Human-interactive Annealing Process with Pictogram for Extracting New Scenarios for Patent Technology

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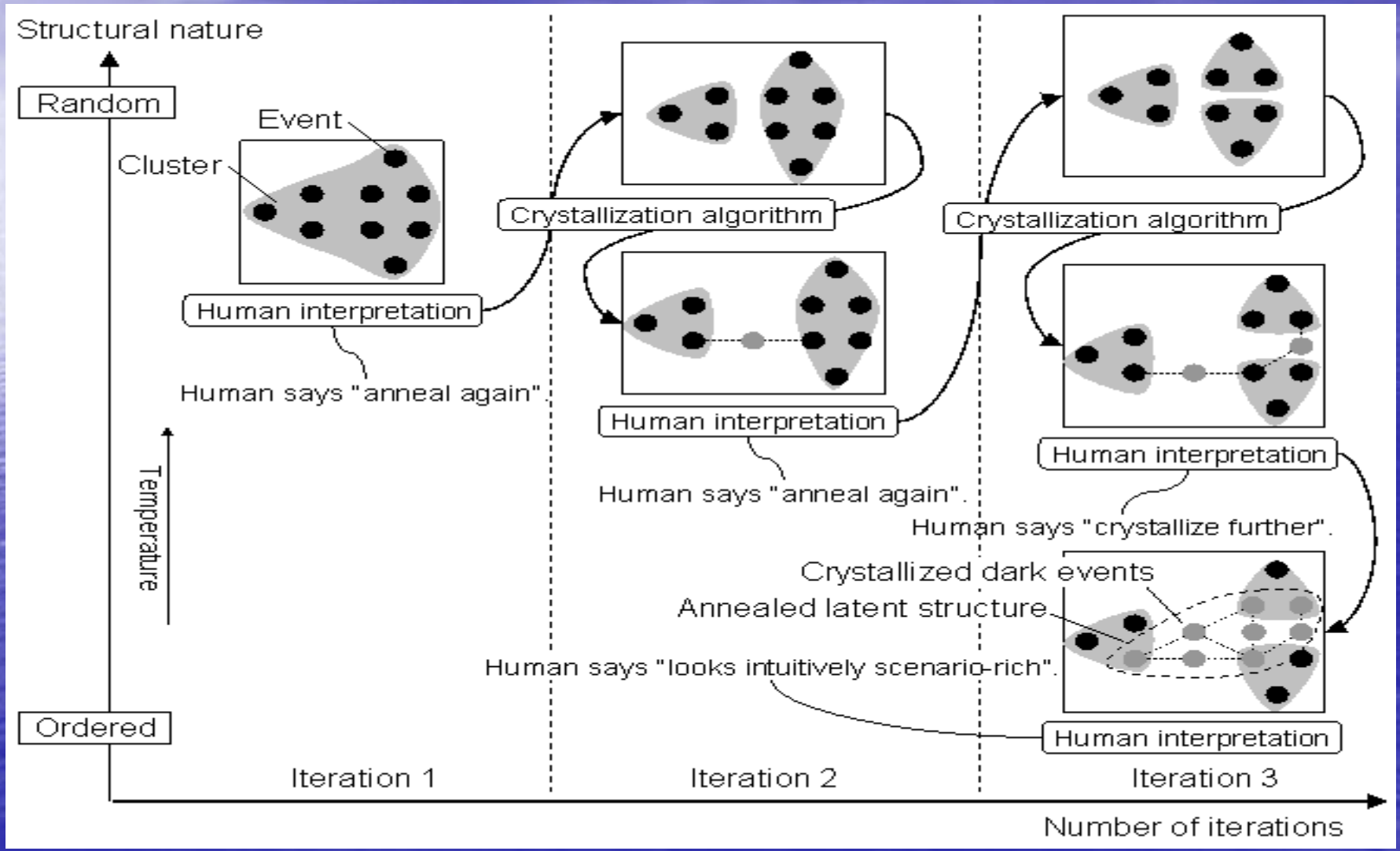
Introduction

- In *a Chance discovery,* it is newly recognized that latent structure behind observation often plays an important role in the dynamics of visible events.
- The latent structure is composed of invisible events named as *dark events* and can be visualized by a breaking-through method, *Data crystallization,* where dummy nodes may potentially correspond to them.
- In addition, a new method, *human-interactive annealing* is developed to reveal the latent structure along with a simplified stable crystallization algorithm.

