Materials Design Analysis Reporting (MDAR) Checklist for Authors

The MDAR framework establishes a minimum set of requirements in transparent reporting applicable to studies in the life sciences (see Statement of Task: doi:10.31222/osf.io/9sm4x.). The MDAR checklist is a tool for authors, editors and others seeking to adopt the MDAR framework for transparent reporting in manuscripts and other outputs. Please refer to the MDAR Elaboration Document for additional context for the MDAR framework.

Materials

Antibodies	Yes (indicate where provided: section/paragraph)	n/a
For commercial reagents, provide supplier name, catalogue number and RRID, if available.		n/a

Cell materials	Yes (indicate where provided: section/paragraph)	n/a
Cell lines: Provide species information, strain. Provide accession number in repository **OR** supplier name, catalog number, clone number, **OR** RRID		n/a
Primary cultures: Provide species, strain, sex of origin, genetic modification status.		n/a

Experimental animals	Yes (indicate where provided: section/paragraph)	n/a
Laboratory animals: Provide species, strain, sex, age, genetic modification status. Provide accession number in repository **OR** supplier name, catalog number, clone number, **OR** RRID		n/a
Animal observed in or captured from the field: Provide species, sex and age where possible		n/a
Model organisms: Provide Accession number in repository (where relevant) **OR** RRID		n/a

Plants and microbes	Yes (indicate where provided: section/paragraph)	n/a
Plants: provide species and strain, unique accession number if available, and source (including location for collected wild specimens)		n/a
Microbes: provide species and strain, unique accession number if available, and source		n/a

Human research participants	Yes (indicate where provided: section/paragraph)	n/a
Identify authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.		n/a
Provide statement confirming informed consent obtained from study participants.		n/a
Report on age and sex for all study participants.		n/a

Design

Study protocol	Yes (indicate where provided: section/paragraph)	n/a
For clinical trials, provide the trial registration number **OR** cite DOI in manuscript.		n/a

Laboratory protocol	Yes (indicate where provided: section/paragraph)	n/a
Provide DOI or other citation details if detailed step-by-step protocols are available.		n/a

Experimental study design (statistics details)	Yes (indicate where provided: section/paragraph)	n/a
State whether and how the following have been done**, or** if they were not carried out.		
Sample size determination	There are 200 whole slide images (WSI) composed of 10 types of human body systems and each of which has 20 slides. The cell structures of each human body system are different, and the samples are cover the structures in pathology, which are representative. It has been provided in "Dataset collection" part of the "Methodology" section and "Fig.1".	
Randomisation	The 200 whole slides were randomly selected from the archive to avoid being influenced by the operators. The pathologists participating in the experiment are randomly arranged. Data selection, image review and evaluation of results are all implemented by different participants to ensure the randomness of the experiment. It has been provided in "Dataset collection", "Dataset review" part of the "Methodology" section and the "Result" section.	
Blinding	In the experiment of "The comparison of pathological diagnosis", the six pathologists involved have not been exposed to the data before. The Researchers participating in the evaluation of the results do not know in advance whether the images are real or generated, nor do they know the WSI where the images are located, and the evaluation is completely blind. It has been provided in "The comparison of pathological diagnosis" part of the "Results" section.	
Inclusion/exclusion criteria	Inclusion criteria: the technicians randomly selected 200 whole slides composed of 10 types of human body systems and each of which has 20 slides. These WSIs are reviewed by pathologists and agreed to be included in the data set if the image quality is applicable for diagnosis. Exclusion criteria: If the image quality of WSI is too poor to be suitable for pathological diagnosis, it will be excluded. However, the current data set does not exclude any WSI due to image quality. The inclusion/exclusion criteria has been provided in "Dataset review" part of the "Methodology" section.	

Sample definition and in-laboratory replication	Yes (indicate where provided: section/paragraph)	n/a

State number of times the experiment was replicated in laboratory	We conducted three experiments to evaluate the quality of the generated images, which are "Peak-signal-to-noise-ratios and structural similarity index", "The comparison of visual inspections" and "The comparison of pathological diagnosis". Each experiment is based on repeated evaluations with hundreds to tens of thousands of images. These experiments include the evaluation of the pixel similarity between the generated image and the real image, as well as the evaluation of the doctor's diagnosis result. From the medical and image analysis methodologies, it shows that the generated image is effective and can be used for diagnosis. The evaluated images are as many as tens of thousands, and the results have good repeatability and are credible. It has been provided in the "Results" section.	
Define whether data describe technical or biological replicates		n/a

Ethics	**Yes (indicate where provided: section/paragraph)**	**n/a**
Studies involving human participants: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.		n/a
Studies involving experimental animals: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.		n/a
Studies involving specimen and field samples: State if relevant permits obtained, provide details of authority approving study; if none were required, explain why.		n/a

Dual Use Research of Concern (DURC)	**Yes (indicate where provided: section/paragraph)**	**n/a**
If study is subject to dual use research of concern, state the authority granting approval and reference number for the regulatory approval		n/a

Analysis

Attrition	**Yes (indicate where provided: section/paragraph)**	**n/a**
State if sample or data point from the analysis is excluded, and whether the criteria for exclusion were determined and specified in advance.	The evaluation results of any WSI in the data set are provided in the results, and no samples or experimental data points are excluded. It has been provided in "Dataset collection" part of the "Methodology" section.	

Statistics	**Yes (indicate where provided: section/paragraph)**	**n/a**
Describe statistical tests used and justify choice of tests.	Because we only compare the difference between the generated image and the real image, which is the only influencing factor, the difference between the doctor's diagnosis and the difference in disease must be ruled out. Therefore, when we compare two ROIs derived from the same WSI, other variables can be well controlled, so the statistical results only reflect the differences in the images of generated and real images. It has been provided in the "Result" section.	

Data Availability	**Yes (indicate where provided: section/paragraph)**	**n/a**

State whether newly created datasets are available, including protocols for access or restriction on access.	We have showed the link to obtain the data and explained the availability of the data, but it is not available for commercial use. It has been provided in the "Data Availability" section.	
If data are publicly available, provide accession number in repository or DOI or URL.	https://doi.org/10.6084/m9.figshare.15173634	
If publicly available data are reused, provide accession number in repository or DOI or URL, where possible.		n/a

Code Availability	**Yes (indicate where provided: section/paragraph)**	**n/a**
For all newly generated code and software essential for replicating the main findings of the study:		
State whether the code or software is available.	We have disclosed the source code in the "Code Availability" section before reference section.	
If code is publicly available, provide accession number in repository, or DOI or URL.	http://github.com/CSU-BME/pathology_MSR	

Reporting

Adherence to community standards	**Yes (indicate where provided: section/paragraph)**	**n/a**
MDAR framework recommends adoption of discipline-specific guidelines, established and endorsed through community initiatives. Journals have their own policy about requiring specific guidelines and recommendations to complement MDAR.		
State if relevant guidelines (eg., ICMJE, MIBBI, ARRIVE) have been followed, and whether a checklist (eg., CONSORT, PRISMA, ARRIVE) is provided with the manuscript.	ICMJE guidelines were followed, as the journal follows ICMJE recommendations for publication.	

Article information: https://dx.doi.org/10.21037/qims-21-749.