "chain of custody").

Trust-enhancing features in ordinary digital platforms

We can find many extensions of popular applications which are meant to create or select trustworthy web content, based on a decentralized approach.

— Popula aims at creating trust among authors and their community of interest, allowing a direct contribution from the

[12] In this paragraph we do not consider AI-based tools, but only those which implement decentralized ledger technologies.
[13] https://www.bbc.co.uk/beyondfakenews/trusted-news-initiative/
[14] https://thetrustproject.org/
[15] https://wordproof.com/
[16] https://www.legaleye.it/

readers of contributions [17].
— Mindzilla creates a peer-to-peer financing system integrated with AI powered tools for detecting disinformation[18].

Automating copyright enforcement applications

Some applications are aimed at providing authors and rights-holders with models and tools for automating the licensing of protected materials. They offer "model release" templates or automatic or semi-automatic completion, but do not certify content:

— Adobe offers a tool implementing Adobe sign, combined with a repository where users can upload their model and share with other contributors. This solution identifies the author, as a copyright owner, but does not provide a certification [19].
— Getty images provides a model for commercial use of images created by contributors. Even in this case, neither certification nor automation is present [20].
— Model release applications and mobile applications marketplaces offer several tools for photographers and media creators, sometimes combined with the most popular cloud services or with commercial repository providers. These solutions do not certify content and do not offer proof of consent of the interviewee [21].

Blockchain-based systems

The field of blockchain applications is constantly expanding, from cryptocurrencies and decentralized finance to supply-chain transactions, e-voting, IoT; media corporations and news agencies have now started to develop blockchain-based solutions to address specific concerns:

— ANSA check [22] aims at certifying the genuineness and integrity of a press release. "When the news is created by ANSA, the Blockchain records its identifier so that its future events can be tracked. When the news is modified or updated by ANSA, the Blockchain records the event allowing for transparent versioning. When the news is resumed by publishers participating in the initiative, the Blockchain verifies the authenticity of the news recorded by ANSA and records its resumption event enabling future consultations of the news resumed by the publisher thanks to the ANSAcheck stamp" [23].
— Verizon Full Transparency [24] is described as follows: "The information that is written to the blockchain is the minimum amount of information that allows an auditor to know what information is being claimed by an entity, when that information was publicly claimed by an entity, the identity of the entity making

[17] https://popula.com/
[18] https://www.crunchbase.com/organization/mindzilla/
[19] https://contributor.stock.adobe.com/static/releases/model/Releases-en.293128c8f1ff86abb874b5f73b8c5094.pdf
[20] https://contributors.gettyimages.com/
[21] Cfr. "Expert Photography", a website which lists several tools for photographers and media creators, sometimes combined with the most popular cloud services or with commercial repository providers, https://expertphotography.com/best-model-release-apps/

these claims, and if any of the information claimed has been tampered with".
— New York Times and IBM "News Provenance Project"[25] focus on visual content, aiming at displaying provenance information on news photos using metadata published to the Hyperledger Fabric blockchain.
— Truepic provides a decentralised platform for certifying pictures against counterfeiting or manipulation.

Limits

These solutions differ from Truthster for many reasons:

— do not aim at enforcing the profession of reporters;
— do not aim at the specific use case considered by Truthster , the interview;
— do not include interaction with a third-party, the interviewee;
— do not include the discovery of documentation (e.g., art. 13 GDPR information notice);
— do not combine media certification and automatic generation of documents (e.g., model release);
— do not offer certification options especially targeted at video interviews;
— are neither inter-operable with other software nor open (e.g., copyleft licenses), thus creating a lock-in effect for professionals who adopt them;
— are not integrated with model release application aimed at collecting consent.

Currently the market of services for media creators does not offer technological tools designed for:

— Content creators aimed at embedding their authorship (e.g., identity, copyrights license) into the materials they produce, which consequently is exposed to plagiarism, counterfeiting and copyright infringements, and to collect consent when needed from their sources.
— Persons who are interviewed to be able to verify the identity of the interviewer and to exercise their rights on portrayal or to personal data protection.

The aim of **Truthster** is to combine the two solutions currently available: certification of content through blockchain technology and a mobile application to offer proof of consent of the persons being interviewed.

