



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 14/982,567 | 12/29/2015 | Petar Aleksic | 231441-461050 | 4284 |
| 101874 | 7590 | 07/01/2020 | EXAMINER | |
| HONIGMAN LLP-GOOGLE DOCKETING DEPARTMENT 650 Trade Centre Way Suite 200 KALAMAZOO, MI 49002-0402 | | | WOZNIAK, JAMES S | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2657 | |
| | | | NOTIFICATION DATE | DELIVERY MODE |
| | | | 07/01/2020 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

google@honigman.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte PETAR ALEKSIC and PEDRO MORENO MENGIBAR

Appeal 2019-001884
Application 14/982,567
Technology Center 2600

Before ALLEN R. MacDONALD, JEREMY J. CURCURI, and
PHILLIP A. BENNETT, *Administrative Patent Judges*.

CURCURI, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1, 3, 4, 8, 9, 11, 13, 15, 16, 21–23, and 25–32. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Google LLC. Appeal Br. 1.

CLAIMED SUBJECT MATTER

The claims are directed to “speech recognition and the use of class-based language models to transcribe speech to text.” Spec. ¶ 1. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A computer-implemented method, comprising:

receiving, at a computing system, speech data that characterizes an utterance of a user;

generating a candidate transcription of the utterance using a static class-based language model that includes a plurality of static classes, each static class populated with a pre-defined set of class-based terms that were selected for inclusion in the static class independently of a context of the utterance or the user;

determining whether the candidate transcription includes a class-based term from at least one static class that is capable of being customized based on the context of the utterance or the user;

in response to determining that the candidate transcription includes a class-based term from at least one static class that is capable of being customized based on the context of the utterance or the user:

(i) generating a dynamic class-based language model that includes at least one dynamic class that is customized based on the context of the utterance or the user, including generating a first dynamic class by adding dynamic class-based terms that were selected based on the context of the utterance or the user to the pre-defined set of class-based terms for a first static class of the plurality of static classes, and

(ii) providing, using the dynamic class-based language model, a speech recognition result for the utterance.

REFERENCES

The prior art relied upon by the Examiner is:

| Name | Reference | Date |
|--------------------|--------------|---------------|
| US 2005/0055210 A1 | Venkataraman | Mar. 10, 2005 |
| US 2011/0055256 A1 | Phillips | Mar. 3, 2011 |
| US 2015/0058018 A1 | Georges | Feb. 26, 2015 |

REJECTIONS

Claims 1, 3, 4, 8, 9, 11, 13, 15, 16, 21–23, 25–30, and 32 are rejected under 35 U.S.C. § 103 as obvious over Phillips and Venkataraman. Final Act. 3–11.

Claim 31 is rejected under 35 U.S.C. § 103 as obvious over Phillips, Venkataraman, and Georges. Final Act. 11–12.

OPINION

The Obviousness Rejection of Claims 1, 3, 4, 8, 9, 11, 13, 15, 16, 21–23, 25–30, and 32 over Phillips and Venkataraman

The Examiner finds Phillips and Venkataraman teach all limitations of claim 1. Final Act. 3–5; *see also* Ans. 11–22. In particular, the Examiner finds Phillips teaches most limitations of claim 1. Final Act. 3–4. In particular, the Examiner further finds

Although Phillips selects a dynamic language model populated with terms based upon the context of utterance hypothesis terms and also considers a user/client context, Phillips does not specifically recite that at least one class in the initial language model has the capability of being customized based on the context of the utterance of the user and then actually adding dynamic class-based terms that are selected based on the context of the utterance or the user to the predefined set of class-based terms for a first static class of the plurality of static classes

because Phillips merely replaces the first, initial language model with dynamic, secondary language model containing terms indicated by words/terms in the utterance transcription generated in an initial speech recognition pass. Thus, Phillips explicitly lacks the customizable/expandable initial language models indicated in claim 1. Venkataraman, however, discloses a refining/updating of an original, utterance-independent, customizable domain-based static language model by adding terms/words based upon domain-based terms that are identified in a transcription generated by an initial speech recognition pass followed by the utilization of the updated language model in a second speech recognition pass.

Final Act. 4–5 (citing Venkataraman ¶¶ 25–26, 29–34, 36, 39–40).

The Examiner reasons

it would have been obvious to one of ordinary skill in the art to modify the teachings of Phillips with the dynamic language model generation technique that adds dynamic domain-based terms to an existing static domain-based language model taught by Venkataraman in order to provide a predictable result in the form of increasing the accuracy of speech recognition results.

Final Act. 5 (citing Venkataraman ¶ 46).

Among other arguments, Appellant presents the following principal arguments:

- i. Phillips and Venkataraman do not teach “generating a dynamic class-based language model that includes at least one dynamic class that is customized based on the context of the utterance or the user,” as recited in claim 1. *See* Appeal Br. 7–9. “Phillips *never* describes a ‘class-based’ language model—let alone a ‘dynamic’ class-based language model having a ‘dynamic class’ as recited in claim 1.” Appeal Br. 8 (citing Phillips ¶¶ 71, 88); *see also* Reply Br. 1–2. Venkataraman mentions class-based language models, but does not teach the language recited in claim 1. *See* Appeal Br.

