

# Artificial Intelligence Takes a Look at the Review of ChatGPT's Knowledge on Map Projections

Artificial intelligence is all around us and little by little, whether we like it or not, it is entering our lives. On April 24, 2025, the social network for scientists Academia.edu, which is used by 266 million users, sent us an email from the address updates@academia-mail.com with the following text: "An AI wrote a review of your paper" and the full text of the review: *AI Review of "ChatGPT and Map Projections"*. We published the text under this title in the *Cartography and Geoinformation journal* (Frančula, Lapaine 2023).

Our assumption is that the Academia.edu editors uploaded the text of our review to ChatGPT, or some other chat program, asked him for his opinion, and then forwarded his response to us. It is common practice for someone who receives an email and wants to publish it to ask the sender for permission. Therefore, the first-named author of this review sent an email to the Academia.edu editors on May 2, 2025:

Dear editors

On April 23rd of this year, I received an email from Academia.edu titled "An AI wrote a review of your paper" and the full text titled *AI Review of "ChatGPT and Map Projections"*. We published the text under that title in the *Cartography and Geoinformation journal*, Vol. 22, No 39, 2023, pp 96-103, (<https://hrcak.srce.hr/file/460521>). The text has also been included in Academia.edu. I assume that the editors of Academia.edu uploaded our

text to some chatbot and asked it for its opinion and then forwarded its response to me.

Prof. Lapaine and I would like to publish this text in the same journal and comment on it. We also received some suggestions from AI and would like to respond to them. Are there any obstacles to publishing this text?

Since we have not received a response to date (18 May 2025), we believe there is no obstacle to publishing the full text of the artificial intelligence-generated version of our text:

## *AI Review of "ChatGPT and Map Projections"*

### "Summary of the Work

The manuscript the capabilities and limitations of ChatGPT when it comes to generating and evaluating content related to map projections and general cartography (The quoted sentence is missing a predicate. Author's note). The authors present numerous examples of ChatGPT's answers to questions about map projections (in multiple languages), analyse the correctness of those answers, and highlight inaccuracies. They also demonstrate that ChatGPT occasionally generates non-existent references and incorrect citation data when asked to provide a list of the most cited map projection publications. The text concludes that while ChatGPT's knowledge is improving, its answers must be independently verified. Overall, the manuscript

provides a comprehensive illustration of the relationship between a large language model (LLM) and cartographic concepts, revealing both the potential benefits and the pitfalls associated with using such tools in scientific and educational contexts.

### Strengths

1. *Detailed Illustrations of ChatGPT's Outputs:* The manuscript thoroughly documents various instances and examples of ChatGPT's responses to questions about map projections, offering readers concrete evidence of the system's strengths and weaknesses in this domain.
2. *Comparative Approach:* By posing the same questions multiple times (and in different languages), the authors illustrate how ChatGPT's answers can evolve over time and how they differ by language, demonstrating the fluidity of LLM responses.
3. *Critical Perspective on LLM-Generated Content:* The discussion around the difficulty of verifying ChatGPT's references and the model's tendency to hallucinate (i.e., fabricate) citations will be valuable to researchers who might be tempted to rely on such tools for literature reviews or academic writing.
4. *Attention to Educational Implications:* The work points out possible ways that ChatGPT could be incorporated into teaching and

# Umjetna inteligencija osvrće se na prikaz ChatGPT-jeva znanja o kartografskim projekcijama

Umjetna inteligencija je svuda oko nas i malo po malo, htjeli mi to ili ne, ulazi u naše živote. Društvena mreža namijenjena znanstvenicima Academia.edu, kojom se služi 266 milijuna korisnika, uputila nam je 24. travnja 2025. s adrese updates@academia-mail.com e-poruku „An AI wrote a review of your paper“ i u nastavku puni tekst prikaza: *AI Review of "ChatGPT and Map Projections"*. Pod tim naslovom objavili smo tekst u časopisu *Kartografija i geoinformacije* (Frančula, Lapaine 2023).

