

NAČRT ZA RAVNANJE Z RAZISKOVALNIMI PODATKI

OBRAZEC ARIS

Ta obrazec je namenjen pripravi načrta za ravnanje z raziskovalnimi podatki (NRRP) za raziskovalne projekte, ki jih (so)financira Javna agencija za znanstvenoraziskovalno in inovacijsko dejavnost Republike Slovenije (ARIS), kot je določeno v 4. členu [Uredbe o izvajanju znanstvenoraziskovalnega dela v skladu z načeli odprte znanosti](#) (Uradni list RS, št. 59/23).

Raziskovalni podatki so opredeljeni kot zapisi o dejstvih (številčni podatki, besedilni, zvočni in slikovni zapisi), ki predstavljajo osnovno podlago za znanstveno raziskovanje in ki v okviru znanstvene skupnosti veljajo kot ustrezno sredstvo za preverjanje veljavnosti raziskovalnih spoznanj.

Prosimo vas, da izpolnite spodnji obrazec NRRP in ga posredujete ARIS **najkasneje v šestih mesecih od začetka izvajanja raziskovalnega projekta**. Priporočljivo je, da NRRP med izvajanjem raziskovalnega projekta po potrebi redno pregledujete in posodabljate. V primeru sprememb posodobljen NRRP priložite vmesnemu in zaključnem poročilu o rezultatih raziskovalnega projekta.

Pregled vsebine NRRP:

0. Splošne informacije
1. Povzetek in opis raziskovalnih podatkov
2. Shranjevanje in varnostno kopiranje podatkov
3. Zagotovitev podatkov na način FAIR
 - 3.1 Zagotavljanje najdljivosti podatkov (F)
 - 3.2 Zagotavljanje dostopnosti podatkov (A)
 - 3.3 Zagotavljanje interoperabilnosti podatkov (I)
 - 3.4 Zagotavljanje ponovne uporabe podatkov (R)
4. Etični in pravni vidiki
5. Drugi raziskovalni rezultati
6. Finančna sredstva

Uporabljene kratice:

- ADP – Arhiv družboslovnih podatkov
- GDPR – Splošna uredba o varstvu podatkov
- IT – informacijska tehnologija
- RO – raziskovalna organizacija
- ZVDAGA – Zakon o varstvu dokumentarnega in arhivskega gradiva ter arhivih
- ZVOP-2 – Zakon o varstvu osebnih podatkov

Navodilo za izpolnjevanje

Obrazec izpolnite tako, da vsebino vnašate v celice v skrajnem desnem stolpcu oz. tam označite eno od ponujenih možnosti. V teh celicah so sedaj v sivi barvi pisave navedeni razlage oz. navodila za vnos ustreznih podatkov in opisov. To pomožno besedilo lahko po vnosu vsebine izbrišete.

0		Splošne informacije
0.1	Šifra projekta	L1-60136
0.2	Naziv projekta	Quantum solver for hard Binary Quadratic problems (QBIQ)
0.3	Šifra vodje projekta	22649
0.4	Ime in priimek vodje projekta	prof. dr. Janez Povh
0.5	Ime in priimek osebe, ki je v RO zadolžena za podporo pri ravnanju z raziskovalnimi podatki	Andreja Dobrovoljc
0.6	Interna pravila RO za ravnanje z raziskovalnimi podatki	There are no internal rules as of now.
0.7	Verzija NRRP	Version - 1.1
1		Povzetek in opis raziskovalnih podatkov
1.1	Ali boste pri projektu ponovno uporabili že obstoječe podatke predhodnih raziskav?	<input checked="" type="checkbox"/> Da <input type="checkbox"/> Ne Biqbin project (High-Performance Solver for Binary Quadratic Problems N1-0057). The code is stored in the Biqbin Repository (https://github.com/Rudolfovoorg/parallel_biqbin_maxcut). We will refactor and extend this code for computing subroutines with quantum computing.
1.2	Katere vrste podatkov boste ustvarili oz. ponovno uporabili in v katerih formatih bodo shranjeni?	<ul style="list-style-type: none"> • CSV, JSON and TXT for numeric datasets, input/output values, and logs—chosen for their openness, compatibility, and ease of reuse. • PKL for complex Python data structures, used internally for model development and efficiency. • Python and C code.
1.3	Kakšen je namen ustvarjanja, zbiranja oz. ponovne uporabe podatkov in njihova povezava s cilji projekta?	The data (existing and new) will be used to construct benchmarking dataset, validating the solution and enabling reproducibility of the experiments. In addition to validating quantum computing solutions, the data will be instrumental in refining and optimizing the algorithms, ensuring that they are robust and scalable for various problem sizes. This iterative improvement is essential for advancing quantum solver technologies in real-world applications.
1.4	Kakšna je pričakovana velikost podatkov, ki jih	<input type="checkbox"/> 0–10 GB <input checked="" type="checkbox"/> 10–100 GB <input type="checkbox"/> 100–1000 GB

