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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ATISH DATTA CHOWDHURY, NAMIT CHATURVEDI, MEENAKSHI BALASUBRAMANIAN, and ARUL GANESH

Appeal 2010-008359
Application 11/545,440
Technology Center 2100

Before DAVID M. KOHUT, JOHNNY A. KUMAR, and MICHAEL J. STRAUSS, *Administrative Patent Judges*.

KOHUT, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134(a) of the Final Rejection of claims 1-28. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm the Examiner's rejection of these claims.

INVENTION

The invention is directed to a method, device, and system for receiving an input and supplying an output through the use of a processor and a finite state automaton. Spec. 4-5. Claim 1 is representative of the invention and is reproduced below:

> 1. A small intelligent device comprising:
> a memory storing a finite state automaton;
> an input/output interface that receives an input and provides an output;
> a processor, wherein the processor is arranged to receive the input and to traverse the finite state automaton stored in the memory in order to supply the output to the input/output interface.

REFERENCES

Arbuckle	US 5,563,805	Oct. 8, 1996
Briel	US 6,119,183	Sep. 12, 2000
Montgomery	US 2001/0000814 A1	May 3, 2001
Xie	US 2002/0013934 A1	Jan. 31, 2002
Reggiani	US 2003/0066021 A1	Apr. 3, 2003
Sidle	US 2005/0278669 A1	Dec. 15, 2005
Bear	US 2006/0032905 A1	Feb. 16, 2006

Gould US 7,082,044 B2 July 25, 2006

Arlindo L. Oliveira, et al., "Exact Minimization of Binary Decision Diagrams Using Implicit Techniques," IEEE Transactions on Computers, Vol. 47, No. 11, November 1998. (Hereinafter referred to as Oliveira.)

Ronald M. Kaplan, "Finite State Technology," Xerox Palo Alto Research Center, September 9, 1999. (Hereinafter referred to as Kaplan.)

C. Enrique Ortiz, "An Introduction to Java Card Technology - Part 1," May 29, 2003. (Hereinafter referred to as Ortiz.)

"Smart Cards" by Cornerstone Lab, from www.c-lab.com/smartCard.html. posted on the internet on January 25, 2005. (Hereinafter referred to as C-Lab.)

Tor Helleseth et al., "Security of Jump Controlled Sequence Generators for Stream Ciphers," SETA 2006, LNCS 4086, pp. 141-152, September 21, 2006. (Hereinafter referred to as Helleseth.)

REJECTIONS AT ISSUE

Claims 1, 3, 7, and 17 are rejected under 35 U.S.C. § 102(b) as being anticipated by Montgomery. Ans. 4-5.

Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and Sidle. Ans. 6.

Claims 4-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery, Kaplan, and Arbuckle. Ans. 6-8.

Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery, Kaplan, and Sidle. Ans. 9-11.

Claims 8-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and Ortiz. Ans. 11-14.

Claim 13 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and Briel. Ans. 14-15.

Claim 14 rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery, Reggiani, and Helleseth. Ans. 15-17.

Claim 15 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and Xie. Ans. 17-18.

Claims 16 and 18-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and C-Lab. Ans. 18.

Claim 21 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and Kaplan. Ans. 18-20.

Claim 22 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and Bear. Ans. 20-21.

Claim 23 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery, Bear, and Sidle. Ans. 22.

Claims 24-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and Oliveira. Ans. 23-25.

Claim 27 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery, Sidle, and Oliveira. Ans. 25.

Claim 28 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Montgomery and Gould. Ans. 25-26.

ISSUES

Did the Examiner err in finding that Montgomery discloses a small intelligent device having a memory that stores a finite state automaton, as required by claim 1?

Did the Examiner err in finding that it would have been obvious to combine Montgomery and Sidle?

Did the Examiner err in finding that the combination of Montgomery, Kaplan, and Arbuckle teaches or suggests a finite state automaton that embodies application context sensitive and application context independent rules, as required by claim 4?

Did the Examiner err in finding that the combination of Montgomery and Briel teaches or suggests a finite state automaton that is stored as a switching circuit representation, as required by claim 13?