[22] https://www.ansa.it/sito/static/ansa_check.html/
[23] Translated from the original: "Con Blockchain si intende un registro virtuale, immutabile e distribuito contenente le specifiche di tutte le informazioni che circolano nella rete. Tutto questo è abilitato da un processo che si attiva in 3 momenti differenti: Quando la news viene creata da ANSA, la Blockchain registra il suo identificativo in modo che ne possano essere tracciati i futuri eventi. Quando la news viene modificata o aggiornata da ANSA, la Blockchain ne registra l'evento permettendo un versioning (sic) trasparente. Quando la news viene ripresa dai Publisher aderenti all'iniziativa, la Blockchain verifica l'autenticità della news registrata da ANSA, e ne registra l'evento di ripresa abilitando le future consultazioni della news ripresa dal publisher grazie al bollino ANSAcheck".
[24] https://www.verizon.com/about/news/transparency-technology. The white paper is available at https://www.verizon.com/about/sites/default/files/2021-01/2021_White_Paper_Full_Transparency.pdf/
[25] https://www.newsprovenanceproject.com/


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3. OUR SOLUTION: HOW TRUTHSTER WORKS

The Truthster project proposes an application for journalists, developers, activists and influencers as well as a solution in terms of a business model to provide a "participatory" and open innovation system for the control of journalistic sources (data and information) in the news media chain.

The components of the model are:

— The evolution of the TruBlo project to host the platform of open-source applications and tools (hardware and software).

— The creation of an archive/database of "certified" journalistic sources through tools based on blockchain technology.

— The community and culture of media creators as a collective movement.
Truthster covers all cases in which the journalist collects news through interaction with another human agent.

Why is Truthster dedicated to journalists?

Because they are the most exposed to the problems of information manipulation, but at the same time they are the subjects who, being closest to the news, are able to give guarantees on the authenticity and genuineness of the source.

Concept

There are five design-binding concepts:

1. The interview should not be released without the consent of the interviewee.
2. The consent of the interviewee should be easy to acquire by the interviewer.
3. The certification of the media content should be activated by the same simple gesture of the interviewee, by which her/his consent is expressed.
4. The certification of the media content should include any relevant data (embedded as metadata), and it should be performed by a decentralized platform (blockchain).
5. The documentation of the interaction and of the certification should be available to both the interviewer and the interviewee.

User experience

Our solution is targeted to a specific use case: interviews (audio and video recording). The user experience is the following:

— the interviewer records the audio/video material;
— the interviewer opens the mobile app, logs in, enters the interview information, the interviewee's contact details, and chooses the interview file;
— the app calculates a hash of the document and uploads it, together with in-

terview metadata and GPS position to the cloud server;
— In the background, the whole document is also uploaded;
— the app sends a link to the interviewee via SMS/E-Mail (or a QR code with a link is generated);
— the interviewee opens the link (or scans the QR code) on his/her phone and a GDPR compliant contract is shown for review and agreement;
— after contract agreement, the GPS position of the interviewee is sent to the server;
— hash and metadata and the interviewee agreement is stored in the blockchain Alastria;
— The interviewer is notified about the process completion, thanks to the Node.js server that notifies the user when the process is complete;
— A history of the interviews made, stored in the database, is available to the interviewer on his/her mobile app.

What does Truthster allow?
It enables the registration of media on the blockchain, with three notable results: **1** it certifies the content and its metadata (place, date, time), **2** it certifies the intellectual property (identity of the journalist), **3** it generates an information for the persons concerned (the respondent), making it easier for them to express their consent