Naša je pretpostavka da su urednici Academia.edu učitali tekst našeg prikaza u ChatGPT, ili u neki drugi konverzacijski program, pitali ga za mišljenje i potom nam prosljedili njegov odgovor. Uobičajeno je da ako netko primi e-poruku i želi ju objaviti za dopuštenje pita pošiljaoca. Stoga je prvoimenovani autor ovog prikaza uputio 2. svibnja 2025. e-poruku urednicima Academia.edu:

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Budući da do danas (18. 5. 2025) nismo primili odgovor, smatramo da nema zapreka da objavimo puni tekst prikaza našeg teksta što ga je sastavila umjetna inteligencija u originalu na engleskom jeziku:

## *AI Review of "ChatGPT and Map Projections"*

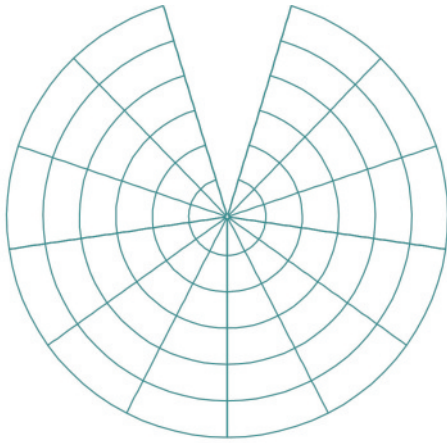
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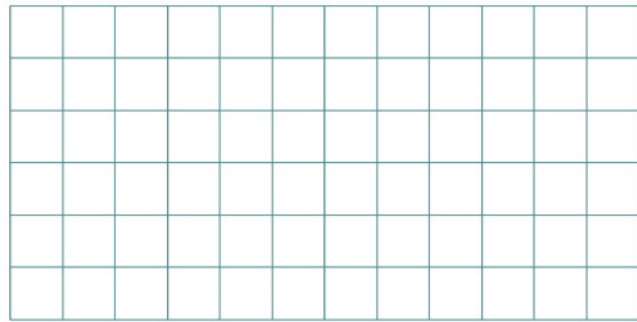
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**Fig. 1** Network of meridians and parallels in normal conic projection.

**Slika 1.** Mreža meridijana i paralela u uspravnoj konusnoj projekciji.



**Fig. 2** Network of meridians and parallels in normal cylindrical projection.

**Slika 2.** Mreža meridijana i paralela u uspravnoj cilindričnoj projekciji.

learning processes, emphasizing critical analysis, source comparison, and formulating appropriate questions.

5. *Relevant Discussion of Cartographic Concepts:* The review of conic, cylindrical, pseudoconic, and pseudocylindrical projections is presented in a manner that underscores the importance of rigorous definitions - especially when LLMs can misrepresent or oversimplify these concepts. *Observations and Suggestions*
  1. *Clarification of Auxiliary Surfaces Critique:* The manuscript explains that conic and cylindrical projections are frequently introduced with auxiliary surfaces (cones, cylinders), but the authors consider such presentations misleading or harmful for understanding. It might be helpful to add a concise explanation or illustration showing how direct mathematical derivation contrasts with the auxiliary surface approach, further clarifying why this latter approach is discouraged.
  2. *Extended Methodology for ChatGPT Data Collection:* Future discussions could benefit from explicitly outlining

how and why certain prompts were chosen, as well as the rationale for using different languages. Details on response tracking (timestamps, ChatGPT versions) could further demonstrate the evolution of the model's answers.

3. *Potential Impact on Scientific Integrity:* The manuscript highlights that ChatGPT can fabricate citations. Expanding on the ways this practice can negatively impact scholarly work, and exploring potential safeguards (e.g., structured guidelines for verifying citations), may strengthen the overall argument about the care required when using LLMs in research.
4. *Discussion of ChatGPT's Rapid Improvements:* The paper notes that the model "learns and corrects mistakes" quickly. Including a brief overview of how ChatGPT's updating process works - acknowledging that it is not necessarily "learning" in real-time but undergoing periodic updates - could clarify the mechanism behind these rapid improvements.
5. *Comparisons with Other Tools:* While the focus is on ChatGPT, it may be instructive to briefly mention

other AI-based language or cartography-focused tools. Such comparisons could place ChatGPT's performance in a broader ecosystem of AI solutions with complementary or differing capabilities. *Overall Impression*

The work provides a clear, hands-on examination of ChatGPT's outputs in the realm of cartography and map projections, illustrated by multiple examples of the model's successes and failures. It highlights a critical concern: the model's compulsion to generate plausible-sounding but occasionally incorrect or entirely fabricated statements and references. Scholars and educators working in cartography will find the discussion pertinent, and the points raised about verifying AI-generated content offer a cautionary example for any field. The text is informative, presenting practical insights on how to navigate the potential pitfalls of these evolving AI tools."

After stating the *Advantages* of our text in five points in the first part, he then presents *Observations and Suggestions*, also in five points.