	nameravate ustvariti oz. ponovno uporabiti?	<input type="checkbox"/> >1000 GB
2	Shranjevanje in varnostno kopiranje podatkov	
2.1	Kje bodo podatki med izvajanjem projekta shranjeni in varnostno kopirani?	All the project data will be controlled by Rudolfovo and stored in GitHub for version control and collaboration purposes. Additionally, data from will be backed up weekly on the NAS station at the Rudolfovo headquarters
2.2	Kako boste izbrali podatke za dolgoročno hrambo?	Data critical to the benchmarking dataset and algorithm validation will be retained in Zenodo for long-term access and reuse.
2.3	Ali bodo podatki shranjeni v zaupanja vrednem repozitoriju?	<input checked="" type="checkbox"/> Da <input type="checkbox"/> Ne The data will be saved in trusted repository Zenodo (https://zenodo.org/) which is included in the ARIS's List of recommended repositories. Zenodo also allows for permanent storage and implementation of digital administration
3.	Zagotovitev podatkov na način FAIR	
3.1	Zagotavljanje najdljivosti podatkov (F)	
3.1.1	Ali bodo podatki označeni s trajnim identifikatorjem (PID)?	<input checked="" type="checkbox"/> Da <input type="checkbox"/> Ne The data which will be saved in Zenodo repository will be assigned the DOI identifier.
3.1.2	Kateri metapodatki bodo ustvarjeni in kateri metapodatkovni standardi bodo pri tem upoštevani?	We will use Dublin Core for general metadata and IEEE taxonomy for keywords. We will generate basic metadata consisting of the project title, description, funders of the project, dataset title and summary, date of data set publication, PI and team members, contact info, etc.
3.1.3	Ali bodo metapodatki vsebovali ključne besede za izboljšanje najdljivosti in možnosti ponovne uporabe?	<input checked="" type="checkbox"/> Da <input type="checkbox"/> Ne To improve findability, all datasets uploaded to Zenodo will be assigned a DOI, ensuring that they are uniquely identifiable. The metadata for these datasets will adhere to Dublin Core standards, ensuring compatibility with international databases and repositories. This standardization will promote widespread discoverability.
3.2	Zagotavljanje dostopnosti podatkov (A)	
3.2.1	Ali bodo vsi podatki odprto dostopni?	<input checked="" type="checkbox"/> Da <input type="checkbox"/> Ne
3.2.2	Kdaj bodo podatki odprto dostopni in za koliko časa?	

		The benchmark datasets and the codes will be available from the time when the publication related to this data will be submitted.
3.2.3	Na kakšen način bo v primeru omejitev pri uporabi omogočen dostop do podatkov med izvajanjem projekta in po njegovem zaključku?	There are no restrictions planned.
3.2.4	Ali bo za dostop do podatkov oz. njihovo branje potrebna dodatna dokumentacija oz. informacija o ustrezni programski opremi?	<input type="checkbox"/> Da <input checked="" type="checkbox"/> Ne <p>There will be no restrictions on reading the data itself. However, to run the code, access to a quantum computer will be required. In addition, specific libraries and software packages, such as Qiskit (for IBM Quantum Computers), will be necessary to execute the code on quantum hardware. These libraries are open-source and widely used in the quantum computing community. The Readme file will contain detailed instructions on how to install and set up the required libraries, including links to the official documentation for each library. It will also provide guidance on configuring the quantum computer environments, so that users can easily replicate the experiments and make use of the code.</p>
3.3	Zagotavljanje interoperabilnosti podatkov (I)	
3.3.1	Katere geslovnike oz. šifrate boste uporabili pri pripravi podatkov in metapodatkov?	<p>In preparing the data and metadata for this project, we will carefully select keywords from the IEEE Taxonomy, ensuring that they accurately reflect the thematic and methodological context of the project. Given that the project is focused on computational mathematics and related areas such as optimization, we will choose terms that best describe the core aspects of the research. These keywords will help improve the discoverability and reusability of the data by aligning it with relevant concepts in the scientific community.</p> <p>By selecting the most appropriate keywords from the IEEE Taxonomy, we will ensure that the data is properly indexed and discoverable by researchers working in computational mathematics, optimization, and related fields.</p>
3.3.2	Ali boste primorani uporabiti manj poznane ali lastne geslovnike oz. šifrate?	<input type="checkbox"/> Da <input checked="" type="checkbox"/> Ne
3.4	Zagotavljanje ponovne uporabe podatkov (R)	