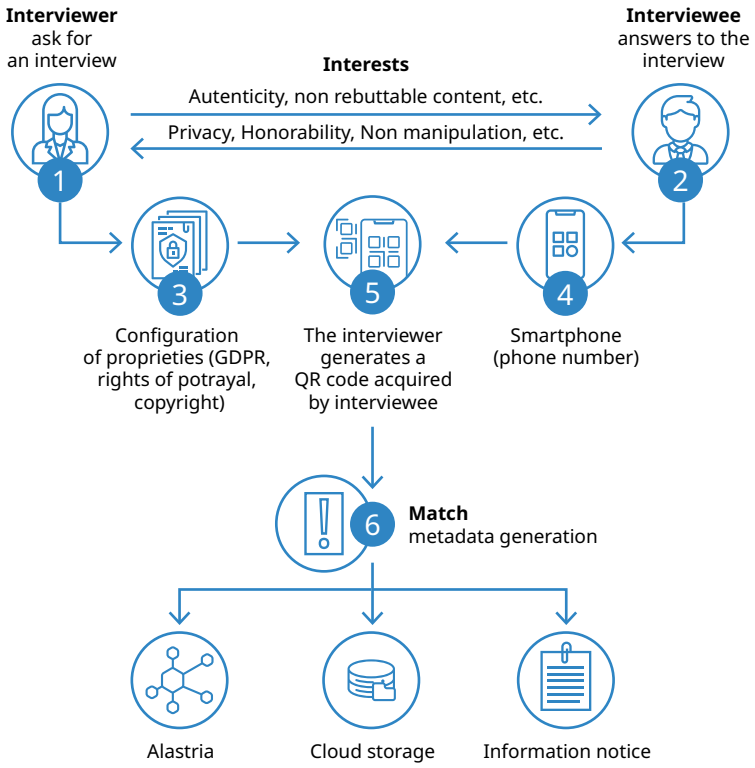

Figure 1: Platform schema

Why is consent not required to be written on paper in Europe for processing personal data?

Because the GDPR requires for "clear affirmative action" to facilitate the movement of personal data in the digital environment.

Technology

It is based on a web/mobile app for the interviewer and for the interviewee a cloud-ready back-end based on an open-source and permissioned blockchain [26].

Back-end

The back-end module of the Truthster project represents the bridge between website/mobile app, constituting the front-end ecosystem, and the DLT technology (e.g., the different kind of nodes exposed by Alastria's networks). It will expose a set of web services to front-end applications (e.g., website, mobile apps) to implement the use case described above.

In particular, the back-end module will include the following functionalities:

— User authentication and authorization: the back-end module will provide web services required to authenticate users directly, by using its own identity database, or by integration with third party identity using the SAML protocol (e.g., SPID identity infrastructure available in Italy, eIDAS in Europe). For the scope of the project, we plan to adopt the authentication service offered by Alastria, called AlastriaID;

— Collect, store and retrieve interview data, metadata, and file upload: the module will allow authorized users (e.g., registered journalists) to create a new interview, define a set of data, metadata (e.g., GPS position) and attached files. For each file a specific signed hash will be calculated; files will be stored encrypted in a folder on the back-end module. The back-end module will interact with the Alastria blockchain network using specific smart contracts to store signed hashed contents in a public-permissioned way;

— Implement a heterogeneous set of ways (e.g., SMS, QR Codes, One-Time Links) to interact with end-users and involve them in the signing process. The back-end will provide users with a unique ID (represented as a link or as a QR Code) to be used by the interviewee to certify her/his consensus. After collecting additional data provided by the authenticated interviewee (e.g., GPS location, signature, pictures, privacy consensus, files, etc.), a call to the smart contract function validating the previous interview is generated. A smart contract will be properly activated to connect data saved in the local storage and the signed hash located on the blockchain. The data will act as a proof of notarization for the provided consensus.

Provide the ability to retrieve public data from the network, allowing users to validate if a given content has been, in fact, authorized by its owner to be shared and used.

