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Your ref.: P303NO00
Application no.: 20210133 (please include in your reply)
Applicant: PRE STACK SOLUTIONS GEO AS, Vita Kalashnikova
Due date: 2022.02.28

Office action in patent application no. 20210133

Basis of the opinion

Description received 2021.02.03
Claims received 2021.02.03
Drawings received 2021.02.03

Conclusion

The subject-matter of the claims is considered to be new, but does not involve an inventive step and therefore does not meet the patentability criteria. This conclusion is based on an initial patentability evaluation of the application and is not a final decision, refer to Instructions.

Results of the novelty search

Reference is made to the following documents:

D1: US 2017108602 A1
D2: US 2011222370 A1
D3: US 2020132873 A1
D4: US 2018045839 A1
D5: WO 2013012470 A1

Assessment of patentability

The following is a reasoned statement with regard to novelty and inventive step, ref. Norwegian Patents Act, Section 2, first paragraph.

Novelty

Document D1 is regarded as being the prior art closest to the subject-matter of the independent claim 1.

D1 discloses (see paragraph [0005]; [0006]; [0033]; [0034]) a computer implemented method for estimating rock properties from seismic data. An initial model with kinematic constraints is modelled. From this initial model synthetic traces are generated. The synthetic data are compared with the real data, the difference between the two are used to update the simulated model. For each iteration the misfit is estimated, and the iteration continues until the global optimum is found. The initial model is made with initial functions of density and/or velocity.

However, D1 does not describe that the density and velocity functions are being randomly updated in random start and length time. The subject-matter of independent claims 1, 8 and 9 and, accordingly, the dependent claims 2-7 is therefore novel.

D2 describes a method for estimating rock properties from seismic data. An initial model with initial density and velocity functions are generated, synthetic seismic traces is generated based on the initial model. The model is iteratively updated using the misfit function to find the global optimum solution. The functions for density and velocity may be independently updated. See paragraph [0099].

D3 discloses computer-implemented methods for inversion of seismic data to extract subsurface rock properties (see paragraph [0011]).

D4 describes (see paragraph [0010]) a method for generating a physical properties model of the subsurface from seismic data. The method involves using a model of kinematic constraints on the rock properties, this model is updated for each iteration.

D5 describes a method for determining a model for each of a plurality of physical properties of a subsurface region by iterative joint inversion of geophysical data (see paragraph [0005]; [0006]; claim 2).

Inventive step

The objective technical problem to be solved by the present method according to claim 1, in view of D1, may be regarded as a more accurate method for estimating rock properties.

A person skilled in the art facing the objective technical problem would, in light of prior art, their general knowledge and D1, know that randomly updating density and velocity values in the rock properties model can be done to increase accuracy without any inventive activity. The subject-matter of claim 1 therefore does not involve an inventive step.

The claims 2-9 does not seem to add anything of inventive significance to the subject-matter of claim 1, they therefore do not involve an inventive step.

Certain defects and observations

Claim 1 is not fully supported by the description as required by the Norwegian Patents Act, Section 8, second paragraph third sentence, as its scope is broader than justified by the description. The claim describes "extracting or estimating rock properties such as density or velocity", but the description seems to only support the estimation of density or velocity, no other types of rock properties.

The description indicates the estimation of velocity and density independently of each other to be an essential feature of the invention (see page 1 line 24, page 4 line 21, page 5 line 10-11). But this feature is not clearly recited in claim 1. See "patentretninglinjene (pr.) del C, kap. III, punkt 4.4" Examination Guidelines, part C, Chapter III, 4.4 (in Norwegian only).

Claim 5 is not clear. The claim is broader than independent claim 1, of which it depends. By using the word "instead" the claim excludes features defined in claim 1, thereby rendering the claim unclear, ref. Norwegian Patents Act, Section 8, second paragraph.

Document D1 should be identified in the general part of the description and the relevant background art discussed therein should be briefly discussed to give the correct background

for the invention, ref. Patent Regulations, Section 9, see "pr. del C, kap. II, punkt 3.2.1" (Examination Guidelines).

Instructions

Although we have concluded in this manner, this conclusion is made on the basis of a first substantive evaluation of the application and does not imply a final decision on the application. If you disagree with our assessments please send us the reasons for your opinion and, if appropriate, an amended set of claims reflecting this.

If you amend the patent claims, you must state where in the application as filed support for the amendment is found, ref. Regulations to the Norwegian Patents Act (Patent Regulations), Section 20.

If you file an amended description, you must specify which parts of the description are not in accordance with the previously filed description and specify in which way the amendments imply anything new with respect to the substantive content, ref. Patent Regulations, Section 21.

Time limit for response

You are invited to submit a written response within the due date above. You may respond via [Altinn](#). If you fail to respond, the application will be shelved. However, the processing of the application may be resumed by paying a fee. Ref. Norwegian Patents Act, Section 15, third paragraph and Regulation Relating to Payments etc. to the Norwegian Industrial Property Office and the Board of Appeal for Industrial Property Rights (Regulation on fees), Section 26. You may request an extension of the due date, see «patentretningslinjene del A, kap. I, punkt 5.1» Examination Guidelines, part A, Chapter I, 5.1 (in Norwegian only). This must be done within the due date.

For general provisions regarding submitting of documents and payments, see Regulation on fees, Sections 1-6 and 8.

Additional information to the applicant

Application documents in English - provisional protection

The patent application will be published 18 months after it was first submitted. In order to obtain provisional protection for the invention described in the application from the publishing date, you must submit a translation of the claims into Norwegian. The patent claims in Norwegian will form the basis for provisional protection during the application period. The provisional protection applies only insofar as the Norwegian and English texts correspond with each other. Provisional protection takes effect once you have supplied a translation of the claims and we have published a notice of this in the Norwegian Official Patent Gazette (Norsk patenttidende).

Supplementary search

A novelty search is not considered to be complete if it was carried out at a time when the newest relevant material was not yet included in the search material. You can request a supplementary search to disclose whether there exist older patent applications, not publicly available when the first novelty search was done. This may be national patent applications, EPO applications that may apply to Norway, see Norwegian Patents Act, Section 66f or international patent applications that have been continued in Norway according to Norwegian Patents Act, Section 31. Such applications may prevent novelty according to Norwegian Patents Act, Section 2, second paragraph, second sentence. A supplementary

search cannot be carried out until after approximately 22 months from the filing date of the application.

Information about patenting abroad

If your intention is to apply for patent abroad, please be aware of the following:

1. You can apply for patent abroad with priority from the Norwegian application within 12 months from the date it was filed in Norway (the priority year). This means that the patent application filed abroad gets the same effective filing date as the application has in Norway. If anyone else has applied for a similar patent during the priority year, your patent application will precede due to its older priority.
2. You may claim priority from this application (the priority application) at the time you file the application abroad, or within 16 months from the Norwegian filing date and at the latest within four (4) months after filing abroad. You must also submit a certificate of priority. The Norwegian Industrial Property Office issues such a certificate of priority on demand if a set fee is paid.

For your information

Relevant laws and regulations, as well as Examination Guidelines are available on our webpage, www.nipo.no.

Information to applicants using Altinn: You will find cited publications linked in the enclosed search report or as electronic attachments. They will be forwarded in paper format only if not available in electronic format or if protected by copyright.

Please contact us if you have any questions

Sincerely,

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Enclosures: cited publications, search report