

# 经典常用例句

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## 说 明

1. “经典常用例句”在其注释中包含“经典短语、经典搭配”等；
2. 这些例句均摘自“美国（或英国）原版外文材料（论文或图书）”，完全值得信赖和模仿。

## 常用动词

### 一、中性词

#### 1. （文章等）给出、研究、建立、提出、提供

- (1) To establish (1), it suffices to show that
- (2) The main results in this paper are the following theorems and corollaries.
- (3) The main theorem in this paper is presented in the following (next) section.
- (4) The main stream in the research for nonlinear control systems is based on the state space representation.
- (5) Our own contribution lies in the design of an algorithm that derives a canonical realization.
- (6) In this paper the author's experience in applying intelligent control in the process industries is discussed.
- (7) The second broad technique considered involves (涉及) model predictive control.
- (8) These results have been jointly established with Liu and Zheng.

#### 2. 由...得到、得出、得到（结论等）

- (1) As a simple corollary of our analysis, we obtain that right invertibility in the sense of Nijmerjer is the same as in that of Fliess.

Note: as the same as; the same as

- (2) Following the steps outlined in section II we find that...
- (3) We conclude this section by introducing some notations and definitions.
- (4) Using the generalized notion of controlled invariance, a condition for the controlled invariance was derived.
- (5) The results when compared with available diagnostic tools show that significant benefits can be derived from the actual application of this technique.
- (6) However, we are primarily interested in how (连词) these algorithms perform on data

*obtained from* chemical sensor arrays.

(7) Because one of the sensors in the array did not respond at high humidities, it was removed, resulting in a three-dimensional pattern vector.

Note1: *resulting in* sth1: 现在分词作“目的状语”，译为“从而得到（获得），因而得到，从而导致，这样便得到”

Note2: *at high humidity*

### 3. 集中、侧重、强调、注重、聚焦、着重、投精力于

(1) Theorem 1 focuses on the application of the essential orders to the decoupling problem.

(2) Current research have thus been focused on the application of such advanced techniques as artificial neural networks (ANN), genetic algorithms (GA), expert systems and fuzzy logics to engine diagnostic problems.

Note1: 正如“动名词”具有“名词性质”一样，名词同样具有“动词性质”（可以完成动词的任务），如此处的“*application of sth1 to sth2*”。还有，“*generalization of sth1 to sth2*”等等。

Note2: *focus on sth*; *focus sth1 on sth2*.

(3) In this paper, we review the need for engine diagnostics and maintenance, present some aspects of the ANN application to diagnostic problems, highlight some features of ANN that make it amenable to GT diagnostics as well as its limitations and finally discuss its application to gas path fault diagnosis of a developed case study.

(4) The focus of the paper is on techniques that have proven beneficial in the process industries.

Note: *focus on*; *prove + adj.*

(5) This paper has been devoted to the generalization of the notion of essential orders to the class of nonlinear affine systems.

Note1: *be devoted to sth1* : 致力于;

Note2: *generalization of sth1 to sth2*.

### 4. 用、使用、应用、采用、采取

(1) Methods utilizing multivariate statistical techniques are presented, with applications to soft sensing and fault detection.

(2) Gas turbines are used for aero and marine propulsion, power generation and as mechanical drives for a wide range of industrial applications.

Note: *a wide range of industrial applications*

(3) Gas turbines are mechanical devices operating on a thermodynamic cycle with (用) air as the working fluid.

Note: “介词”可以完成“动词”的任务，如此处的“*with* (用)”

(4) Current research have thus been focused on the application of such advanced techniques as artificial neural networks (ANN), genetic algorithms (GA), expert systems and fuzzy logics to engine diagnostic problems.

(5) This network was designed to assess the amount of DCF present in the compressor and compressor turbine.

Note: *be designed to do*:

(6) Coupling pattern recognition algorithms and arrays of partially selective sensors has been employed successfully for gas oxide sensors.

(7) *For application of* the chemical sensor system to field measurements, the pattern recognition algorithm must *accurately* classify new sensor signals.

Note: “名词”动词化: 名词具有动词的属性, 如: application of sth1 to sth2.

