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Patent Eligibility And Fed. Circ. F-35 Helmet Case

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Patents that claim a mathematical equation sometimes are not eligible for patenting under 35 U.S.C. § 101. This is because the pure application of mathematical theory, e.g., using an equation derived from Newton's laws of motion to predict an object's location, is regarded in patent-parlance as an abstract concept. Whether such a claim is indeed patent-eligible under Section 101 depends on whether the claim as a whole recites an invention that the U.S. patent laws were meant to protect. Is the claim directed to little more than computing a number using an equation, or does the claim instead result in an unconventional process that uses the equation to produce a useful result? This was the basic patent-eligibility question before the U.S. Court of Appeals for the Federal Circuit in Thales Visionix Inc. v. United States.

The patent at issue claimed a method that used an equation to track movements of an object relative to a moving platform. The court found the patent claim eligible as not directed to an abstract concept under the U.S. Supreme Court's Alice/Mayo test for Section 101. This piece reviews the decision. It then concludes with thoughts on how this precedent fits in with other patent-eligibility decisions by the Federal Circuit, and whether the decision sheds any new light on the patent eligibility of an innovation that uses a mathematical model to produce a desired result.

Alice/Mayo and Diehr

Step one of the Alice/Mayo two-part test asks whether a claim is directed to an abstract concept. If the answer is yes, the claim is patent-ineligible unless, under step two, there is significantly more to the claim than the patent-ineligible abstract concept. When a patent claim centers upon the use of an algorithm or equation, application of Alice/Mayo often invokes the Supreme Court decision of Diamond v. Diehr, which predates Alice/Mayo. Diehr involved patent claims to an equation used in a manufacturing process. The Diehr claim recited a process for curing synthetic rubber that computed a number (temperature). The Diehr claim was eligible for patenting because the claim as a whole was directed to an improved process for curing rubber, not the abstract concept of using an equation to compute temperature.

The Thales Visionix Patent

The patent, issued as U.S. Pat. No. 6,474,159, discloses a method for tracking the orientation of an object (e.g., a pilot's helmet) relative to a moving platform (e.g., an aircraft cockpit). An "inertial sensor," such as an accelerometer, gyroscope, or angular rate sensor, is mounted to the helmet and to the

cockpit. As such, both sensors are located in moving, or non-inertial frames of reference. Tracking relative changes in orientation using inertial sensors located in these frames of reference, according to the patent, departs from convention.

Advantages to using inertial sensors in this way include providing a self-contained system and reducing the amount of data needed to compute relative motion, and while also accounting for measurement errors. The mathematics disclosed in the patent explains, for the most part, how these results are achieved. By contrast, there is very little disclosed about the inertial sensors or processing hardware, since conventional sensors and hardware can be used to practice the invention. Claim 22 of the patent (the Thales claim) is reproduced below.

A method comprising determining an orientation of an object relative to a moving reference frame based on signals from two inertial sensors mounted respectively on the object and on the moving reference frame.

Federal Claims Court

The patentee, Thales Visionix, filed a lawsuit against the United States under 35 USC § 1498, alleging the unlawful practice of the patented method in a head mounted display system developed for the F-35 Joint Strike Fighter. In response, the U.S. Government brought a motion to dismiss for patent ineligibility under 35 U.S.C. § 101. The claims court granted this motion, finding the Thales claim was directed to an abstract concept — the equations of motion used to determine the orientation of the object.

Federal Circuit

The Federal Circuit disagreed. The Thales claim was not directed to the abstract concept of a mathematical equation. Rather, under step one of Alice/Mayo the claim was directed to a method using inertial sensors “in a non-conventional manner to reduce errors in measuring” the orientation of an object. The opinion emphasizes the need, under step one of Alice/Mayo, to do more than simply identify an abstract concept in a patent claim. Step one requires that a claim is articulated with sufficient specificity when deciding what it is "directed to" under step one (apparently the major fault with the lower court’s decision was that it had not approached step one in this way). In its explanation of this principle, the court proceeds, by way of examples from its earlier decisions, to point out the difference between patent claims “directed to” an abstract concept from claims that make use of an abstract concept (law of nature or use of a general-purpose computer) but nonetheless are directed to patent-eligible subject matter. The court then compares the Thales claim to Diehr.

For purposes of evaluating patent eligibility, the Thales claim was, in the court’s opinion, “nearly indistinguishable” from the Diehr claim. The equations used to practice the Thales claim tabulate position and orientation information received from a particular arrangement of sensors. While the type of sensors used was conventional, the location of those sensors was not. This combination of sensor arrangement and use of equations was analogous, in the court’s opinion, to the Diehr claim, which required constant temperature calculations at a location closely adjacent to a mold press. According to the court, just as the Diehr claim reduced imperfections in cured rubber, the Thales claim reduced tracking errors when using an inertial sensor located on a moving platform.

Conclusion

The accepted manner of resolving cases under Alice/Mayo is to compare the subject matter of claims at

issue to similar claims that were previously adjudicated and, based on how those earlier cases were decided, arrive at a patent-eligibility decision for the claim. Thales was decided no differently. An element-by-element comparison was made with Diehr, which was, until now, the only patent-favorable appellate decision where the patent-eligibility question centered on the use of a mathematical equation to achieve a desired result.

Does Thales give any guidance on the extent to which patentable subject matter exists for innovations best described using terms understood only through mathematical theory or the laws of physics; that is, terms embodying abstract concepts?

The Thales inventors' derivation of a particular form of well-known equations governed by Newton's laws of motion was significant to the conception of invention. The inventors' equations enabled the use of data from inertial sensors while minimizing computational errors, such as round-off and drift. The format of the data received by the processor and the type of sensors used was conventional. The sensors' location, however, was not conventional, according to the Federal Circuit. It could be argued, therefore, that the Thales claim was not directed to an abstract concept because movement was being tracked using data received from a nonconventional place (essentially, an inertial sensor located in a non-inertial reference frame).

Viewed in this way, Thales might then stand for the more generally stated patent-eligible concept of predicting an outcome or event based on sensors located in unconventional places. For example, suppose a new learning model is developed that maps input data to an output that classifies the input as belonging to class A or class B. Such classification models are conventional. The conventional models sample input data from conventional places. This new learning model, however, produces more accurate classifications between A and B because it uses input sampled from unconventional places. It could be argued that a claim to the new learning model is patent-eligible under Thales because the input, even if collected using standard sensors, originates from unconventional places for a classification between A and B.

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