

Committee on WIPO Standards (CWS)

Ninth Session
Geneva, November 1 to 5, 2021

REPORT BY THE 3D TASK FORCE

Document prepared by the 3D Task Force Leader

BACKGROUND

1. At its eighth session in 2020, the Committee on WIPO Standards (CWS) noted the progress of the 3D Task Force on Task No. 61, which is led by the Russian Federation. The CWS also approved the results of the survey conducted among Member States and noted the information collected by some Offices from their local industries using the model questionnaire for industry, presented at the seventh session of the CWS. A draft Standard was also presented by the Task Force for information purposes. The Task Force proposed to study in detail the search capabilities for three-dimensional (3D) models, existing best practices, promising technologies and criteria for comparison of 3D models and 3D images. The CWS agreed and updated the description of Task No. 61 accordingly, which now reads: "Prepare a proposal for recommendations on three-dimensional (3D) models and images, including methods of search for 3D models and 3D images." (see paragraphs 73 to 75 and 103 to 108 of document CWS/8/24).

PROGRESS REPORT

2. After the eighth session of the CWS, the Task Force prepared and published via the Task Force wiki, the criteria for selecting formats as well as a mapping table based on the survey results analysis. Following discussions of the prepared documents, the draft Standard was accordingly updated.

3. In May 2021, the Task Force carried out the first round of discussions for updating the draft Standard and consideration of the proposed criteria. Moreover, the Task Force Leader presented a general overview of the ongoing activity carried out in terms of the research focused on 3D search and comparison methods. Following the discussions in May 2021, the

Task Force Leader updated the documents and encouraged the Task Force Members to provide their comments on the updates.

4. In order to approve the proposed criteria and provide an update concerning 3D search methods, as well as to prepare a final draft Standard on 3D model and 3D images for consideration at CWS/9, the Task Force conducted a second round of discussions in July 2021.

5. During the online meeting in July 2021, the Task Force reviewed the comments on 3D formats and adopted the proposed criteria for selecting formats. The Task Force Leader also presented an update on 3D search methods and indicated the complexity of the issue, as reproduced in the Annex to the present document. The Task Force noted that Task Force Members need more time to work on 3D search methods, given the ongoing investigations and limited experience in this new area. Therefore, the Task Force decided to postpone work on the 3D search methods until further research is complete and agreed to propose a draft Standard without 3D search at CWS/9.

6. Following the discussions, the final draft proposal was prepared for a new WIPO Standard for “Recommendations on digital three-dimensional (3D) models and 3D images”, taking into account all the comments received from Task Force Members. The proposed new Standard is presented for consideration at CWS/9 as a separate working document (see document CWS/9/6).

7. The draft research materials and outcomes on 3D search are presented for information as the Annex to this document. If the proposed new Standard is adopted at this session of the CWS, the Task Force will prepare a proposal to revise the new Standard with material on 3D search at the next session of the CWS.

WORK PLAN

8. The Task Force informs the CWS of its work plan for 2021 – 2022 as follows:

Item	Description	Time frame
CWS/9	Standard on 3D presentation and consideration by the CWS Task Force report at CWS/9	1 – 5 November, 2021
Research on 3D search methods	Conduct the research and present the outcomes for further discussion within the Task Force	2021 – 2022
Research results	Following the analysis, it is planned to initiate the discussion of the research results	Early 2022
First round of discussions	To discuss the outcomes of the research and the way forward in terms of Standard modification given the outcomes of the discussion	Early – Mid 2022
Standard modification	Taking into account potential results of further discussions it is planned to provide a proposal for the revision of new Standard on 3D	Mid 2022
Second round of discussion	To modify and update the Standard (if required)	2022
Preparation for the CWS/10	To draft working documents for the next CWS session	2022
CWS/10	To present a revised new Standard on 3D	2022

9. *The CWS is invited to:*

(a) note the content of this document and the Annex to the document; and

(b) note the work plan of the 3D Task Force in paragraph 8 above.

[Annex follows]

Editorial Note prepared by the International Bureau

This document was presented by the 3D Task Force Leader to the Task Force. It is reproduced here for information.

The study of the search and comparison of 3D models and 3D images

We are delighted to present you with an initial overview addressing the key challenges in the 3D model search.

1. Search methods. Common information

The three-dimensional object search is most commonly carried out by metadata or object descriptions. This approach is technically simple to implement, at the same time, the efficiency of searching for similar objects may decrease as the number of objects increases since the conceptual description of the objects does not always correlate with the visual similarity. This method also involves manual input of object descriptions, which would not allow the complete automatization of the process.

The use of computer vision technology to determine the relationship between the visual similarity of an object and its 3D geometrical representation, as well as to compare 3D objects with each other, seems more promising, especially when searching in large amounts of data.

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To be added

2. Criteria for the search quality

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To be added

3. 3D models pre-processing

It is important to define the similarity criteria for 3D model search. Existing 3D models should be pre-processed to enable neural network training. This may be done either through pre-categorizing objects in the same category using natural language or through using other mathematical techniques for object pre-processing, including feature vectors (descriptors).

3D models may be specific to each object for IPR protection (e.g. three-dimensional trademarks, industrial designs, utility models and inventions).

Currently, even the IP Offices, that accept the applications comprising 3D models, do not possess sufficient IP data to train the neural networks.

We propose to create test and training data sets of 3D models based on any freely available objects selected according to certain criteria, bearing in mind existing 2D images of IPR objects, as well as examiners` and other IP specialists` opinions. In addition, we propose the IP Offices to exchange 3D model data. Content of such test data sets may differ significantly for various IPR objects.

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To be added

4. Mathematical methods for 3D models Search

We suggest using a combined approach to implement search algorithms identifying similarities between 3D objects, i.e. combining the use of mathematical methods (e.g. feature vectors) with already existing IP classification systems (e.g. Vienna Classification, CPC, etc.).

Furthermore, we propose not to consider the creation of a universal algorithm for all IPR objects, but to focus on features of the visual representation of each IPR type. For the next TF meeting, we are also planning to prepare a more detailed analysis related to the use of some algorithms.

The above-mentioned issue requires a more detailed analysis. We propose to analyze existing methods used in search engines for 3D object repositories and to identify the current best practices, as well as to analyze the applicability of such methods to 3D model sets considered as visual representations of objects for IPR protection.

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To be added (comparison of different mathematical methods of search)

5. AI methods for 3D models Search

We believe it is necessary to envisage additional training of applied neural networks used in information systems, therefore the examiners' decision on similarities of various objects obtained during the examination process should be stored and processed. Accumulation of such data could significantly improve the search quality in the information systems.

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To be added (comparison of different AI methods of search)

6. Comparison between 3D models and 2D images of IP objects

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To be added

7. Conclusion

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To be added

[End of Annex and of document]