For application of sth1 to sth2: 为了将 sth1 应用于 sth2.

(8) The classification rules used by the pattern recognition algorithm must be learned quickly.

Note: sth1 used by sth2: sth2 所用到的 sth1.

(9) Four data sets representing typical chemical sensor data were employed *in* this research.

(10) To help explain some of the results from this study, principal components analysis (PCA) was employed to visualize the pattern spaces.

(11) Use of the pooled covariance matrix implies that the covariance (sometimes called variance-covariance) matrices for each class are *not significantly* different.

(12) The usual way to join parallel structures *is with the use of* coordinating conjunctions such as "and" or "or."

Note1: the way to do sth: 做(实现)...的方法/途径

Note2: be with the use of: 是采用/使用/应用...

For example:

The most convenient way to access your money from a home bank in the US is with the use of an Automated Teller Machine (ATM) card.

The problem I have is with the use of computer technology in primary and secondary schools.

## 5. 构造、形成、构成、由...构成、由...组成

(1) CLASS1 data set comprised representations from all the possible fault scenarios.

Note: comprise = consist of = be composed of

(2) Chemical fingerprints for the target analyte(s) will form clusters in *m*-dimensional space (where *m* is the number of sensors in the array).

(3) The final data set (SAW2) *consists of* 664 pattern vectors obtained from SAW data collected using a six sensor array with a preconcentrator sampling system.

Note: “定语的定语的定语”

## 6. 覆盖、包括

(1) Generating data to cover all the possible fault scenarios as well as the required operating conditions defined by the power setting parameter and ambient conditions.

(2) Further study of this anomaly indicated that this result *was due to* the fact that the training and prediction subsets do not cover *the same* data space exactly.

Note1: be due to: 由于, 因为, 归功于, 归因于

Note2: 同位语从句 (that)

Note3: the same sth1

Note4: cover: 覆盖、包括、包含

## 7. 包含、包括、涉及

(1) It contains a rich amount of structural information about the system.

Note: a rich amount of = a great amount of = a large amount of, a large number of

(2) The procedures adopted include the following steps:

(3) CLASS1 data set comprised representations from all the possible fault scenarios.



Note: 此处的 “comprise” 应为 “由...组成”。

- (4) The ANN module involved in estimating the fault in this component is APP1 (see Fig. 5).

Note: be involved in n./doing: 涉及、专心于、用于、司职于

- (5) The ANN structure described above *forms* a part of the diagnostic tool that includes other aspects involved in parameter corrections as well as aspects that provide linguistic information on the nature and type of fault *since* ANN only gives qualitative and quantitative results without any explanation for them.

Note: form 的用法

- (6) Some of these vapors (DMMP, GD, VX, and HD) were also included in SAW1.

- (7) The SAW1 data set *contained* pattern vectors for three classes of vapor data.

Note: differentiate “contain, hold; comprise, consist of, include, involve”:

contain and hold:

Sth1 contain (or hold) sth2: 通常来说, sth2 并不是 sth1 的组成部分; 另外, hold 指 “容纳、包含、包括” 的能力, 而 contain 指的是一种客观存在的事实, 如: The pitcher holds two pints but contains only one. (这个罐子可装两品脱, 但现在只装了一品脱。)

comprise, consist of, include, and involve:

sth1 comprise / consist of / include / involve sth2: sth2 是 (作为) sth1 的组成部分; 另外, comprise = consist of 并且指的是: 全部包含进去, 所包含的内容已 “全部” 列出, 而 include 和 involve 通常指的是: 只列出了所包含内容的 “一部分”, 并且在通常情况下, 所列出的这一部分并不是所包含的内容的主体, 而是作为 “附属品”; 最后, 需要指出的是 “involve” 通常指的是 “包含不利的 (不好的) 事物”, 译为 “涉及, 牵连, 牵涉, 拖累, 卷入, 使复杂” 等。

- (8) The SIM1 data set featured six data classes that *were slightly overlapped* as seen in Fig. 1.

