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Bezeichnung der Erfindung: Systematic error correction in bar code scanner
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : G06K 7/14

ENTSCHEIDUNG / DECISION
vom / of / du 19 October 1989

Anmelder / Applicant / Demandeur : IBM Corp.

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56 EPC

Schlagwort / Keyword / Mot clé : "Inventive step (yes)"

Leitsatz / Headnote / Sommaire

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Case Number : T 185/86 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal
of 19 October 1989

Appellant : INTERNATIONAL BUSINESS MACHINES CORPORATION
Old Orchard Road
Armonk, N.Y. 10504
(US)

Representative : Vekemans, André
Compagnie IBM France
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Decision under appeal : Decision of Examining Division 066 of the European Patent Office dated 15 January 1986 refusing European patent application No. 82 102 518.6 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : P. Ford
Members : J.A.H. van Voorthuizen
W. Riewald

Summary of Facts and Sumbissions

I. European patent application No. 82 102 518.6 (publication No. 0 066 680) claiming a priority as from 18 May 1981, based on an application in the USA, was refused by decision of Examining Division 2.2.01.066 dated 15 January 1986.

II. That decision was based on Claims 1-5 filed with letter dated 31 July 1985 on the ground that the subject-matter of Claims 1-3 was not considered to involve an inventive step with respect to the prior art disclosed in the following documents :

D1: IBM Technical Disclosure Bulletin, Vol. 17, No. 3, August 1974, pages 724, 725;
D2: GB-A-1 519 256.

III. The Appellant (Applicant) lodged a Notice of Appeal against this decision on 25 March 1986 and paid the relative fee on the same day. The Statement of Grounds was filed on 26 May 1986.

IV. In two Communications dated 20 July 1988 and 10 April 1989 the Board raised objections against the independent claims which were considered as being too broadly drafted for being sufficiently supported by the description. In the second Communication the Board suggested amendments to the claims, the description and the drawings. In a reply dated 1 August 1989 to the second Communication the Appellant stated his agreement with the arguments of the Board and filed a new set of three claims and amended pages of the description and drawings corresponding to the suggestion made by the Board.

Thus the Appellant requests that a patent be granted on the basis of the following documents:

Description
Pages 1, 5, 7, 8, 10, 11, 16, 19 as originally filed (as published),
Pages 2, 3 , 3A, 4, 6, 9, 12-15, 17, 18 as filed on 10 August 1989 with letter dated 1 August 1989,

Claims
1-3 as filed on 10 August 1989 with letter dated 1 August 1989,

Drawings
Sheets 1/5 to 3/5 as originally filed (as published),
Sheets 4/5 and 5/5 as filed on 10 August 1989 with letter dated 1 August 1989.

The only independent Claim 1 reads as follows:

"1. A method for compensating for systematic errors affecting the apparent width of encoded bars for use in a system for reading and decoding in succession the characters in a bar-coded multicharacter label which may include certain characters which can be unambiguously decoded using one or more bar-space pair measurements and other characters which can be partially decoded using bar-space pair measurements and fully decoded only by use of an additional bar width measurement, in which method whenever the bar-space measurements indicate that a character cannot be fully decoded without the use of a bar width measurement, a correction value is applied to said bar width measurement, characterized in that:

The correction value for the character being decoded is equal to:

$$\frac{(\Sigma TB_{n-1})7}{TR_n} - K_{n-1}$$

where

$\Sigma TBn-1$ is the measured total bar width of the previously decoded character,

TRn is the measured width of the character being decoded, and

Kn-1 is the standard total bar width of the previously decoded character,

in that this correction value is subtracted from the normalized measured bar width of the character being decoded, and in that the measured total bar width ΣTB_n and the standard total bar width K_n of the character being decoded are stored for use in decoding a successive character."

Claims 2 and 3 are dependent upon Claim 1.

V. In the Statement of Grounds the Appellant submits that the invention relates to an improvement over the prior art method for compensating systematic errors described in document D1. He accepts that document D2 describes a bar code discrimination method wherein the previously decoded character is used to decode a character of the bar code. However he considers that the invention is not suggested by D2 because the method of D2 involves an entirely different decoding scheme (standard bit interval for sampling) than the invention (bar width measurement). Thus in the view of the Appellant the method of Claim 1 would represent a patentable improvement of the method described in D1, while the approach followed in D2, consisting in the application of a technique widely used in data communications, could not lead the skilled person to the error correction method as defined in Claim 1.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. **Admissibility of the amendments**

2.1 Present Claim 1 corresponds to the combination of original Claims 2 and 3 with the addition of features taken from the original description page 12, last paragraph to page 15, first paragraph after table 4. Claim 2 derives from original Claim 4. Claim 3 derives from original Claims 5 and 6.

2.2 The description has been amended in view of the amendments made to the claims and to acknowledge the relevant prior art. The other amendments made to the description and drawings relate to the correction of clerical errors or obvious errors in the sense of Rule 88 EPC.

2.3 Thus there are no formal objections under Article 123(2) EPC to the amendments filed, since they are adequately supported by the application documents as originally filed.

2.4 However the Board notes that a clerical error subsists in the last paragraph of page 3. The words "Then the total width of the first character" should apparently be inserted between "first character" and "is divided by" in line 6 of said paragraph in conformity with the suggestion made by the Board in its second Communication.