Did the Examiner err in finding that the combination of Montgomery and Kaplan teaches or suggests a data structure that transitions the finite state automaton from an initial state to a next state in response to an input, as required by claim 21?

Did the Examiner err in finding that the combination of Montgomery and Oliveira teaches or suggests: a finite state automaton in the form of a decision tree in the memory of a small intelligent device, as required by claim 24; a decision tree that comprises a binary decision tree, as required by claim 25; and level indicators, as required in claims 26 and 27?

Did the Examiner err in finding that the combination of Montgomery and Gould teaches or suggests wherein the finite state automaton comprises accepting states and non-accepting states, wherein the processor transitions to a new state, wherein the input is an allowable sequence if the new state

comprises an accepting state, and wherein the input is not an allowable sequence if the new state comprises a non-accepting state, as required by claim 28?

ANALYSIS

Claims 1, 3, 7, and 17.

We select claim 1 as representative of the group comprising claims 1, 3, 7, and 17 as Appellants have not addressed any of the other claims with particularity. 37 C.F.R. § 41.37(c)(1)(vii). Appellants argue that "Montgomery does not disclose a small intelligent device having a memory that stores a finite state automaton," as required by claim 1. App. Br. 17. Specifically, Appellants argue that Montgomery discloses software and programs stored on the smart card and a processor for carrying out operations, but do not mention storing a finite state automaton. App. Br. 18. Instead, Appellants argue that even though Montgomery describes the operation of the smart card using a state diagram, Montgomery never mentions storing a finite state automaton on the smart card. App. Br. 18. We disagree.

The Examiner finds that Montgomery's smart card processor executes programs that are stored in its memory. Ans. 28. The Examiner additionally finds that Montgomery's Figures show the smart card operating as a finite state machine. Ans. 28. Therefore, the Examiner finds that a finite state automaton is stored in Montgomery's memory of the smart card. Ans. 28. We agree with the Examiner's findings and logic and subsequently sustain the Examiner's rejection of claims 1, 3, 7, and 17.

Claim 2

Appellants make the same arguments with respect to claim 2 as with claim 1. App. Br. 20-21. Therefore, we sustain the Examiner's rejection of claim 2 for the same reasons indicated *supra*. However, Appellants also argue that the combination of Montgomery and Sidle is improper since there is no motivation to combine the two references. App. Br. 22. We disagree.

The Supreme Court stated that an explicitly stated motivation to combine the references is seen as "helpful insight," *KSR Intern. Co. v. Teleflex Inc.*, 550 U.S. 398, 418, but that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. *Id*. at 416. In this situation, the Examiner finds that Montgomery discloses a finite state automaton. Ans. 4. Additionally, the Examiner finds that Sidle teaches a finite state machine that corresponds to a binary decision diagram. Ans. 6. Both of the references deal with state machines. Therefore, we consider using Sidle's binary decision diagrams of its finite state machines with Montgomery's finite state automaton as nothing more than using known elements according to known methods in order to yield the predictable results.

Further, though explicit motivation to combine the references is not required (*see KSR, supra*), the Examiner has provided a motivation to combine them. The Examiner stated that the combination would provide "a convenient means of finding the output of one or more functions for any given input." Ans. 6. While Appellants are correct that there is no motivation explicitly cited by the references (App. Br. 22), we are not persuaded that the motivation would not be known to one skilled in the art (App. Br. 22) as indicated by the Examiner's citation to Akers. Ans. 30.

Thus, we are not persuaded by Appellants' arguments and we sustain the Examiner's rejection of claim 2.

Claim 4.

Appellants make the same arguments with respect to claim 4 as with claim 1. App. Br. 24. We do not find those arguments to be persuasive for the reasons discussed *supra*. Appellants additionally argue that Arbuckle does not teach or suggest a finite state automaton that embodies application context sensitive and application context independent rules, as required by claim 4. App. Br. 25. However, as correctly indicated by the Examiner, the Examiner finds that Kaplan teaches context sensitive and context independent rules and Arbuckle teaches application contexts. Ans. 32-33. Thus, the Examiner finds that it is the combination of Kaplan and Arbuckle that teaches the disputed limitation. Ans. 32-33. Appellants do not address the Examiner's specific finding regarding the combination. Therefore, we agree with the Examiner and sustain the Examiner's rejection of claim 4.