8–9 (citing Venkataraman ¶ 26); *see also* Reply Br. 2–3 (“Venkataraman generates the second language model through analysis of the **content** of the utterance itself (as reflected by the ‘high-confidence words’ from the initial recognition hypotheses) rather than based on a **context** of the utterance”).

ii. Phillips and Venkataraman do not teach “generating a first dynamic class by adding dynamic class-based terms that were selected based on the context of the utterance or the user to the pre-defined set of class-based terms for a first static class of the plurality of static classes,” as recited in claim 1. *See* Appeal Br. 9–11. “Venkataraman teaches essentially the opposite of what is claimed—instead of **adding** terms to a class as recited in claim 1, Venkataraman ‘**narrows**’ a search space so that fewer terms are included.” Appeal Br. 9 (citing Venkataraman ¶ 32); *see also* Appeal Br. 10–11, Reply Br. 4–6.

Appellant’s arguments persuade us that the Examiner erred.

Phillips discloses determining an initial set of language models, running recognition, determining a new set of language models, and running recognition again. *See* Phillips ¶ 88; *see also* Phillips Fig. 5a. Phillips discloses “n-gram statistical language models,” but does not explicitly state that the models are class-based language models. Phillips ¶ 71.

Venkataraman discloses “a class-based language model may be used.” Venkataraman ¶ 26. However, even if we were to conclude a skilled artisan would have modified Phillips to use class-based language models, resulting in “generating a dynamic class-based language model” (Phillips’s new set of language models), as recited in claim 1, we find Phillips and Venkataraman do not teach the specific class-based model recited in the claim. That is, the cited references do not teach the further recitation of

that includes at least one dynamic class that is customized based on the context of the utterance or the user, including generating a first dynamic class by adding dynamic class-based terms that were selected based on the context of the utterance or the user to the pre-defined set of class-based terms for a first static class of the plurality of static classes,
as recited in claim 1.

According to Venkataraman, an initial language model is applied to a speech signal to determine high-confidence words, and a data set query is made with the high-confidence words. *See* Venkataraman ¶¶ 27–29. Venkataraman discloses “the second language model is constructed by updating the initial language model based on the query results.” Venkataraman ¶ 30.

In describing the updating of the initial language model, Venkataraman discloses “analyz[ing] the query results to find novel words” that are not contained in the initial language model, and then “add[ing] the novel words . . . to the method 400’s pronunciation dictionary, thereby enabling the novel words to be identified the next time they are spoken by the user.” Venkataraman ¶ 31.

In our view, adding words to the “pronunciation dictionary” does not teach “adding dynamic class-based terms . . . to the pre-defined set of class-based terms for a first static class of the plurality of static classes,” as recited in claim 1.

In reaching our decision, we recognize that Venkataraman discloses “a class-based language model may be used.” Venkataraman ¶ 26. However, it is unclear to us how or why the further disclosures in Venkataraman of adding words *to a pronunciation dictionary* (Venkataraman ¶ 31) would have been applied to a class-based language model, and in particular, how or

why adding words *to a pronunciation dictionary* suggests adding terms (or words) *to a static class of a plurality of static classes* to generate a dynamic class, as recited in claim 1.

Thus, on the record before us, we determine the Examiner erred in finding Phillips and Venkataraman teach

(i) generating a dynamic class-based language model that includes at least one dynamic class that is customized based on the context of the utterance or the user, including generating a first dynamic class by adding dynamic class-based terms that were selected based on the context of the utterance or the user to the pre-defined set of class-based terms for a first static class of the plurality of static classes,
as recited in claim 1.

We, therefore, do not sustain the Examiner's rejection of claim 1.

We also do not sustain the Examiner's rejection of claims 3, 4, 8, 9, 11, 22, 28–30, and 32, which depend from claim 1.

Independent claim 13 recites similar language as claim 1. We, therefore, also do not sustain the Examiner's rejection of claim 13.

We also do not sustain the Examiner's rejection of claims 15, 16, and 23, which depend from claim 13.

Independent claim 21 recites similar language as claim 1. We, therefore, also do not sustain the Examiner's rejection of claim 21.

We also do not sustain the Examiner's rejection of claims 25–27, which depend from claim 13.

The Obviousness Rejection of Claim 31 over Phillips, Venkataraman, and Georges

Claim 31 depends from claim 1. The Examiner does not find Georges cures the deficiency of Phillips and Venkataraman. *See* Final Act. 11–12.

We, therefore, do not sustain the Examiner’s rejection of claim 31.

CONCLUSION

The Examiner’s decision to reject claims 1, 3, 4, 8, 9, 11, 13, 15, 16, 21–23, and 25–32 is reversed.

DECISION SUMMARY

In summary:

| Claims Rejected | 35 U.S.C. § | References | Affirmed | Reversed |
|---|--------------------|---------------------------------|-----------------|---|
| 1, 3, 4, 8, 9, 11, 13, 15, 16, 21–23, 25–30, 32 | 103 | Phillips, Venkataraman | | 1, 3, 4, 8, 9, 11, 13, 15, 16, 21–23, 25–30, 32 |
| 31 | 103 | Phillips, Venkataraman, Georges | | 31 |
| Overall Outcome | | | | 1, 3, 4, 8, 9, 11, 13, 15, 16, 21–23, 25–32 |

REVERSED