[26] **https://alastria.io/**

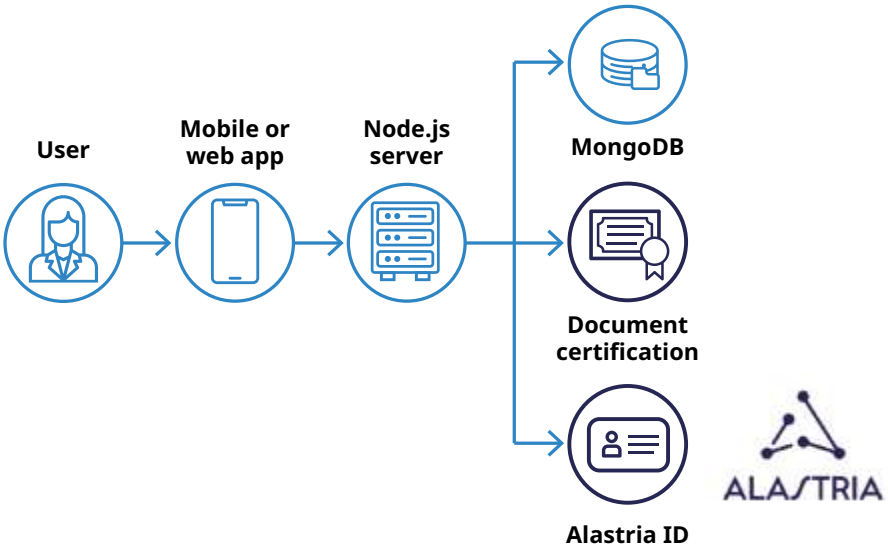

Figure 2: Back-end schema

The back-office module will expose a set of web services to handle described use cases and their related process; only authenticated users (according with their own specific set of permissions) are allowed to call the web services and access exposed capabilities and information. A stateless architecture will be adopted, to grant the reactiveness of the proposed solution, according to the Reactive Manifesto [27].

Thanks to Alastria ID, only authorized people (registered interviewers) have the right to write in the blockchain. Together with the blockchain, all the media files and info are stored in a separate database. In particular, we decided on a documental one: MongoDB. MongoDB is a document database that builds highly available and scalable internet applications. Its flexible schema approach is popular with development teams using agile methodologies.

The module is aimed at being implemented adopting state-of-the-art Open Source (or Open Source oriented) solutions, being able to run on most operating systems (e.g., Windows, Linux, OsX).

The back-office module will use a Postgres DB in order to store the following information:

— Users and authorizations.

— Configuration (by using encrypted data).

[27] https://www.reactivemanifesto.org/

— Log of requests received by the module.

— Log of responses sent by the module.

— Backup data concerning interviews and attached files (whose digital fingerprints have been published on the DLT in accordance with the scenario);

Communication between front-end and back-end will take place on a secure connection (HTTPS with valid certificate and TLS>=1.2) by using JWT tokens as authentication protocol. In order to move towards a complete automation of the dev-ops, the back-office module will be containerized using Docker containers.

Front-end

Thruthster will interact:

— with the interviewer, through an Android mobile application.

— with the interviewee, through a web application made accessible by a link/QR code sent by the interviewer.

Both the applications will exchange data with the back-end cloud through REST APIs.
The interviewer, after entering some data about the interview, and linking the media file, chooses the approval method for the interviewee.

— Selfie: approval is given directly on the interviewer's phone, by registering a short video of the interviewee saying "TRUTHSER!" (or similar).

— SMS/E-Mail message containing a link.

— QR: approval is given on the interviewee's phone, by receiving and clicking a link or by scanning a QR Code generated by the app on the interviewer's phone.

— Interview hash, interview metadata and consent is stored on the blockchain.

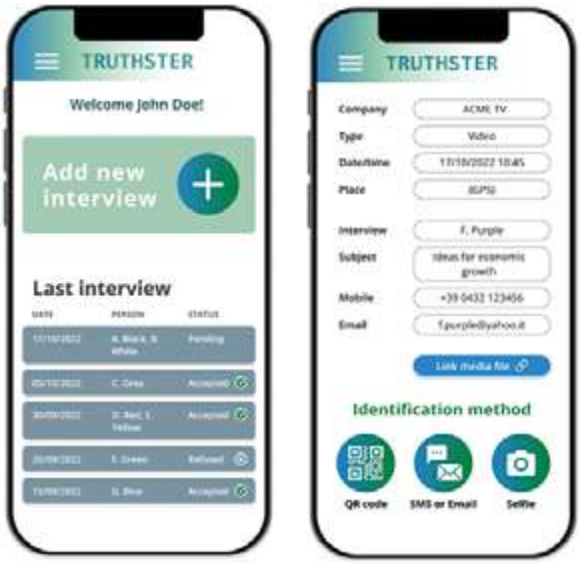

Figure 3: Application interface

4. FEEDBACK FROM STAKEHOLDERS

Figure 4: Design thinking

The Truthster project was born from everyday journalists' needs, gradually expanding its potentials in a constant exchange with technicians, laypeople, human rights experts and economists.