Note1: feature: 作动词时: 展示、展现、刻画; 由...主演; 以...为卖点; 以...为特色; 另外, 最重要的是: 它有 “包含” 的意思, 而被包含的通常是具有 “特征、特色及代表性” 的 “东西” (宾语), 此例句中就是这个意思。

Note2: slight; slightly = somewhat

Note3: as seen in Fig.1 = as shown in Fig.1

- (9) The SAW2 data set included seven data classes, several of which featured highly overlapping clusters.

Note1: several of which: 定语从句的用法

- (10) PNN *features* the fastest training, but has the highest computational requirements for prediction.

Note1: have requirements for

## 8. 认为、发现、观察

- (1) BP-ANN is considered the slowest and most difficult *to train* among the algorithms studied.

Note: consider sth1: 考虑...; consider sth1 sth2: 认为 sth1 是 (或具有) sth2, 把 sth1 看作是 sth2, 相当于 “regard (sth1) as (sth2)” .

- (2) Thus, the prediction classification performance *for* BLDA can be considered inflated.

- (3) The configuration settings that resulted in the best classification performances *on* the training and monitoring subset *data* were considered *optimal*.

Note1: configuration (配置)与 settings (设置)不同。

Note2: on data

Note3: consider sth1 + adj. : 认为...怎么样, 类似于 “find / make sth1 + adj.”。

(4) For SIMCA, models based on two principal components for each class *were found to be* the best configuration for each data set.

Note: be found to do (be) sth1 / adj. : 被发现..., 被认为...

(5) In this work, ten iterations *were found to be sufficient to* achieve convergence.

Note: be sufficient to do sth1

(6) The optimal kernel widths for the four data sets in this study *were found to be* 0.0358, 0.0678, 0.0138, and 0.0062 for SIM1, SIM2, SAW1, and SAW2, *respectively*.

(7) For the four data sets in this study, 120, 120, 25, and 25 hidden units for SIM1, SIM2, SAW1, and SAW2, *respectively*, were found to be optimal.

(8) It was observed that the BP-ANN training was easily trapped in local minima, thus *requiring that* the training runs for each configuration be repeated *10 times* to increase the probability of convergence.

Note1: be trapped = get stuck: 只是 “get stuck” 通常用于 “否定句” 中

Note2: 10 times: 表示 “补语”, 前面不加介词, 如 “for” 等。

Note3: require + 从句: 需要用虚拟语气, (should) do

Note4: increase the probability of convergence

(9) New study finds mammograms have benefits in fighting cancer.

Note1: 宾语从句后面的 “that” 可以省略

Note2: sth1 have benefits in doing sth2

## 9. 基于、建立在...基础上

(1) The MLDA algorithm employed in this work is based on the Mahalanobis distance metric.

Note: sth1 be based on sth2

(2) The assignment of class membership for new patterns is based on the side of the discriminant in which the pattern vector lies.

## 10. 在于

(1) In general, the key to solving a decoupling problem lies in modifying the system's relative degrees and/or structure at infinity in order to achieve equality between these two lists of integers.

Note1: in general; in practice; in application; in principle; in operation; in effect; in condition; in essence; in detail; in depth; in fact; in theory;

Note2: lie in + 名词 (or doing) : 在于

(2) Our own contribution lies in the design of an algorithm that derives a canonical realization.

## 11. 放、置于

(1) Since multiple concentrations were available for each vapor, the pattern vectors obtained from SAW data collected from an exposure to amid-level concentration of each vapor were placed in the prediction subset. The remaining pattern vectors were placed in the training subset.

Note1: be available for sth1

Note2: exposure to sth1

(2) Each probability density function (PDF) is estimated by placing a Gaussian-shaped kernel at the location of each pattern in the training set.

Note: place sth1 at the location of sth2

## 12.影响

(1) Often, they are affected by gas path faults which have hitherto been diagnosed by techniques such as fault matrixes, fault trees and gas path analysis (GPA).

Note: affect: 影响, 通常指不利影响。

(2) Normally, costs associated with the design and manufacture of the engine are fixed and rarely influenced by the users.

Note1: associated with: 与...有关的

(3) However, when the turbines are removed from operation due to forced outages, the downtime incurred depends on the time required to complete the necessary repair or maintenance action, hence affecting its availability.

