

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOYOTA MOTOR CORPORATION

Petitioner

v.

AMERICAN VEHICULAR SCIENCES

Patent Owner

Patent No. 5,845,000

Issue Date: December 1, 1998

Title: OPTICAL IDENTIFICATION AND MONITORING SYSTEM USING
PATTERN RECOGNITION FOR USE WITH VEHICLES

**DECLARATION OF CRIS KOUTSOUGERAS, PH.D. IN SUPPORT OF
AVS'S RESPONSE UNDER 37 CFR § 42.120**

Case No. IPR2013-00424

I. INTRODUCTION AND SUMMARY OF OPINIONS

1. My name is Cris Koutsougeras. I am a professor at the Department of Computer Science and Industrial Technology at Southeastern Louisiana University in Hammond, Louisiana, where I teach courses in Computer Science and in Engineering Technology. My background consists of degrees in Electrical Engineering, Computer Engineering, and Computer Science. Of my past work, pertinent to the present review is my research on neural networks, robotics control and intelligence, and sensors and their interfacing.

2. I have been hired by American Vehicular Sciences (“AVS”) in connection with the above-captioned Inter Partes Reexamination Proceeding (“IPR”) before the United States Patent and Trademark Office. In the below paragraphs, I provide my opinion that at least claims 10, 11, 16, 17, 19, 20, and 23 of U.S. Patent No. 5,845,000 (“the ‘000 patent”) at issue in the IPR are not anticipated or obvious in view of the grounds for review.

II. PROFESSIONAL BACKGROUND AND QUALIFICATIONS

3. My background consists of a B.S. degree in Electrical Engineering, an M.S. degree in Computer Engineering, and a Ph.D. degree in Computer Science.

4. I received my B.S. degree in 1983 from the National Technical University of Athens, my M.S. degree in 1984 from the University of Cincinnati, and my Ph.D. in 1988 from Case Western Reserve University. My Ph.D. research

and dissertation was on the topic of neural networks and, more specifically, on algorithms for training feed-forward types of neural networks.

5. I also have experience in automotive technology involving external object detection systems, collision warning systems, and the use of pattern recognition technology in such systems, as I have participated in the DARPA 2005 Grand Challenge competition with a team that built an autonomous vehicle designed to drive completely unassisted in unknown and unrehearsed cross-country environments. The vehicle was a regular production SUV that was modified to be controlled by computers aided by sensors including Ladars and GPS.

6. I am a professor at the Department of Computer Science and Industrial Technology at Southeastern Louisiana University in Hammond, Louisiana, and teach courses in Computer Science and in Engineering Technology. I served as department head of that department from 2006 to 2011.

7. Prior to joining Southeastern Louisiana University, I was a faculty member of the Department of Electrical Engineering and Computer Science at Tulane University in New Orleans, Louisiana, from 1988 to 2006.

8. A more detailed account of my work experience, qualifications, and list of publications is included in my Curriculum Vitae, which is attached to this Declaration.

III. COMPENSATION AND MATERIALS CONSIDERED

9. I am being compensated for my time as an expert witness on this matter at \$260 per hour. My compensation, however, does not depend in any way on my opinions or conclusions, nor on the result of this proceeding.

10. I am not an employee of AVS or any affiliate, parent, or subsidiary.

11. I have not served as an expert in the last 10 years.

12. In arriving at my opinions, I considered the following documents:

- U.S. Pat. No. 5,845,000;
- Prosecution History of U.S. Pat. No. 5,845,000;
- The Patent Trial and Appeals Board's Decision to Institute Inter Partes Review;
- Toyota's Petition for Inter Partes Review;
- The Declaration of Dr. Nikolaos Papanikolopoulos;
- The Transcript of the Deposition of Dr. Papanikolopoulos
- U.S. Pat. No. 6,553,130 to Lemelson;
- U.S. Pat. No. 5,214,408 to Asayama;
- Pomerleau, Dean, "Neural Networking Perception for Mobile Robot Guidance," CMU-CS-92-115, AD-A249927, Feb. 16, 1992;

- Japanese Unexamined Patent Application Publication JP-H06-267303 to Mizukoshi;
- Japanese Unexamined Patent Application Publication JP-S62-131837 to Yanagawa; and
- The additional patents and references I cite in this declaration in support of my opinions.

IV. OVERVIEW OF THE ‘000 PATENT

A. Technical Overview of the ‘000 Patent

13. The ‘000 patent relates, in relevant part, to a system for monitoring at least one object exterior to a vehicle and to a headlight dimming system. In particular, the ‘000 patent involves identifying objects or radiation sources outside the vehicle, and affecting other systems in the vehicle in response to the identification.

14. Each of the claims at issue in the IPR requires at least one of the following specific features: claims **10, 11 and 19** require using a “trained pattern recognition means” that is “structured and arranged to apply a pattern recognition algorithm generated from data of possible exterior objects and patterns of received electromagnetic illumination from the possible exterior objects”; claims **16, 17, and 20** require “trained pattern recognition means” that is “structured and arranged to apply a pattern recognition algorithm generated from data of possible sources of

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