Collecting users' needs

The Truthster solution has been developed in strict collaboration with end-users. The first focus group was organized in 30th September 2022 and has served to collect users' needs, to reflect on the scope of the proposed solution and to delimit its boundaries.

During the workshop journalists have pointed out that:

— The challenges faced by journalists in contemporary times are many, and some of them can be addressed through technology;

— Technological tools for certifying content are urgently needed;

— Technological tools to collect consent from the sources being interviewed are also needed;

— In some scenarios (e.g., when sources have to remain anonymous), this solution cannot offer an added value.

Collecting users' feedback on the demo

What advantages does Truthster offer to a journalist?

There are several advantages: **1** certification of content makes it easier to prove ownership of rights in the face of third party claims; **2** documentation of consent by the persons concerned makes it more difficult to repudiate the media; **3** the interface makes it easier to manage archives of material.

The second workshop was held on 30th March 2023 to showcase our proof-of-concept. We collected users' feedback on the online demo with a questionnaire. Examples of questions to users included:

— Is the offered solution able to address one or more concerns/difficulties that you face?

— Is the solution easy to use?

Figure 5: Meeting with journalists

— What is the aspect of the solution that you like the most?

— Is there anything that you would like to change?

— Do you think you will make use of this service daily / weekly / monthly / I would never use this service?

— How much would you be keen to pay for a similar service?

— Would you recommend this solution to your colleagues?

The results were highly encouraging. The majority of the respondents assessed Truthster platform as easy to use, useful while in-the field activity and suitable to avoid legal controversies. They expressed also interest towards in-app service integration (cloud storage, marketplace, media post-production tools).

What advantages does Truthster offer to interviewees?

There are several advantages: **1** the media is certified, so it can be easily distinguished from possible counterfeits (e.g. Deepfake); **2** rights are embedded in the certification, so it is easier to defend against infringement; **3** the respondent is informed of the identity and contact details of the copyright holders of the media, so it is easier to exercise their rights.

5. MARKET UPTAKE AND BUSINESS MODEL

In this project, technological innovation consists in combining mobile applications, recording functions and decentralized ledger technologies (DLT, such as blockchain, hashing, digital signature, web and mobile interface).

Business canvas

The business canvas below describes our orientation in the use of DLTs for the focus of our project and considering the project drivers mentioned in the following sections.

<table>
<tr>
<td rowspan="2">Key partners

— Alastria
— Trublo (platform)
— University

Advanced phases:
— open source development community</td>
<td>Key activities

— Platform management

Advanced phases:
— Software support services (for other markets)
— Software versioning and testing</td>
<td rowspan="2">Key proposition

"Free basic" content creators (journalists/ media creators) sharing

"Premium" content creators sharing

— "Service Company"
— "upgrades", "serviced" and customized software</td>
<td>Custumer relationships

Mass customized tools</td>
<td rowspan="2">Custumer segments

"Casuals users"

— "High-volume users"

— Enterprise clients (public and private in new markets)</td>
</tr>
<tr>
<td>Key resources

Advanced phases:
— Platform and digital archive
— Brand and royalties</td>
<td>Channels

— an "open innovation" tool in the community of media professionals</td>
</tr>
<tr>
<td colspan="3">Cost structure

Storage cost
— fixed and sunk costs related to platform development
—variable cost depending on number of "contents" stored

— Platform development
— cost structure of a "sevice company"</td>
<td colspan="2">revenue streams

Free limited basic accounts:
— large base of "basic accounts" for casual users
— Small base of paying "pro" users

Annual subscription pro account</td>
</tr>
</table>

Social drivers

What is the marketing role of Truthster in the sector of (data) journalism?

Truthster explores connections between (digital) infrastructures and market dynamics, introducing the role of "trust" in the process of markets change. Data Journalism is about transformation of publicly available data and data being a trusted source of information.