(4) Gas path faults can occur during the operation of a gas turbine and because they affect performance, it is necessary that they should be diagnosed and corrected.

(5) This is because when one or both components included in the DCF are lightly affected by fault, the fault pattern becomes basically similar to that of a SCF and is classified as such.

(6) If both components in the DCF are heavily affected by fault, the pattern created becomes very similar to that of a MCF and is thus classified as such.

## 13.考虑、考虑到

(1) If we take into account also the (1) (倒装), we see that .....

(2) In view of the changes in world economy towards globalization and openness of the market, any efforts that can reduce the total cost of ownership and life-cycle cost of the equipment will be added advantages.

Note: in view of = in consideration of = take into account: 考虑到, 鉴于

(3) It necessary to note that the engine under consideration has four basic components—one compressor, one combustor and two turbines.

(4) Considering the level and complexity of the faults being diagnosed, especially with the level of noise added, this degree of accuracy is satisfactory even in actual applications.

(5) After consideration of the qualitative features of an ideal pattern recognition algorithm, LVQ still rates very highly.

Note1: after consideration of sth1

Note2: rate very highly: 具有在很高的等级。rate 名词时: 等同于 “level of quality”, 质量的等级标准; 不及物动词时: 在某等级; 及物动词时: 估价, 认为, 鉴定等级

(6) We must *allow for* his inexperience. It takes about two hours to get to their office building, *allowing for possible* traffic delays.

Note1: allow for: 考虑到, 体谅

Note2: it takes sb1 sometime to do sth1

## 14.回到、追溯、回归、回顾

(1) We now come back to (=return to) the original problem of the study of the smallest distribution.

(2) It should be recalled that approximation networks are created to quantify the amount of changes in independent variables.

## 15.寻求、打算

(1) In the present analysis, we seek to develop a methodology for fault diagnostics of the gas path of a two-shaft gas turbine.

## 16.确定、决定、作决定

(1) We should determine the sensors to be monitored.

(2) This can be done by making use of the sensor information available for the given engine or applying such techniques as gas path analysis to determine the optimum combinations that would be effective to diagnose the desired faults.

(3) This method of determining *when* to stop training is sometimes referred to as Train-and-Test [15].

Note1: determine when to do sth1: 此处“when”是名词（或代词）：什么时候

Note2: be referred to as: 被称为...

(4) The criteria used to make this decision for each data set will be discussed in the following sections.

Note1: make this decision: 作决定

Note2: in the following section

## 17.刻画、描述、表述、描绘、叙述、陈述

(1) Under certain conditions, the algorithm characterizes the input space on which the input-output map is injective.

## 18.指示、显示、表明、指出、指明、标明

(1) The classification accuracy of CLASS1 is very high which indicates the networks ability to adequately distinguish between a faulty and non-faulty engine.

(2) Thus, the percentage deviation between input to this network and its output provides an indication of the amount of bias or even noise present in each of the sensors.

(3) The MSE from the training and testing process in the presence of measurement noise indicates the high estimation quality of the networks for the faults being diagnosed.

(4) The MSE errors, both for training and testing of the network here again, indicate a very high level of prediction accuracy.

(5) However, the prediction classification results indicated that BLDA performed the best.

Note1: the results indicate that

(6) Among the algorithms studied here, it appears that *the neural network based* approaches are *the most accurate* classifiers for typical chemical sensor array data.

Note: among: 介词，在...之中

## 19.意味着、推断、暗示、建议

(1) These *recent* results suggest that other classification algorithms may be better suited than BP-ANN for this application.

(2) In terms of classification accuracy, some *experimental evidence* suggests that *splitting* the pattern recognition *into* a series of two-class improves prediction performance.

Note1: experimental evidence: 试验证据

Note2: split sth1 into sth2: 此处, 动名词作主语

Note3: improve ... performance

(3) Parallel structure means using the same pattern of words to show that two or more ideas have the same level of importance.

Note1: mean doing sth1 (to do: 补语).

## 20.描述、刻画、理解

(1) Sensor failures can be viewed as either hard catastrophic failures or soft uneasy to detect failures.