3.4.1	Na kakšen način boste zagotovili dokumentacijo, potrebno za ponovno uporabo podatkov?	To ensure the reuse of the data, we will provide a Readme.md file containing basic information, methodology and metadata which will follow Dublin Core and use IEEE Taxonomy for keywords to improve findability.
3.4.2	Ali bodo vaši podatki javno dostopni in licencirani v skladu z odprto licenco CC0, da bo s tem omogočena čim širša ponovna uporaba?	<input type="checkbox"/> Da <input checked="" type="checkbox"/> Ne In regard to the previous Biqbin project, which outputs, mostly in the form of code, will be integrated in the code of QBIQ solver, the final code produced in this project will be licensed by GNU General Public License version 3
3.4.3	Kakšne postopke zagotavljanja kakovosti podatkov boste uporabili?	To ensure data quality, we will use automated checks (unit testing, data validation) and peer reviews. We will implement version control to track changes and ensure reproducibility. Comprehensive documentation will accompany the data, describing collection methods and quality control measures.
4. Etični in pravni vidiki		
4.1	Ali obstajajo etična ali pravna vprašanja, ki bi lahko vplivala na deljenje podatkov?	<input type="checkbox"/> Da <input checked="" type="checkbox"/> Ne There are no ethical issues.
4.2	Ali boste med izvajanjem projekta obdelovali oz. hranili osebne podatke?	<input type="checkbox"/> Da <input checked="" type="checkbox"/> Ne There will be no personal data stored during the project.
4.3	Ali bodo med projektom ustvarjene oz. ponovno uporabljene posebne vrste osebnih podatkov?	<input type="checkbox"/> Da <input checked="" type="checkbox"/> Ne There will be no personal data created or reused.
4.4	Kako boste uredili lastništvo avtorskih pravic in pravic intelektualne lastnine podatkov, ki jih boste ustvarili ali ponovno uporabili?	<p>The primary ownership of intellectual property rights (IPR) will reside with Rudolfovo as the coordinating organization, unless otherwise specified in consortium agreements. In general, the authors/creators of the data, code, or other research outputs retain the intellectual property rights to their work.</p> <p>In the case of data or outputs jointly produced with partner institutions, ownership and usage rights will be governed by the terms set out in the consortium agreement, ensuring transparency and legal clarity among all parties.</p>

		For all research outputs intended for dissemination (e.g., datasets, code), the intellectual property rights and licensing conditions will be clearly defined and explicitly stated at the time of publication in the selected repository, ensuring proper attribution and clarity of reuse conditions.
5.	Drugi raziskovalni rezultati	
5.1	Ali boste poleg podatkov ustvarili ali ponovno uporabili tudi druge raziskovalne rezultate?	<input checked="" type="checkbox"/> Da <input type="checkbox"/> Ne <p>We will create and reuse software, models, and other relevant research results that may emerge during the course of the project. This includes building upon the outcomes of the Biqbin project and integrating any new findings or methodologies that could enhance the research. These results, including software, models, and relevant documentation, will be shared on GitHub and Zenodo, with proper citations provided in the Readme file.</p> <p>All research outputs will be made publicly available under an open-source license and will follow the FAIR principles (Findable, Accessible, Interoperable, and Reusable), ensuring that they are accessible for reuse and collaboration by the wider research community.</p>
6.	Finančna sredstva	
6.1	Kakšni bodo stroški ravnanja s podatki in drugimi rezultati projekta po načelih FAIR in kako bodo kriti?	No additional costs are anticipated, as data management will be carried out using existing institutional infrastructure and resources.
6.2	Kdo bo odgovorna oseba za ravnanje z raziskovalnimi podatki pri projektu?	Andreja Dobrovoljc Omkar Bihani Janez Povh

Uporabljeni viri:

- *Anotirana predloga načrta za ravnanje s raziskovalnimi podatki za projekte Obzorja Evropa.* CTK UL. Dostopno na: <https://dirrosdata.ctl.uni-lj.si/raziskovalni-podatki/nacrt-ravnanja-z-raziskovalnimi-podatki/>.
- Bezjak, Sonja (ur.) (2024). *Spoznaj FAIR: Priročnik o odprti znanosti v Sloveniji.* Univerza na Primorskem. Dostopno na: <https://www.hippocampus.si/ISBN/978-961-293-328-9.pdf>.
- *Horizon Europe Data management plan template.* Dostopno na: <https://www.openaire.eu/images/Guides/HORIZON EUROPE Data-Management-Plan-Template.pdf>.
- *NWO Template Data management plan.* Dostopno na: <https://www.nwo.nl/en/research-data-management>.

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