Truthster explores some key insights in the connection between technology, entrepreneurship, innovation and social change in digital economics (specifically in the case of "content creators" and in the "community of media professionals"):

— Digital transformation: a strategy to catch up with and perhaps leapfrog the more mature economies by skipping certain steps along a developmental path

— Disruptive innovation: provides viable entry points into an industry often at the lower ends of a market. Digitalization can facilitate the development of disruptive innovation

— Entrepreneurship alertness: refers to the cognitive process by which certain actors can identify and seize entrepreneurship opportunitiesh

— Ecosystems development: entrepreneurs and firms are supported by digital innovation friendly ecosystems and in turn help to shape them and seek institutional support

— Affordance: technology and digital technology can enhance the value of enterprise products and services and enhance the competitiveness of enterprises and even countries

— Interactive: digital technology development and digital entrepreneurship development are interdisciplinary and constantly updated digital technology formed by the intersection of researchers

— Digitally inclusive: digital technology-based entrepreneurship has a potential impact on creating more assessable technologies and inclusive economies in the world

Next steps

We envision the creation of an ecosystem based on trustworthy media creation composed by three pillars:

ca set of legal rules, both deriving from legislation, terms and conditions with users and agreements among Truthster partners

— a sustainable business model – based on an "open innovation" paradigm – and

— a digital platform – based on distributed ledger technologies – which is meant to avoid by design both centralized monopoly over media production and lack of control on its circulation.

The project proposes a formula for entrepreneurial innovation that seeks to go beyond the traditional distinctions of the innovation process, basing innovation on a dimension of cultural entrepreneurship (the evolution of the digital media creation culture). The project team provides innovative tools in terms of solutions consistent with the proposed model:

— Collective entrepreneurship (commu-

What is Truthster's business model?

Truthster is a multi-sided platform and a "freemium" business model based on basic services free of charge and premium services for a fee.

nity capacity to innovate and improve market dynamics; reflecting community identities and aspirations; encouraging popular education/literacy).

— Social control (discussing the function of the social venture; adjusting resource allocation; bringing and selecting community demands; developing entrepreneurs and responsible management (mobilizing community members to establish the venture; considering the role of new technology in terms of a feeling of moral responsibility towards community and users).

The business model can be traced back to the formula of the multi-sided platform in which the main activities are:

— The management of the platform itself.

— The creation and dissemination of applications and tools based on blockchain technology.

— The promotion of the platform in terms of the online community, allowing the provision of other services such as a repository of certified media provided to third parties (e.g., publishers, newsrooms, news aggregators).

The economic transactions generated through Truthster's application are supposed to support even the cost for the use of the blockchain platform (e.g., through the revenue stream from royalties on the use of the tools made available by the community of users.

The value produced revolves around the development of the community, linked to the ability to attract, and build relationships between developers, professional journalists, and citizen journalists.

6. TRUTHSTER CONTRIBUTORS

Truthster is a multi-disciplinary project based on a strong private-public partnership, nurtured by a vibrant community of stakeholders and pushed forward by talented researchers.

Truthster team

The Truthster team integrates different backgrounds, including law, economics, IT, political science, to tackle both theoretical and practical issues, having built a cross-disciplinary experience in many fields (such as IT industry, media communication, legal issues and human rights) over many years at national and international level. The companies involved in the project have a wide portfolio of clients and previous experience in projects including research and development, having developed a strong background in DLT solutions.

Federico Costantini

(M.D. in Law, Ph.D. in Philosophy of Law) is Associate Professor in Legal Informatics in the Department of Law at the University of Udine (Italy). He was involved, as Working Group 1 leader, in CA16222 (Wise-Act) on the social and economic impact of autonomous vehicles and, as Management Committee member, in CA19143 (GDHRNet) on the protection of human rights in the online context.

Francesco Crisci

(University of Udine: B.A., 2002 and Ph.D., 2007) is Assistant Professor of Management, School of Economics. Francesco was a research fellow at the CRG-PREG, Ecole Polytechnique (Paris). His main research interests concern "knowledge intensive" organizations/ research contexts in a Critical Management perspective (science/technology-based companies in a "Science and Technology Studies" perspective).

Marino Miculan

Associate Professor in Computer Science at the University of Udine, has gained a PhD in Computer Science at the University of Pisa in 1997. Currently he is head of the Laboratory of Models and Application of Distributed Systems at the Department of Mathematics and Computer Science of Udine, head of the Udine node of the CINI National Laboratory on Cybersecurity, member of the Distributed Ledger Technology group, Italy. His research mainly concerns semantic models and formal methods for concurrent and distributed systems, in particular for ensuring security proper-

ties, and blockchain technologies. He has (co)authored more than 75 publications in international scientific journals and conference proceedings with peer review.