(2) This can be described as instrument non-repeatability or precision error, and can be of the same order of magnitude as changes induced by a real engine fault.

(3) A brief description of the operating principles of each algorithm is given below. For a more theoretical discussion of these algorithms and pattern recognition in general, please see Refs. [23-28].

Note: a more theoretical discussion of sth1

## 21.需要指出的是、需要强调的是、需要注意的是

(1) It should be noted that, while possible, *the use of* probabilistic outputs in NN, LVQ and BPANN *is not yet common*.

Note1: while possible = if possible

Note2: not yet: 尚未, 还未

## 22.推荐、建议、劝告

(1) The PNN is recommended for applications where a confidence measure and fast training are critical, while speed and memory requirements are not. LVQ is suggested for all other applications of chemical sensor array pattern recognition.

Note: all other applications of

(2) Thus, based on the results in this paper, *we recommend* the LVQ for most applications of chemical sensor arrays *and the PNN for special cases* where a statistical measure is required.

Note1: recommend sth1

Note2: 省略句

Note3: required: 形容词: 必需的、必不可少的、必要的、需要的

## 23.展示、表现、展现

(1) Due to the nonlinear nature of the pattern space, neural networks and NN should *exhibit good classification ability*.

Note1: nonlinear nature = nonlinearity

Note2: exhibit (good / poor) ability

## 24.控制、管理、监管、安排

(1) Their downtime can be managed to acceptable levels as they are either easily replaceable or generally designed with redundancy.

Note: arrange sth1 to sth2

## 25.使得

- (1) It is unfortunate that I had not written the generalized inverter concept as a separate paper, making it difficult to trace in a literature search.
- (2) The position of the discriminant computed by the BLDA procedure *was such that* most of the patterns that it missed in the training subset were not included in the prediction subset.

Note1: sth1 be such that +从句: sth1 使得...

- (3) Cancer of the esophagus may cause such an obstruction that only small quantities of food can enter the stomach.

## 26.扩展、拓展、扩张

- (1) The generalization of these conditions to MIMO systems is open for further researches, as well as the use of minimal number of output time-derivative.

## 27.改变、变更、变化、修改

- (1) The number of hidden layer neurons was varied from 25 to 150.  
Note: vary sth1 from A to B
- (2) However, this is often the case in many applications due to the constantly changing environments found in *field measurements*.

Note1: this is often the case

Note2: constantly changing environments: 不断变化的环境

- (3) Additional variation is seen in Fig. 6 since these pattern vectors *were obtained from* different vapor concentrations *than* the training subset.

Note1: be obtained from sth1

Note2: than: 此处是“介词”，与...比较: in comparison with

## 28.贡献、占据、捐献

- (1) Operation and maintenance costs of a gas turbine contribute a major portion of the annual maintenance budget of a company.

Note: contribute: 贡献、捐献; 但此处译为“占、占据”更好。

## 29.持续、维持

- (1) For each vapor, three exposures lasting >10 min were performed at different humidity levels (ranging from 0 to 80%) and trace level concentrations.

Note1: last 10 minutes; last four years; last 5 days: “last” 后面不加 “for”，因为后面的时间作补语。

Note2: perform exposure

Note3: at ... level

Note4: range from sth1 to sth2

## 30.近似、逼近

- (1) A summary of the approximation networks are presented.

### 31.接近、接触、进入

(1) I believe that participating in the ISIE2006 is an opportunity to access the most recent critical *information* and *update* your knowledge by visiting the ISIE2006 participating Industrial exhibitor.

Note1: 动名词作主语

Note2: be an opportunity to do sth1

Note1: *access* the most recent information: 接触到最新的重要信息

### 32.成为

(1) BP-ANNs have become the *de facto* standard *for* chemical sensor pattern recognition due to the increasing power of personal computers and their inherent advantages in modeling complex data spaces.

### 33.趋势、趋向、潮流、发展（变化）方向

(1) However, the results did not follow this expected *trend* exactly.

## 二、褒义词

#### 1. 保证、确保、担保

(1) We want to ensure that there exists a function such that....

(2) In general, current technology has ensured that the gas turbines for industrial application, especially for base load power plant operation, have high levels of reliability.