2.5 The Board also notes that the description fails to mention that the preamble of Claim 1 is based on D1. It is considered necessary, therefore, to insert on page 3 at the end of line 4: "... on which the preamble of Claim 1 is based ...".

2.6 Furthermore, in conformity with the Board's suggestion, in Claim 2 "where" is to be added in line 2 after "label" and "select decimal characters 0, 3, 4, 5, 6, 9 and to" at the end of line 3.

3. **Novelty**

3.1 D1 describes a method for compensating for systematic errors affecting the apparent width of encoded bars for use in a system for reading and decoding in succession the characters in a UPC-type bar-coded multicharacter label. As is generally known an UPC-type label may include certain characters which can be unambiguously decoded using one or more bar-space pair measurements and other characters (1, 7, 2, 8) which can be partially decoded using bar-space pair measurements and fully de-coded only by use of an additional bar width measurement. In the method of D1 whenever the bar-space measurements indicate that a character cannot be fully decoded without the use of a bar width measurement, a correction value is applied to said bar width measurement. The correction value remains constant for all the characters of the label and is equal to (TO/2) - BO, with TO being the width of a bar-space pair in the guard-bar pattern (GB) and BO the width of a bar in the centre-bar pattern (CNTR).

3.2 D2 describes a method for discriminating an UPC-type label in which the characters are decoded in succession and which is said to be free from the influence of printing accuracy. Each character is sampled seven times at regular intervals. For the first character this sampling interval is equal to half the length (T_G) of a bar-space pair of the guard pattern. For the second and further characters the sampling interval is equal to the length (T_1', T_2', etc) of the previously discriminated character divided by seven (see in particular page 2, line 112 to page 3, line 50; Figure 7).

3.3 The subject-matter of independent Claim 1 is thus not disclosed in any of the cited documents and is therefore deemed to be new.

4. Inventive step

4.1 The Board regards D1 as disclosing the prior art closest to the subject-matter of Claim 1. The distinguishing features are specified in the characterising part of the claim.

4.2 By means of the novel features it becomes possible to take into account changes of the systematic error affecting the apparent width of a bar along the length of a label, as happens when an ink shrink condition at one end of a label changes to an ink spread condition at the opposite end of the label (cf. original description page 3, second full paragraph). Thus, with respect to the prior art known from D1, the objective problem which the invention aims to solve appears to be that of obtaining an improved compensation for bar width systematic errors which change along the length of a label.

In the opinion of the Board this problem, which reveals itself when the method of the prior art is put into practice, is obvious to the skilled person.

4.3 D1 does not suggest a solution to the problem identified above.

4.4 According to the decision under appeal it would be known from D2 to use values relating to the previously decoded character for correction operations. The Board has indeed found in D2 that the sampling interval is calculated as a function of the apparent length of the previously decoded character. However the Board has not found in D2 any

suggestion about the compensation of the width of a bar (not the width of a bar-space pair or the width of a whole character). Furthermore, according to D2, the influence of printing accuracy is eliminated by using an average of white (space) and black (bar) modules as reference for the length of a character and by sampling the bar-code at selected sampling times (page 3, lines 18-27 and 33-50). D2 also states that changing the standard bit interval allows to scan labels disposed on curved surfaces such as a can (page 3, lines 27-33). In D2 there is thus no suggestion about how the apparent bar width could be compensated. It must therefore be concluded that the correction operation which is executed in D2 (changing the sampling interval on the basis of the length of the previous character) serves a different purpose than the correction operation which is the subject of the present invention (correcting the width of a bar in a character which allows to compensate for bar width errors which change along the length of a label). Taking into account these differences in purpose and means document D2 cannot be considered as relevant for solving the problem of the invention.

4.5 For these reasons the Board has come to the conclusion that the features specified in the characterising part of Claim 1 are not obvious to the skilled person. Thus Claim 1 is held to be allowable under the terms of Articles 52(1) and 56 EPC.

Claims 2 and 3 are dependent upon Claim 1 and thus are also allowable.

Order

For these reasons, it is decided that:

1. **The decision under appeal is set aside.**

2. **The application is remitted to the first instance with the order to grant a European patent on the basis of the following documents:**

Description
Pages 1, 5, 7, 8, 10, 11, 16, 19 as originally filed (as published),
Pages 2, 3 , 3A, 4, 6, 9, 12-15, 17, 18 as filed on 10 August 1989 with letter dated 1 August 1989, with the words "Then the total width of the first character" being inserted between "first character" and "is divided by" in line 6 of the last paragraph of page 3, and the words "on which the preamble of Claim 1 is based", being inserted at the end of line 4 on page 3.

Claims
1-3 as filed on 10 August 1989 with letter dated 1 August 1989, with the word "where" being inserted on line 2 of Claim 2 between "label" and "first" and the words "select decimal characters 0, 3, 4, 5, 6, 9 and to" being inserted at the end of line 3 of that claim.

Drawings
Sheets 1/5 to 3/5 as originally filed (as published), Sheets 4/5 and 5/5 as filed on 10 August 1989 with letter dated 01 August 1989.

The Registrar: The Chairman:

S. Fabiani P. Ford