Stefano Bistarelli
Full Professor at the University of Perugia, is an active researcher in the field of Knowledge Representation and Reasoning, with a particular interest in Argumentation, Constraint Programming, Cybersecurity and blockchain. Currently he is leading the Italian DLT working group bringing together many of the Italian scientists working on blockchain. He is an active researcher counting more than 300 papers and 4000 citations on Google Scholar. He received his PhD in Computer Science in Pisa, awarded by both the Italian section of the European Association for Theoretical Computer Science (EATCS) and by the Italian Association for Artificial Intelligence (AI*IA). Later, in 2004, an extended version of his doctoral work was published as a volume in the Springer Jacketed LNCS series. Today, this book represents an important reference for those who are deeply involved in the (Soft) Constraint Programming area.

Silvia Venier
(MA in International Relations, PhD in International Law) is Postdoctoral Fellow at the Scuola Superiore Sant'Anna in Pisa (Italy), where she is deputy coordinator of the CBRN-Italy project. She also serves as an independent ethics and human rights advisor in the scope of two EU funded projects (INCLUDING and RISEN). Since 2009, she has been involved as a human rights expert in several EU projects aimed at developing new technologies to be deployed in different fields (including HEIMDALL, ANYWHERE and PACT). She has spent research periods at the Essex University Human Rights Centre and Copenhagen University Faculty of Law.

Giancarlo Virgilio
is a journalist with 15 years of experience and a video reporter from Udine (IT). He is currently the supervisor of the website of Telefriuli, the main television broadcaster in the Region Friuli Venezia Giulia (IT). He writes, shoots, edits, manages news sites and studies strategies and campaigns to support individuals, companies and NGOs to communicate.

Rosario Lombardo
(Chairman of innov@ctors s.r.l.) is an Electronic Engineer with 12+ years of experience in complex ICT projects, and one of the founders of innov@ctors s.r.l., a former spin-off of the University of Udine. Innov@ctors, incorporated in 2010, develops full stack ICT solutions for business process optimization and fintech solutions for banks and payment institutions.

Federico Rosso
works as CEO and owner of HTS s.r.l., a company that develops and produces IT security products for enterprise customers. He has an electronic engineering degree, and his first experience was as a project manager in the Carlo Gavazzi Space, a company that produce satellites for science research and telecommunications. He started his 20 years' experience in the IT security market in SATA HTS S.p.A., first as project manager then in the commercial division and finally

as Vice President. He has a strong experience in IT security technology and related international law and regulation.

Paolo Casoto
MA in Computer Science, 2006, PhD Computer Science, 2011) is a software architect with 15+ years of experience in designing and implementing ICT projects. He works as CTO in HTS s.r.l.; over the past 10 years, he has taught dozens of courses at the university and corporate level. His experiences includes: software engineering design, artificial intelligence, distributed systems, system thinking and design thinking.

Stakeholders involved in focus groups

The Truthster team expresses the deepest gratitude to the stakeholders involved in the focus groups held on 30th September 2022 in the Department of Law, University of Udine (IT) and on 30th March 2023 (remotely):

Paolo Mosanghini, journalist, managing director of "Messaggero Veneto", the top daily newspaper in Friuli Venezia Giulia https://messaggeroveneto.gelocal.it;

Gianpiero Bellucci, freelance journalist and owner of the agency Bellucci Comunicazione, http://www.belluccicomunicazione.it/, https://www.linkedin.com/in/gianpiero-bellucci-5bb87249

Monica Bertarelli, managing director of "radio Gioconda" https://www.radiogioconda.it/staff/monica-bertarelli, director of the "Consorzio Sappada Dolomiti Turismo" https://www.sappadadolomiti.com, freelance journalist and external contributor for "Messaggero Veneto" https://messaggeroveneto.gelocal.it, https://www.linkedin.com/in/monica-bertarelli-665b1b11/