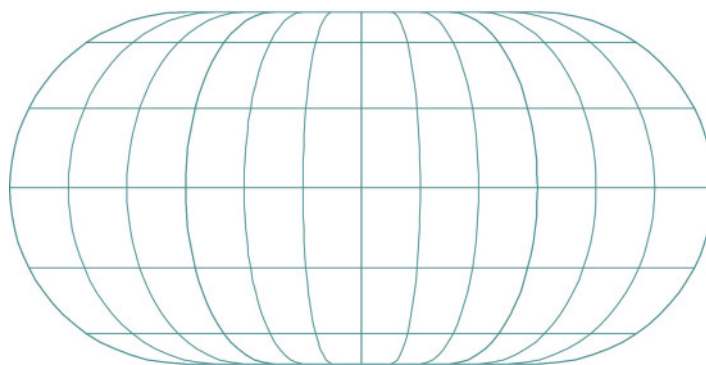
We find his suggestion to clarify the harmfulness of using auxiliary surfaces particularly useful: "It might

learning processes, emphasizing critical analysis, source comparison, and formulating appropriate questions.

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Observations and Suggestions

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**Fig. 1** Network of meridians and parallels in normal pseudocylindrical projection.

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Nakon što je u prvom dijelu u pet točaka naveo *Prednosti* našeg teksta, u

nastavku donosi *Zapažanja i prijedloge*, također u pet točaka.

Posebno korisnim smatramo njegov prijedlog o pojašnjenju štetnosti primjene pomoćnih ploha: „Možda bi bilo korisno dodati sažeto objašnjenje ili ilustraciju koja pokazuje kako se izravno matematičko izvođenje razlikuje od pristupa s pomoćnim ploham, dodatno pojašnjavajući zašto se ovaj potonji pristup ne preporučuje.“ O tome smo objavili više tekstova (Frančula, Lapaine 2018, Lapaine, Frančula 2022, Lapaine 2023). Bez obzira na to, i ovom prigodom naglasit ćemo potrebu jedinstvenog pristupa svim skupinama projekcija koji ovdje ilustriramo na primjeru uspravnih konusnih (sl. 1), cilindričnih (sl. 2) i pseudocilindričnih projekcija (sl. 3). Za svaku od tih skupina potrebno je dati definiciju oblika mreže meridijana i paralela uspravnih (normalnih) projekcija. Iz tih definicija slijede osnovne kartografske jednadžbe i slike mreže meridijana i paralela.

Na slici 1 primijenjen je polarni koordinatni sustav u kojem je  $\delta$  kut između meridijana,  $\rho$  polumjeri paralela, a  $k$  konstanta. Na slikama 2, i 3 primijenjen je lijevi Kartezijev pravokutni koordinatni sustav u ravnini. U osnovnim kartografskim jednadžbama s  $x$  i  $y$  označene su pravokutne koordinate u

be useful to add a concise explanation or illustration showing how direct mathematical derivation differs from the auxiliary surface approach, further clarifying why the latter approach is not recommended.” We have published several texts on this (Frančula, Lapaine 2018, Lapaine, Frančula 2022, Lapaine 2023). Nevertheless, on this occasion we will emphasize the need for a unified approach to all groups of projections, which we illustrate here with the example of normal conic (Fig. 1), cylindrical (Fig. 2) and pseudocylindrical projections (Fig. 3). For each of these groups, it is necessary to provide a definition of the shape of the network of meridians and parallels of normal projections. From these definitions follow the basic cartographic equations and images of the network of meridians and parallels.

In Figure 1, a polar coordinate system is used, in which  $\delta$  is the angle between meridians,  $\rho$  is the radius of the parallel, and  $k$  is a constant. In Figures 2 and 3, a left Cartesian rectangular coordinate system is used in the plane. In the basic cartographic equations,  $x$  and  $y$  denote rectangular coordinates in the plane,  $\varphi$  the latitude, and  $\lambda$  the longitude on the sphere.

In *normal conic projections*, meridians are depicted as rays that intersect at a single point at angles proportional to the differences in their longitudes, and parallels as arcs of concentric circles centred at the

intersection of the meridian images. The basic cartographic equations are:

$$\rho = \rho(\varphi), \delta = k(\lambda - \lambda_0).$$

In *normal cylindrical projections*, meridians are mapped as parallel segments of lines at a distance proportional to the distance of their longitudes, and parallels as segments of lines perpendicular to the meridians. The basic cartographic equations are:

$$x = x(\varphi), y = k(\lambda - \lambda_0).$$

In *normal pseudocylindrical projections*, meridians are mapped as curves symmetrical with respect to the image of the central meridian, which is part of the straight line, and parallels as parts of parallel straight lines perpendicular to the image of the central meridian. The basic cartographic equations are:

$$x = x(\varphi), y = y(\varphi, \lambda).$$

It is evident that the approach for all three groups of projections is the same, and this approach is also valid for azimuthal, pseudoconical, polyconical, circular and other projections. The definitions of conic and cylindrical projections do not mention auxiliary surfaces (cone and cylinder) because they are not only unnecessary but also harmful because they lead to many wrong conclusions (Lapaine, Frančula 2022). The classification of projections using auxiliary (developable) surfaces includes only conic, cylindrical and azimuthal projections, and not pseudoconical, pseudocylindrical, polyconical,

circular and other projections, and this is its biggest drawback.

