Advancements in Vision Sewing Technology

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What is Vision Sewing?

- When we think of the term “vision sewing”, we assume it involves some type of sewing machine with a camera. What is not understood is how the two work together.

- While there is no clear technical definition in the sewn products industry for “Vision Sewing” we can say that vision sewing often involves an industrial camera and a processor with software that is integrated with the machine controller of the industrial sewing machine to perform “complex tasks”.

Forms of Vision Sewing:

- Vision systems integrated with a conventional type sewing machine.
- Vision systems integrated with a electronic programmable sewing machine.
Vision Sewing

Software Automation has developed vision sewing systems that are designed to perform complex tasks in the control, feeding, and orientation of material during the sewing process.

Typical has developed a vision sewing system capable of automated sewing, by tracking the movement of material with intelligent cameras and controlling the movement of the material under the needle on a stitch by stitch basis.
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Vision Sewing

A vision sewing system that is integrated with an electronic programmable sewing machine.
Electronic Programmable Pattern Sewing Machine

An electronic programmable sewing machine is commonly referred to as Sewing machine equipped with a work holder to hold the workpiece and moves it moves the workpiece around a pre-programmed sewing path or pattern.

Basic Elements:
- Pulse motors (stepper or servo) for movement of the work holder clamp in the X-axis and Y-axis.
- Processor to control the operation and movement of the stepper or servo motors as determined by the pre-programmed sewing pattern.
- A programming means to create the desired sewing pattern(s)
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Basic elements of the Electronic Programmable Pattern Sewing Machine

With advanced processors and servo motion control, high-precision pattern stitching is possible during sewing. Sewing Speeds up to 2,800+ SPM can easily be achieved.

Movement is resolved at 0.05mm per pulse making slanted stitch lines and curves more accurately sewn.
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Electronic Programmable Pattern Sewing Machine

Sewing Pattern Creation

Virtually all sewing patterns for electronic programmable sewing machines are created using some form of a teach pendant device or off line using a PC equipped with pattern programming software.
Programmable Pattern Sewing Machine use

Products & industries where programmable machines are most commonly used:

- Shoes, Footwear, leather handbags, luggage, fashion leather goods

- Automotive airbags, automotive seat belts, aircraft seat belts

- Safety harness, fall protection, cargo nets, cargo straps / slings

- Military apparel, vests, chin straps, ammo packs, mollies,

- Ball caps, athletic apparel, jeans,

- Used in the manufacturing of a wide array of industries, products, and applications
**Vision Sewing System**

A Vision system integrated with an electronic programmable sewing machine that “creates” the sewing program based on the object being sewn.
Vision Sewing System

A vision sewing system has been developed which is integrated with a programmable Sewing machine that employs an industrial PC with software, custom camera, and lighting, to “automatically” create a stitch pattern around the perimeter of a regular or irregular shaped object (patch, label, applique, etc.) within the sewing area of the machine.
Vision Sewing System

The Vision camera views the image within the machine sew area (field of view)
**Vision Sewing System**

*Use / Function:*

The vision sewing system is designed for use to attach items such as labels, patches, appliques of any shape to various fabrics or garments.
Vision Sewing System

How does it work?

The vision sewing system creates the sewing pattern of the image in the machine sewing area by comparing the color of the image border to the color of the background fabric or garment.
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Vision Sewing System

Steps to Create the Sewing Pattern

Operation of the vision sewing system is quite simple and easy to operate and requires **No sewing skill**.

1. Place the garment or fabric into the machine work clamp.
   The patch or applique can be set to the garment or fabric prior to loading.

2. Press the foot switch or external switch
   This signals the vision system to process the image and transfer it to the sewing machine.

3. Press the foot switch or external switch to begin the sewing cycle.
   The sew cycle is performed attaching the patch or applique to the garment or fabric.
Vision Sewing System

Pattern Time / Sewing Speed

Pattern Generation Time:
The time required to generate the patch image, create the sewing pattern, and transfer it to the electronic programmable sewing machine is typically 3 seconds or less. The time will vary depending the quantity of stitches of the sewing pattern program generated.

Sewing Speed:
The programmable sewing machine can sew at speeds up to 2,800 stitches per minute. However, the speed at which the machine can be operated is dependent on the product being sewn and the thread being used. Typical zig zag stitch type sewing applications are sewn at speeds of 1400 to 1800 stitches per minute.
Vision Sewing System

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Video Demonstration #1
Video Demonstration #2
Vision Sewing System

How is the Patch Held to the Garment or Fabric?