(3) The BP training algorithm used in a BP-ANN is both slow and prone to local minima, *requiring* many replicate optimizations *to ensure convergence*.

#### 2. 澄清、解释、解释为

(1) In the sequel we argue that the chain of subspace gives a linear algebraic framework that clarifies many structural properties of nonlinear systems and leads to a synthesis of many previous works on rank invariants of nonlinear systems.

(2) Before proceeding further with the analysis, we want to stress that the recursive construction indicated by algorithm (8) can be interpreted as a nonlinear analogue of the construction in a linear system. We return now to the analysis of the properties of the sequence of distributions in the nonlinear setting.

(3) The ANN structure described above forms a part of the diagnostic tool that includes other aspects involved in parameter corrections as well as aspects that provide linguistic information on the nature and type of fault *since* ANN only gives qualitative and quantitative results without any explanation for them.

Note: explanation for sth1 : 对...的解释

(4) To help explain some of the results from this study, principal components analysis (PCA) was employed to visualize the pattern spaces.

(5) The density-based methods, such as PNN, can be interpreted as *posterior* probabilities.

### 3. 证明、证实、演示、例证

- (1) This completes the proof \ The proof is complete. (Strict theorem proof)
- (2) It turns out that the sufficient conditions for DDPO are less restrictive than the existing ones, and most importantly they provide specific procedures to construct a dynamic output feedback.
- (3) However, in *recent* work at the NRL, using simulated chemical sensor array data, the probabilistic neural network (PNN) was shown to be a potentially powerful alternative to the *conventional* BP-ANN approaches.

Note1: sth1 is shown to be + adj. / n.

Note2: a potentially powerful alternative to sth1

Note3: conventional = traditional

Note4: in recent work, in recent research

- (4) The PC scores plots shown in Figs. 5 and 6 illustrate the overlapping clusters for the GB and GD classes

### 4. 尽、尽量、尽力、尽可能的

- (1) For many applications, the database of training ANN will need to be updated *periodically*, thus requiring the algorithm to “relearn” its classification rules. This procedure must be performed as simply and quickly as possible.

Note1: need to do sth1: 需要

Note2: require sth1 to do sth2: 要求

Note3: as simply and quickly as possible

- (2) To our (best) knowledge, no studies comparing multiple pattern recognition algorithms on several chemical sensor array data sets have been reported.

Note1: to our (best) knowledge: 就我们的所掌握的知识（情况）而言，据(尽)我们所知

Note2: on data

### 5. 努力、尝试

- (1) A first attempt at this, using cruder tools, was made in [1].
- (2) In view of the changes in world economy towards globalization and openness of the market, any efforts that can reduce the total cost of ownership and life-cycle cost of the equipment will be added advantages.

- (3) We attempt to isolate the affected component.

Note1: 名词: attempt at: 在...方面的努力; attempt on : 对...攻击;

make an attempt to do

及物动词: attempt to do / attempt sth.

Note2: affected: adj.

- (4) For the past decade, efforts at the Naval Research Laboratory (NRL) have been directed *toward* using these sensor systems in the field or uncontrolled environments.

Note: direct sth1 toward / to sth2/ doing sth2: direct efforts toward using these sensor

- (5) BLDA, PNN, and NN require the *least* effort in training.

Note1: the least + n. / pron. : 表达了否定的意思

Note2: effort in (sth / doing sth) = attempt at (sth / doing sth)



## 6. 给出、提出、提供、给予、供给

(1) Thus, the percentage deviation between input to this network and its output provides an indication of the amount of bias or even noise present in each of the sensors.

(2) Field measurements *offer* additional challenges not seen in the laboratory or controlled environments, such as the need to detect and identify the target analyte(s) *in the presence of* large concentrations of interfering species that may or may not be known *beforehand*.

Note: offer: 提出、提供、给予: offer additional challenges: 提出了新的挑战

(3) They concluded that the choice of the best algorithm was application specific and that hybrid approaches offered great potential.

Note1: 动词名词化: the choice of the best algorithm

Note2: offer great potential

(4) To classify a new pattern, the Euclidean distance between the new pattern and each pattern in the training set is computed. The Euclidean distance metric *is given by* Eq. (1).