Claims 5, 6, 8-12, 14-16, and 18-20.

Appellants make the same arguments with respect to claims 5, 6, 8-12, 14-16, and 18-20 as with respect to claim 1. App. Br. 26-29. As such, we sustain the Examiner's rejection of claims 5, 6, 8-12, 14-16, and 18-20 for the same reasons as discussed *supra* with respect to claim 1.

Claim 13.

Appellants make the same arguments with respect to claim 13 as with claim 1. App. Br. 27. We do not find those arguments to be persuasive for the reasons discussed *supra*. Appellants additionally argue that the combination of Montgomery and Briel does not teach or suggest storing a finite state automaton as a switching circuit representation because Briel

teaches implementing a switching circuit as a state machine, but not the reverse. App. Br. 27. Appellants contend that the Examiner's finding that Briel teaches the disputed limitation is only logical "when all finite state machines can be implemented as switching circuits." App. Br. 27. However, we agree with the Examiner that it would have been obvious to one of ordinary skill in the art to create a state machine based on a switching circuit since it is known to create a switching circuit based on a state machine. Ans. 36. Thus, we sustain the Examiner's rejection of claim 13.

Claim 21.

Appellants make the same arguments with respect to claim 21 as with claim 1. App. Br. 29-30. We do not find those arguments to be persuasive for the reasons discussed *supra*. Appellants additionally argue that neither Montgomery nor Kaplan teaches or suggests a data structure that transitions the finite state automaton from an initial state to a next state in response to an input, as required by claim 21. App. Br. 31. Appellants contend that the Figures and sections of Montgomery cited by the Examiner do not discuss a transition between states in response to an input. App. Br. 31. However, the Examiner finds that Montgomery teaches a smart card that waits for a command (ST21), i.e., an initial state. Ans. 38. Upon receipt of a command, the Examiner finds that the smart card enters a "next state." Ans. 38. Additionally, the Examiner finds that Kaplan teaches an initial state and the transitions from state to state as inputs are received. Ans. 38. We find the Examiner's findings to be reasonable and Appellants have not addressed the Examiner's specific findings. As such, we sustain the Examiner's rejection of claim 21.

Claim 22.

Appellants make the same arguments with respect to claim 22 as with claim 1, in respect to Montgomery. App. Br. 32. We do not find those arguments to be persuasive for the reasons discussed *supra*. Claim 22 recites "wherein the reader memory stores an execution logic of the finite state automaton." Appellants argue that Bear does not teach or suggest this limitation because there is nothing in the reference that includes storing execution logic in memory. App. Br. 32. However, the Examiner finds that Bear discloses ROM, and as such, it would have been obvious to include execution logic in the ROM of Bear in order "to provide a means for accomplishing the state machines of Montgomery's figures without having to involve the terminal." Ans. 30. We agree with the Examiner's rationale and Appellants have not addressed the Examiner's specific finding. Thus, we sustain the Examiner's rejection of claim 22.

Claims 24 and 25.

Appellants make the same arguments with respect to claims 24 and 25 as with claim 1. App. Br. 34. We do not find those arguments to be persuasive for the reasons discussed *supra*. Appellants argue that neither Montgomery nor Oliveira teaches or suggests a finite state automaton in the form of a decision tree, as required by claim 24, or wherein the decision tree is a binary decision tree, as required by claim 25. App. Br. 34. Appellants are not arguing that decision trees are not taught; just that it would not have been obvious to store a finite state automaton as a decision tree. App. Br. 34. We disagree.

The Examiner finds that Oliveira teaches a binary decision diagram in Figure 3. Ans. 23. Additionally, the Examiner finds that it would have been

obvious to combine Montgomery with Oliveira in order to minimize the decision diagram for optimization purposes (citing Oliveira's Abstract). Ans. 23. We find this motivation to be reasonable and Appellants have not addressed the Examiner's specific finding. Thus, we sustain the Examiner's rejection of claims 24 and 25.