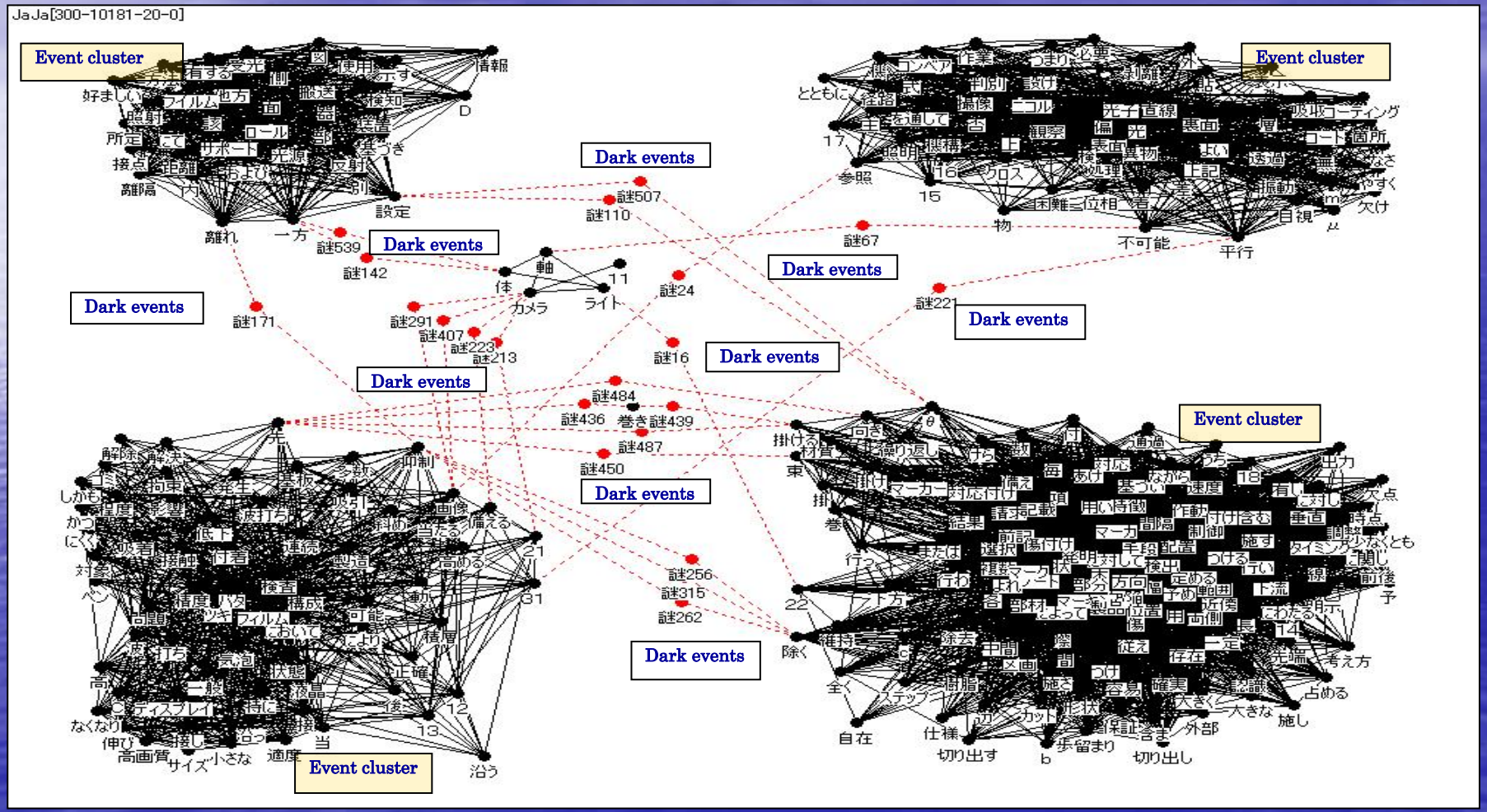
Purposes

1. Development of a new process for designing new products from patents with *Human-interactive annealing* and *Data crystallization.*
2. Propose New method of *Pictogram* to aid human understanding a visible latent structure of patent by *Human-interactive annealing* and *Data crystallization* and to emerge new scenarios for new products.