(5) Distance based approaches, such as NN, MLDA, SIMCA, PNN, and LVQ, *offer* additional outlier rejection *power*.

Note: offer ... power: 提过...能力(力量)

## 7. 能、使能、能够、有能力

(1) For real-time analysis, the pattern recognition algorithm must be able to produce a classification *quickly*. Thus, algorithms that are computationally intense may not be appropriate for this application.

Note1: algorithms that are computationally intense: 那些计算强度很高的算法

Note2: be appropriate for = be suitable for = be applicable to: 适合于、适宜于、适用于  
be applicable to: 强调“适用于”, “用”

否定: be not appropriate for = be inappropriate for

(2) For chemical sensor array applications *in* uncontrolled environments, the pattern recognition algorithm must be able to reduce the potential for false alarms by being able to differentiate between sensor signals which it was trained on and those which it was not.

Note1: “it” stands for “the pattern recognition algorithm”.

Note2: differentiate between sth1 and sth2

Note3: 省略句及代词“those”的用法。

(3) They also reported that each method has its own relative advantages and disadvantages and that the practitioner would be wise to choose the *appropriate* algorithm for the application at hand.

Note1: be wise to (介词) + n./pron.: 明白..., 知道..., 了解...

be wise to do: 明智的做..., 具有博学知识来做..., 有能力来做...

Note2: at hand

(4) Stable liquid technology will enable vaccines to be stored for long periods without refrigeration.

Note1: enable sth1 to do sth2; enable sth1 to be done

(5) Information on the proposed experimental design and tests for statistical analysis of projects will enable comparisons to be made between different approaches adopted by various researchers.

Note1: make comparisons between sth1 and sth2

## 8. 增加、增长、增强、加强

- (1) The increase of difficulty depends on the fact that...
- (2) Therefore, in order to increase the overall profit and be competitive in the open market, the users are left to manage the life-cycle costs of the engine during its operation and maintenance.
- (3) Other networks showed similar performance to those presented above, but generally, as the complexity of the problem being addressed increased, the degree of accuracy of the network in addressing the problem reduced.

## 9. 胜过、超过、比...多

- (1) For applications involving a large number of sensors (i.e. *high* dimensionality of the pattern vector) or requiring many pattern vectors to describe the data space, the memory requirement may *overcome* the amount available on most microcontroller cards.

Note1: involve: 牵涉、卷入、包含, 一般指“不利的事情”

Note2: require sth1 to do sth2

Note2: 此处的“overcome”不是“克服、战胜、征服”的意思(指好的事情), 而是“超过、胜过、比...多”(通常指好的事情, 但也可能是坏事, 如此例句中的意思)。

Note4: the amount

## 10. 水平、有水平、高水平

- (1) In general, current technology has ensured that the gas turbines for industrial application, especially for base load power plant operation, have high levels of reliability.
- (2) Their downtime can be managed to acceptable levels as they are either easily replaceable or generally designed with redundancy.
- (3) After consideration of the qualitative features of an ideal pattern recognition algorithm, LVQ still rates very highly.

Note1: after consideration of sth1

Note2: rate very highly: 具有在很高的等级。rate 名词时: 等同于“level of quality”, 质量的等级标准; 不及物动词时: 在某等级; 及物动词时: 估价, 认为, 鉴定等级

## 11. 有、享有、允许有、拥有、具有、带有

- (1) The structure at infinity of Definition 1 enjoys the following properties.
- (2) Traditional techniques for gas path fault diagnosis such as visual inspection, fault trees, fault matrixes and gas path analysis, have their limitations.
- (3) In general, current technology has ensured that the gas turbines for industrial application, especially for base load power plant operation, have high levels of reliability.
- (4) This can be described as instrument non-repeatability or precision error, and can be of the same order of magnitude as changes induced by a real engine fault.

Note: be of:

- (5) It also has the basic advantage of novelty detection.
- (6) Among the seven algorithms in this study, the neural network based algorithm has the highest classification accuracy.