Claims 26 and 27.

Appellants make the same arguments with respect to claims 26 and 27 as with claim 1. App. Br. 34-36. We do not find those arguments to be persuasive for the reasons discussed *supra*. Appellants additionally argue that none of the cited references teaches or suggests level indicators that have a first value indicating that a corresponding node maps to a state of the automaton and a second value that indexes an input string, as required by claim 26. App. Br. 35-36. Appellants contend that the values indicated by the Examiner (X1, X2, and X3), could represent anything because Oliveira does not describe their function. App. Br. 35-36. Appellants also argue that since the levels are not taught by the references, that the references also do not teach a first value and a second value as described in the claims. We disagree.

The Examiner finds that X1, X2, and X3 are levels in Figure 3's decision tree. Ans. 42. After reviewing Figure 3 of Oliveira, we agree with the Examiner that X1, X2, and X3 represent different levels of a decision tree. Additionally, the Examiner finds that Oliveira teaches minterms and values of the minterms and the level of the node in the binary decision diagram relates to the index of the variable that is tested at that node. Ans. 42. Appellants do not address the Examiner's specific findings. Thus, we

agree with the Examiner and sustain the Examiner's rejection of claims 26 and 27.

Claim 28.

Appellants make the same arguments with respect to claim 28 as with claim 1. App. Br. 36-37. We do not find those arguments to be persuasive for the reasons discussed *supra*. Appellants additionally argue that the combination of Montgomery and Gould does not teach or suggest wherein the finite state automaton comprises accepting states and non-accepting states, wherein the processor transitions to a new state, wherein the input is an allowable sequence if the new state comprises an accepting state, and wherein the input is not an allowable sequence if the new state comprises a non-accepting state, as required by claim 28. App. Br. 37. We disagree.

The Examiner finds that Gould teaches "a finite state machine, transitioning between states, and an accepting state." Ans. 44. Additionally, the Examiner finds that claim 8 of Gould teaches using a look-up table (LUT) to generate an output after receiving a next state, and accepting or rejecting a request. Ans. 44. Thus, we agree with the Examiner that the disputed limitations are taught. Additionally, Appellants do not address the Examiner's specific findings regarding claim 8 of Gould nor do Appellants provide sufficient evidence or reasoning to show why the portions of Gould cited by the Examiner do not teach the disputed claim limitation. As such, we sustain the Examiner's rejection of claim 28.

CONCLUSION

The Examiner did not err in finding that Montgomery discloses a small intelligent device having a memory that stores a finite state automaton, as required by claim 1.

The Examiner did not err in finding that it would have been obvious to combine Montgomery and Sidle.

The Examiner did not err in finding that the combination of Montgomery, Kaplan, and Arbuckle teaches or suggests a finite state automaton that embodies application context sensitive and application context independent rules, as required by claim 4.

The Examiner did not err in finding that the combination of Montgomery and Briel teaches or suggests a finite state automaton that is stored as a switching circuit representation, as required by claim 13.

The Examiner did not err in finding that the combination of Montgomery and Kaplan teaches or suggests a data structure that transitions the finite state automaton from an initial state to a next state in response to an input, as required by claim 21.

The Examiner did not err in finding that the combination of Montgomery and Oliveira teaches or suggests: a finite state automaton in the form of a decision tree in the memory of a small intelligent device, as required by claim 24; a decision tree that comprises a binary decision tree, as required by claim 25; and level indicators, as required in claims 26 and 27.

The Examiner did not err in finding that the combination of Montgomery and Gould teaches or suggests wherein the finite state automaton comprises accepting states and non-accepting states, wherein the processor transitions to a new state, wherein the input is an allowable

sequence if the new state comprises an accepting state, and wherein the input is not an allowable sequence if the new state comprises a non-accepting state, as required by claim 28.

SUMMARY

The Examiner's decision to reject claims 1-28 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

ELD