Human-interactive annealing and *Data Crystallizations*



Application of *Human-interactive annealing* and *Data Crystallization* to patents



Preliminary study for 6 patents of “CCD Inspection” and “Marking system”

Result & Tasks of Preliminary study

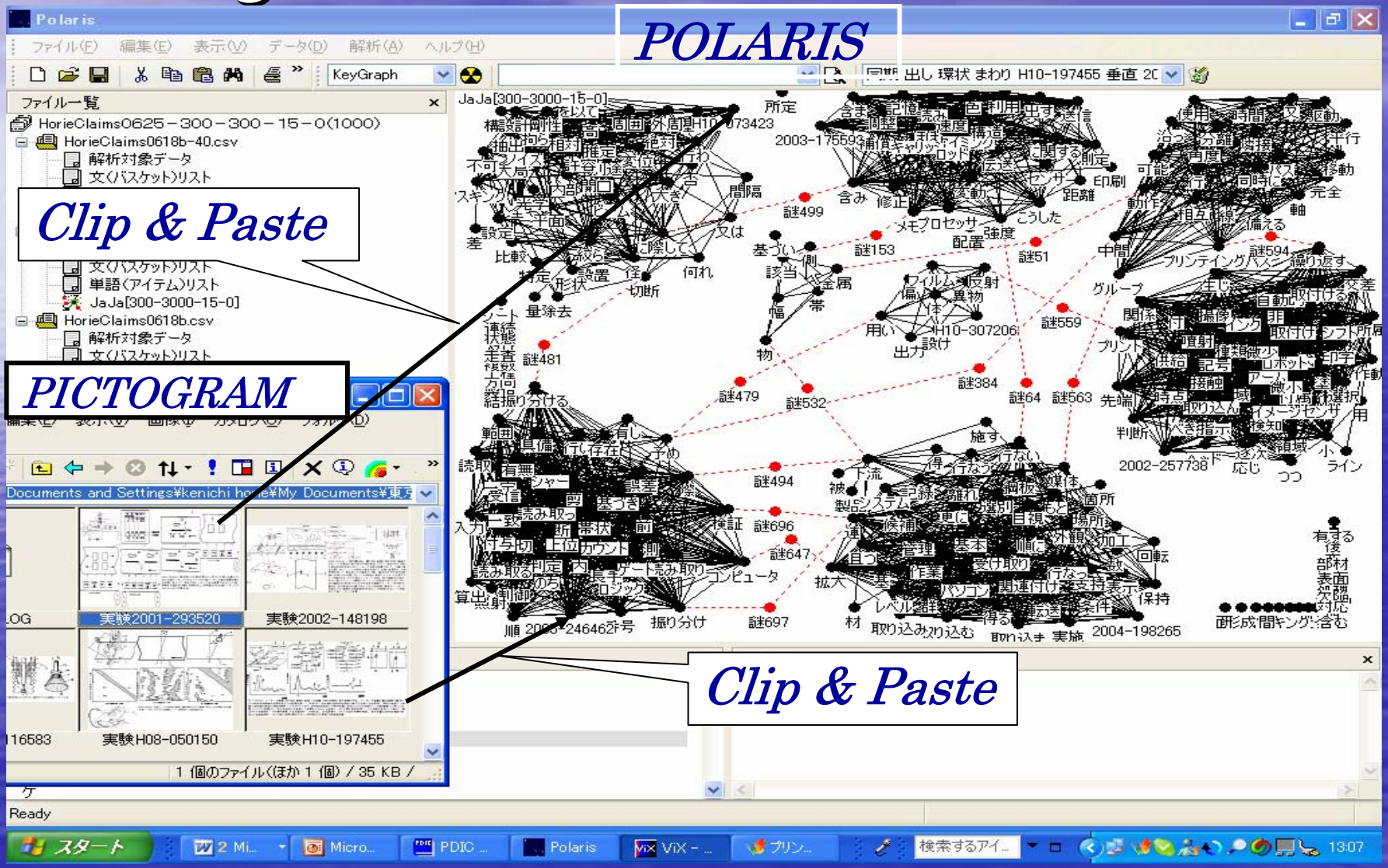
Result " Only one engineer out of 6 examinees can interpret each clusters of event map but nobody can create new scenarios from dummy nodes."