Massimiliano Cao, press and communication office of the Municipality of Palmanova https://www.comune.palmanova.ud.it/, https://www.linkedin.com/in/massimilianocao/

Alessandro Cesare, https://www.linkedin.com/in/alessandrocesare, journalist, managing director of online daily newspaper "Diario del FVG" https://www.diariofvg.it/

Claudio Cescutti, https://www.linkedin.com/in/claudio-cescutti-b7a551120, freelance photographer and video operator;

Eleonora Cuberli, https://www.linkedin.com/in/eleonora-cuberli-9ba90445, journalist, freelance press office;

Anna Dazzan, journalist, reporter for "UdineToday" https://www.udinetoday.it/, "L'espresso" https://espresso.repubblica.it/, and "Il Fatto Quotidiano" https://www.ilfattoquotidiano.it/;

Silvia De Michielis, freelance journalist, press office of the Oncologican Center of Aviano https://www.cro.sanita.fvg.it/it/ https://www.linkedin.com/in/silvia-de-michielis-482229152/

Alessandro Di Giusto, journalist and vice-managing director of the weekly magazine "Il Friuli" https://www.ilfriuli.it/, https://www.linkedin.com/in/alessandro-di-giusto-689046b7/

Alfonso Di Leva, https://www.linkedin.com/in/alfonso-dileva, journalist, CEO of "Telefriuli", the top private-owned TV broadcasting company of the Region https://www.telefriuli.it/, and managing director or "mediafriuli" ;

Simone Ferraro, https://www.linkedin.com/in/simoneferrarofotografo, journalist, freelance photographer and photoreporter;

Roberto Mattiussi, journalist, managing director of the on line local media company "Nord Est 24" www.nordest24.it, https://www.linkedin.com/in/roberto-mattiussi-4a93a2112/;

Paolo Mosanghini, journalist, managing director of "Messaggero Veneto", the top daily newspaper in Friuli Venezia Giulia https://messaggeroveneto.gelocal.it;

Francesco Pezzella, journalist, regional network account manager for broadcasting company "Udinese TV, https://www.udinesetv.it/ https://www.linkedin.com/in/francesco-pezzella-11665911a/;

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Marta Rizzi, speaker and journalist of "Radio Spazio / Vita Cattolica" http://www.radiospazio103.it/;

Alessandra Salvatori, managing director and anchorwoman of Telefriuli https://www.linkedin.com/in/alessandra-salvatori-3a3b48a2, journalist.

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— Andrea Vendrame
— Ivan Mercanti
— Mirko Lorenz

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7. FUTURE DEVELOPMENT

As per the future developments of the solution, it is important to emphasize that this tool can be easily customized to be deployed in other contexts and can be integrated with other services and tools.

Platform customization

The solution can be easily customized and deployed in other settings or market sectors, including:

— Creation of certified audio/video for evidence purposes in judicial proceedings (e.g., digital evidence);

— Identity verification or authentication (e.g., public authority identity check, restricted areas logging);

— Expression of informed consent and digital documentation in healthcare (e.g., private healthcare providers, insurance companies);

— Expression of informed consent and digital documentation in financial services (e.g., insurance and bank).

Platform integration and vertical implementation

Our solution can be integrated with other services, such as:

— Storage services for media;

— Authentication services;

— Digital signature and other identity providers;

— Media release or production.

Companies interested in industrial or commercial partnership

During the demo development phase, we have raised interest among several potential partners that have shown an interest in the proposed solution and are available to discuss partnership with Truthster to develop it further.

Potential partners interested in fostering our project include:

— OMNIADOC [28], a company providing both physical and digital storage, integrated with digitalization and notarization services to professionals, enterprises and public administration;

— PLAIN-X [29], an innovative digital platform which uses the latest speech-to-text and text-to-speech engines to ensure accurate transcriptions, natural-sounding voice overs, and perfectly synchronized subtitles.

[28] https://www.omniadoc.it/
[29] https://www.plain-x.com/

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See https://www.trublo.eu/ for details.

9. Further references

Federico Costantini / Francesco Crisci / Silvia Venier / Stefano Bistarelli / Ivan Mercanti, Tackling disinformation in the EU: the case of "Truthster", in: Jusletter IT 30. März 2023.
https://www.trublo.eu/truthster/

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