Other observations and suggestions of artificial intelligence are also acceptable, except for the one about rapid improvements. Our recent research has shown that artificial intelligence answers questions very quickly and politely, accepts our corrections, but also immediately forgets them! Already after a few days, it again gives different and again wrong answers to the same questions - at least as far as map projections are concerned. On the other hand, it is not acceptable for artificial intelligence, based on one correction of a wrong statement, to accept it as the truth because it would allow manipulation of it. In order for artificial intelligence to accept something as permanent knowledge, it must have numerous confirmations. Therefore, this text is a small contribution in the effort for artificial intelligence to learn to correctly classify map projections.

It is a shame that the sender of the email *An AI wrote a review of your paper* from [updates@academia-mail.com](mailto:updates@academia-mail.com) doesn't have a name and surname and doesn't answer our questions, because that way we could find out which chatbot we can thank for the interest in map projections.

Nedjeljko Frančula,  
Miljenko Lapaine ■



ravnini, s  $\varphi$  geografska širina, a s  $\lambda$  geografska dužina na sferi.

U *uspravnim konusnim projekcijama* meridijani se preslikavaju kao zrake koje se sijeku u jednoj točki pod kutovima proporcionalnim razlikama njihovih geografskih dužina, a paralele kao lukovi koncentričnih kružnica sa središtem u presjeku meridijana. Osnovne kartografske jednadžbe jesu:

$$\rho = \rho(\varphi), \delta = k(\lambda - \lambda_0).$$

U *uspravnim cilindričnim projekcijama* meridijani se preslikavaju kao paralelni dijelovi pravaca na razmaku proporcionalnom razmaku njihovih geografskih dužina, a paralele kao dijelovi pravaca okomiti na meridijane. Osnovne kartografske jednadžbe jesu:

$$x = x(\varphi), y = k(\lambda - \lambda_0).$$

U *uspravnim pseudocilindričnim projekcijama* meridijani se preslikavaju kao krivulje simetrične u odnosu na sliku srednjeg meridijana koji je dio pravca, a paralele kao dijelovi paralelnih pravaca okomitih na sliku srednjeg meridijana. Osnovne kartografske jednadžbe jesu:

$$x = x(\varphi), y = y(\varphi, \lambda).$$

Vidljivo je da je pristup za sve tri skupine projekcija jednak, a takav pristup vrijedi i za azimutne, pseudokonusne, polikonusne, kružne i ostale projekcije. U definicijama konusnih i cilindričnih projekcija ne spominju se pomoćne plohe (konus i cilindar) jer ne samo da su nepotrebne nego su i

štetne jer dovode do mnogih pogrešnih zaključaka (Lapaine, Frančula 2022). Klasifikacija projekcija uz primjenu pomoćnih (razvojnih) ploha obuhvaća samo konusne, cilindrične i azimutne projekcije, a ne i pseudokonusne, pseudocilindrične, polikonusne, kružne i ostale projekcije i to je njezin najveći nedostatak.

I ostala zapažanja i prijedlozi umjetne inteligencije su prihvatljivi, osim onoga o brzom poboljšanju (*rapid improvements*). Naša novija istraživanja pokazala su da umjetna inteligencija vrlo brzo i pristojno odgovara na pitanja, na prvi pogled prihvaća naše korekcije, ali ih isto tako odmah zaboravlja! Već nakon par dana ponovno daje drukčije i ponovno pogrešne odgovore na ista pitanja – barem što se tiče kartografskih projekcija. S druge strane, nije prihvatljivo da umjetna inteligencija na osnovi jednog ispravka pogrešne tvrdnje, to prihvati kao istinu jer bi omogućavalo manipulaciju njome. Da bi umjetna inteligencija nešto prihvatila kao trajno znanje, mora za to imati mnogobrojne potvrde. Stoga je i ovaj naš tekst mali doprinos u nastojanju da umjetna inteligencija nauči pravilno klasificirati kartografske projekcije.

Šteta je što pošiljatelj e-poruke *An AI wrote a review of your paper* s adrese updates@academia-mail.com nema ime i prezime i ne odgovara na naša pitanja,

jer bismo na taj način mogli saznati kojoj umjetnoj inteligenciji možemo zahvaliti za interes o kartografskim projekcijama.

#### Literatura / References

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