1. Difficult to find the relation among many words in each cluster.
2. Hard to read words with low contrast caused by many black links behind words.
3. Difficult to predict imagine suitable words to corresponding dark events.

Countermeasures of Tasks

1. Add patent number in each claims as tags and prepare *Pictograms* of each patent number, which contain charts, drawings and all claims and dark event number.
2. Change the presentation timing of *Pictogram* to examinees.
   -Show the *Pictogram* of patent numbers for the reinterpretation after interpreting each cluster and creating scenarios.
   -Next, show other *Pictogram* of dark events when new scenarios are about to considered.
3. Instruct examinees to give their prior attention to a aggregated dark events between clusters.

Pictogram


POLARIS
Clip & Paste
PICTOGRAM
Clip & Paste
Polaris
ファイル(F) 編集(E) 表示(V) データ(D) 解析(A) ヘルプ(H)
KeyGraph
ファイル一覧
HorieClaims0625－300－300－15－0(1000)
HorieClaims0618b-40.csv
解析対象データ
文(バスケット)リスト
単語(アイテム)リスト
JaJa[300-3000-15-0]
HorieClaims0618b.csv
解析対象データ
文(バスケット)リスト
Documents and Settings¥kenichi ho...¥My Documents¥東京
実験2001-293520
実験2002-148198
実験H08-050150
実験H10-197455
1 個のファイル(ほか 1 個) / 35 KB /
Ready
スタート
Polaris
検索するアイ...
13:07

Process for designing new products scenarios

Step1: Create the event map by KeyGraph after processing patents with *human-interactive annealing* and *data crystallization* and show it examinees.

Step2: Instruct them to interpret the event of each cluster and write the title of them on each clusters through group discussion.

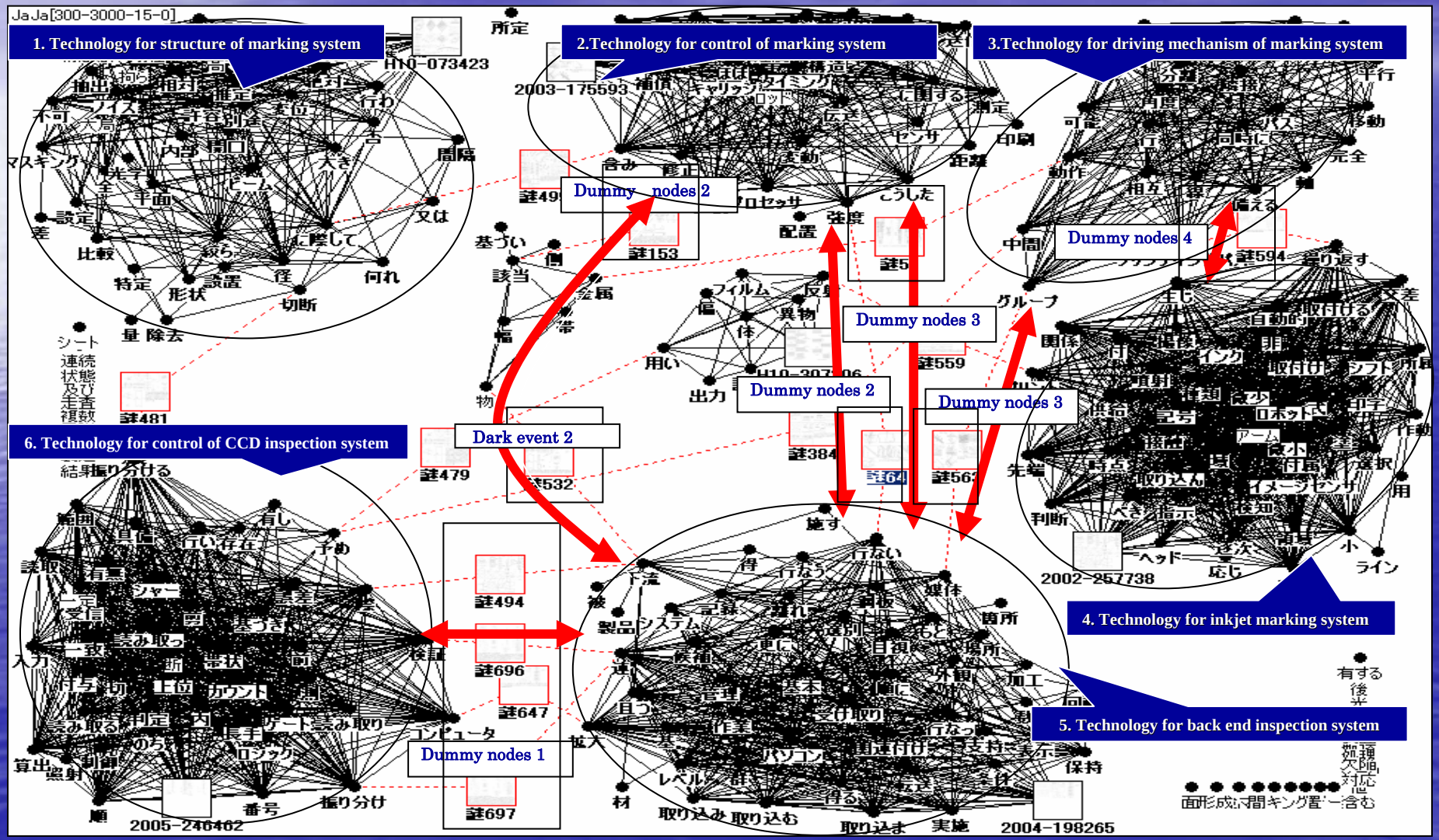
Step3: Instruct them to create scenarios in each cluster through group discussion.