Many patch’s, applique’s, letter(s), number(s), can be purchased with an adhesive backing already applied. Other methods for adhesives/applicators include tapes, dots, and spray adhesives can be used.
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Typical Work Clamps?

The type of work clamp used is dependent on the application. Certain standard work clamps are available. Often custom work clamps can be created specifically for the application.
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Typical Work Clamps?

Typical work clamp used for sewing in sleeve openings and shoulder areas. Custom work clamps can be created specifically for the application.
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Vision Sewing System

Applicable Stitch Types

Stitch types such as straight or zig zag can easily be selected

Straight Stitch:
- Stitch pitch / length (0.1 mm increments)
- Over sew stitches (up to 10)

Zig Zag Stitch:
- “V” or “N” type
- Stitch pitch / length (0.1 mm increments)
- Stitch width (up to 12mm, 0.1 increments)
- Over sew stitches (up to 10)
- Zig Zag points (2 to 9 points per stitch)
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Other Stitch Parameters

Stitch types such as straight or zig zag can easily be selected

Offset:
- Stitch line offset +/- 10mm (0.1 increments)
  - Offset allows the stitch margin to be positioned +/ to the edge and can be used to sew multiple stitch rows on multi layered letters, numbers, etc.

Pattern Starting Point:
- The starting point of the stitch pattern can easily be selected within 8 different locations around the perimeter of the patch or shape
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Patch location / Orientation

With the vision sewing system technology, the location or orientation of the patch within the machine sew area is of no concern. The vision system simply finds the patch within the machine sewing area and creates the sewing pattern based on the perimeter of the patch.

- A sewing pattern is created for each time an item is presented to the machine for sewing for each sewing operation.
- Irregular shaped patches or “inconsistently” shaped patches, labels, etc. are no longer a concern.
- Complex patch shapes are easily sewn
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Size Limitations

Maximum:
The largest size patch, letter, or applique that can be sewn is limited only by the sewing area of the machine. The current maximum machine sew area is 300mm x 200mm

Minimum:
The smallest size patch, letter, or applique that can be detected and sewn is an area of 50mm
This means a patch having an area of 5mm x 10mm can be detected and sewn.
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Sewing Multiple Patches in a Single Operation

The vision sewing system is capable of sewing multiple patches such as letters or numbers in one operation as long as they fit within the machine sew area.
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Sewing Multiple Patches That Exceed the Machine Sew Area

The vision sewing system will only recognize those patches that fit within the sew area of the machine and create the sewing patterns accordingly. Those patches that are not completely in the machine sew area are ignored.

In the example below, the name SENIOR is sewn in two operations. In the first operation, the system will only sew the S-E-N-I. The “O” is ignored as it is not completely in the sew area. In the second operation, the O-R is then sewn (the I is ignored as its not in completely in the machine sew area.)
**Vision Sewing System**

*Multi Layered Patch Sewing*

Letters or numbers having multiple layers with a consistent margin can be sewn. Each individual layer must be sewn as a single operation. The use of the “offset” feature allows you to set the stitch parameters for each layer.
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Patch Types

Most any patch type can be sewn that has a consistent border color. Items such as embroidered or printed patches, labels, appliques, letters, and numbers are easily sewn with the vision sewing system.

Common Shapes:

Irregular Shapes:

Complex Shapes:

Letters / Numbers:
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Fabric Colors

Most any fabric color can be sewn. In some applications, fabric’s having pin stripes or limited pattern background can be used.
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Applications - Uses

Work Wear Uniforms:
Police, Fire, Parks & Recreation, Postal, Security, etc.

Athletic / Fan Apparel:
Jersey’s, Shirts, Jackets, Towels, Totes, etc.
Schools, Institutions, Clubs / Organizations

Fashion Apparel:
Jackets, Shirts, Jeans, Handbags

Home Décor:
Appliques for Bath / Hand Towels, Decorative Pillows, place mats, window coverings
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Vision Sewing System

Key Benefits!

- **NO** operator sewing skill is required
- Consistent sewing speed is realized for multiple patch sewing
- Many multi layered letters / numbers are sewn automatically
- Inconsistent or irregular patch shapes are sewn with ease
- Complex patch shapes are sewn with ease
- Inconsistent patch placement or orientation is of no concern
- Improved handling (Less handling of the garment or fabric)
- In many cases, one operator can operate multiple machines
- Straight or zig zag stitching can easily be sewn
Thank you