Step4: Show them *Pictogram* pasting to the corresponding patent numbers and have them reinterpret the cluster referring to them , when the group discussion starts standing still.

Step5: Show them other *Pictogram* pasting to the corresponding dark event numbers and instruct them to pay their prior attention to aggregated dark events between clusters.

Step6: Select new scenarios which can be agreed by all of them and evaluate them in feasible and novel view points by full 10 points.

Application of *Data crystallization with Pictogram* for 106 patents



New Scenarios for new products

Scenario	Aggregated Dark events	Scenario
1	494, 647, 696, 697	*Marking system which is available to mark around zonal defects by using logic which divide position of the defects into segments and transmit the information to the marking processor in case they are appeared over the range between sensor and mark*
2	64, 153, 532	*System which identify defects of a product with marking and detect the mark after cutting at back end so as to increase the efficiency of visual inspection.*
3		*Barcode management which make visual inspection effectively with barcode at back end by processing the information about the position and classifications of defects with it and marking it near by defects.*
4	51, 563, 532	*Marking system with multiple heads on multiple axes towards traveling direction, which is prevented from missing to mark around Defects*
5		*Mark the information of defects of each segment after dividing into segments on the surface of film in roll.*
6	594	*Adhere thermal cured resin around defects on the surface of film and change the color of it with laser or thermal element for marking resin.*

Evaluation of scenarios

	No. of scenarios	1	2	3	4	5	6
Feasibility of development	Manager	10	3	10	10	10	5
	Engineer1	10	2	10	10	10	3
	Engineer2	8	2	10	10	10	1
	Sales1	10	2	10	10	10	4
	Sales2	9	8	10	8	10	7
	Total	**47**	**17**	**50**	**48**	**50**	**20**
Feasibility of Marketing	Manager	4	6	5	7	5	9
	Engineer1	3	5	4	8	5	9
	Engineer2	4	7	4	8	5	8
	Sales1	3	7	6	6	6	10
	Sales2	3	8	4	7	4	10
	Total	**17**	**33**	**23**	**36**	**25**	**46**
Novelty	Manager	6	4	3	7	2	3
	Engineer1	5	4	2	4	1	10
	Engineer2	2	4	1	5	1	2
	Sales1	2	5	2	5	1	5
	Sales2	3	2	1	3	2	2
	Total	**18**	**19**	**9**	**24**	**7**	**22**
Grand Total		**82**	**69**	**82**	**108**	**82**	**88**

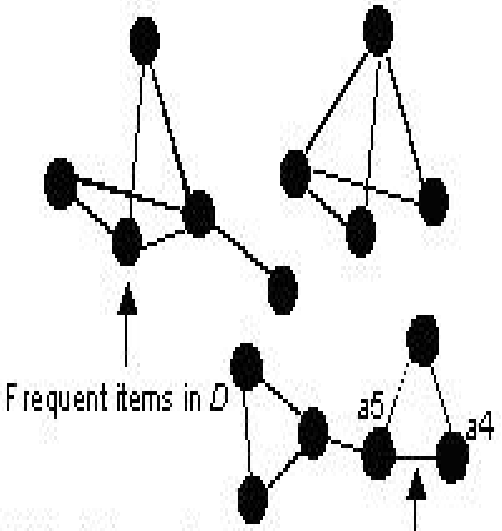
Conclusion

- 6 latent structure of 106 patents are heuristically acquired by *Human-interactive annealing* and clearly visualized by *Data Crystallization*
- *Pictogram* aided examinees to identify the technology contents of each clusters and to emerge new scenarios for new products from dummy nodes.
- Our new process aided making a decision to design new products by creating novel and feasible scenarios.

1. "*Adhere thermal cured resin around defects on the surface of film and change the color of it with laser or thermal element for marking resin.*"
2. " *Make multiple marking ink jet heads against travel direction of works to improve slippage loss of defects inspection.*"

Procedures of *KeyGraph*

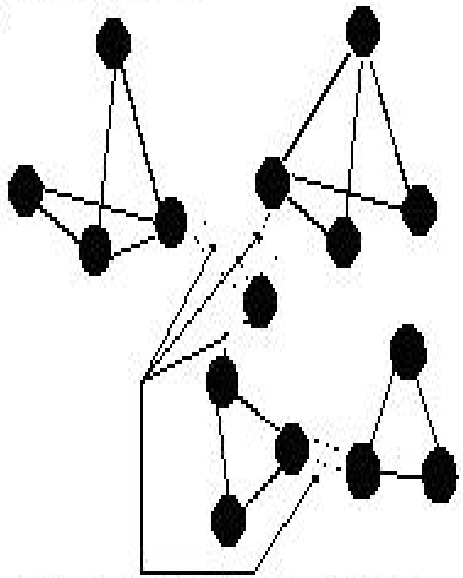
(1) Obtain the co-occurrence network



Links between item pairs, co-occurring frequently in *D*.

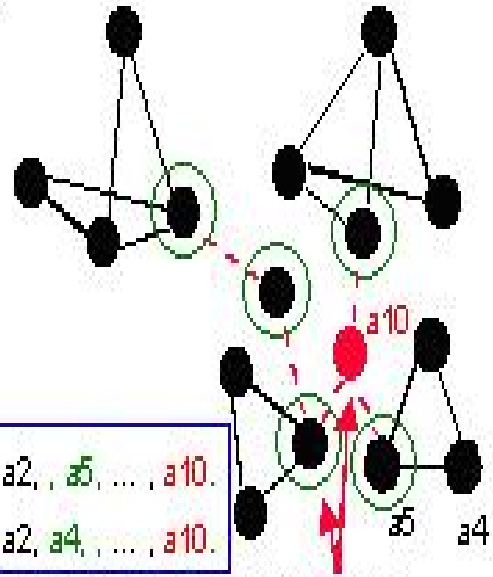
Target data *D*: a1, a2, a4, a5 ... .
a4, a5, a3, ...
a1, a2, a5, ...
... a4, a5 .
... .

(2) Obtain islands



Separate into fundamental clusters, i.e., islands.

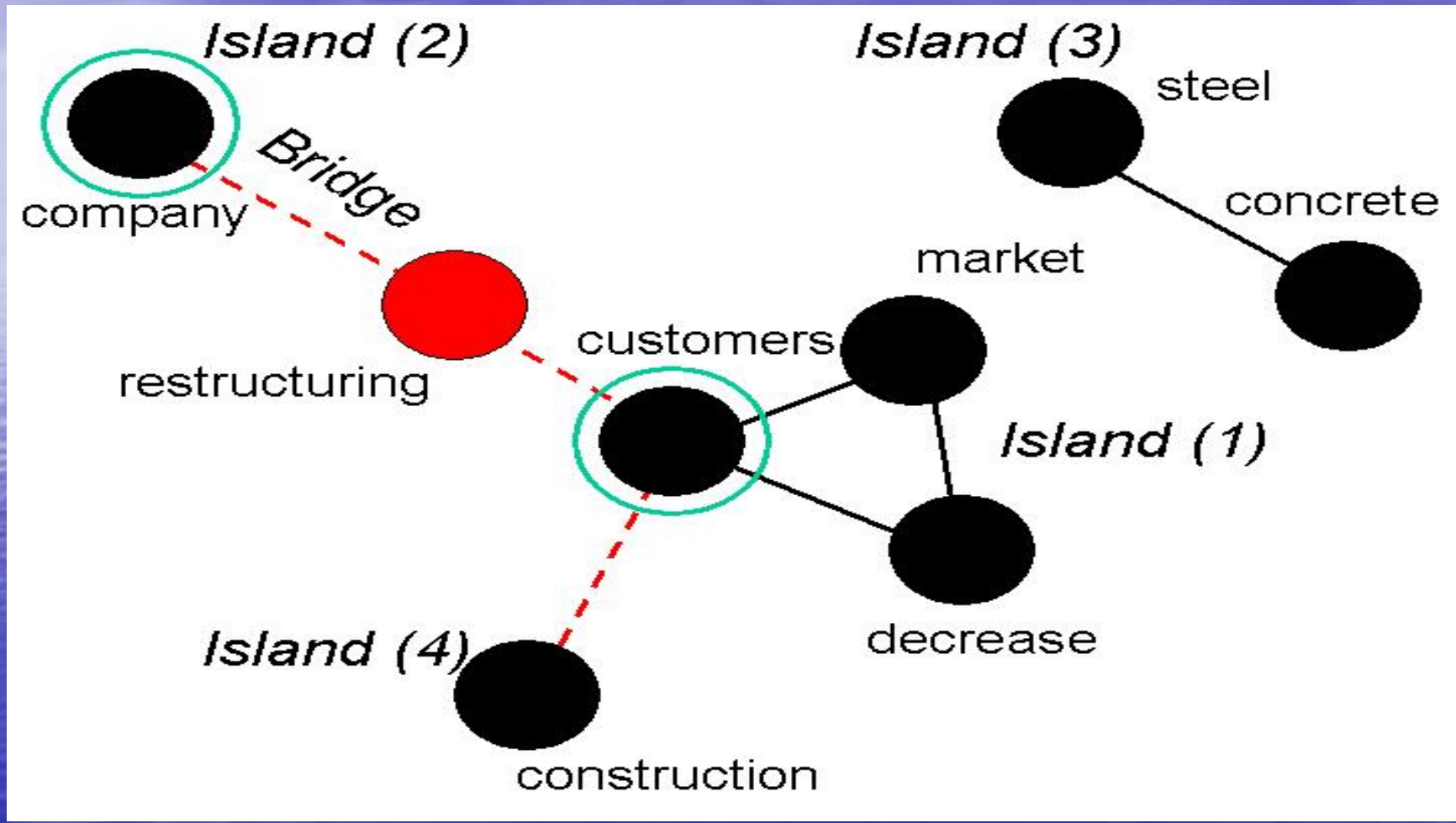
(3) Obtain bridges, on which chances may exist



a1, a2, , a5, ... , a10.
a1, a2, a4, , ... , a10.

Obtain significant items, touching many node-cluster (green nodes) bridges of frequent co-occurrence. If the node is rarer than black nodes, it is a new node put as a red one.

Scenario Map of *KeyGraph*



＊Scenario Map：Visualized textual dataset by *KeyGraph*

Background

- Patent comes to be more important role in business enterprises as tangible assets.
- Patent should be applied strategically not only for intellectual property but also for new products design to satisfy customer.