Note: have the highest accuracy

- (7) Thus, pattern recognition algorithms with large memory requirements may not be

appropriate for this application.

Note: with sth1 requirements: 要求有 sth1; 需要 sth1: 名词动词化

(8) Although many ANN researchers have attempted to overcome these limitations, there are *no* generally *acceptable* solutions to these problems.

Note1: attempt to do sth1

Note2: overcome these limitations

Note3: no generally acceptable solutions to these problems

Note4: there be sth1 + 地址/地点 (此“地址/地点”在不确定或不需要指明或比较笼统时可以省略)

(9) Compared with BP-ANN, LVQ classifiers are simpler to construct and *get stuck in* local optima less frequently, but have a large random component in training that results in *longer training times* compared with the statistical methods.

Note1: be + 形容词 + to do: 这个句型的主语可以是代词“it”(此时后面的不定式是真正的主语), 也可以是“真正的名词作主语”(此作主语的名词其实是 to do 的宾语)

Note2: get stuck in: 受骗于, 被...欺骗, 使劲干(通常指不知情的蛮干)。这个词通常用在“否定句”中, 如此处的“less frequently”, 或其他的 do not 等。

Note3: result in longer training times.

Note4: less frequently: 表示否定意义

(10) LVQ had the best classification performance.

(11) It was the differential geometric framework that allowed an elegant formulation and geometric interpretation of these problems and their solutions.

Note1: allow: 使拥有, 允许有, 拥有, 使得以实现(发生); 用法(甚至意义上)与“enable”都非常相似。区别: allow 强调主体(即主语)所拥有的“使事物得以发生”的性质和能力, 强调“主体拥有”; enable 只是客观的描述主体具有“使事物可能发生”的性质和能力。

(12) They allow the BP-ANN outputs to be interpreted as posterior probabilities.

Note1: allow sb1 / sth1 to do sth2: 允许某人做某事

Note2: allow sth1: (允许)拥有, 使得以发生, 使拥有

(13) The measurements of the main component concentrations in bioprocesses are very useful. Indeed, they allow the on-line monitoring and control of the process.

## 12.(对...)起作用、有效、运行(执行)良好

(1) In recent research by Johnson et al., neural networks based upon learning vector quantization (LVQ) were also found to work well with chemical sensor array data [12].

Note1: sth1 be found to do:

Note2: work (well) with sth1: 对...起(很好的)作用, 对... (很)有效

(2) They found that, in general, neural-network methods performed very well in terms of predictive performance but required long training times and an expert's intuition to implement.

Note1: perform very well

Note2: require: 要求(有), 需要(有)

Note3: in terms of: 在...方面, 就...而言, 根据...来看, 用...的话, 根据, 按照。与“with reference to”相同, 而不同于“according to”。

### 13. 优化

(1) The BP-ANN training procedure employed the Levenberg-Marquardt technique to optimize the weights of the hidden layer.

Note1: optimize the weights of

### 14. 支持、赞成、推荐、喜欢、更喜欢

(1) Applications involving multimodal classes require a nonlinear boundary between the classes. Thus, this data set would appear to favor the neural network and NN algorithms.

Note1: applications *involving* sth1 require sth2

Note2: appear to do: 看起来, 表现出, 显现出

Note3: favor: 支持、赞成

(2) To our knowledge, only one other publication *has advocated* the use of this algorithm for chemical sensor array pattern recognition [12].

Note1: advocate the use of: 拥护; 提倡; 主张

(3) Thus, based on the results in this paper, *we recommend* the LVQ for most applications of chemical sensor arrays *and the PNN for special cases* where a statistical measure is required.

Note1: recommend sth1

Note2: 省略句

Note3: required: 形容词: 必需的、必不可少的、必要的、需要的

### 15. 期待、期望、指望、有望、有希望

(1) This is expected to cover the range of faults of interest during engine operation.

Note: be expected to do: 以期..., 预计...

(2) Thus, SIMCA, PNN, BLDA, and MLDA would be expected to perform very well because they *either presume* an underlying distribution *or attempt to model it*.

Note1: presume: 姑且认为(有), 假定, 认为(有)

Note1: either...or..., 可以并列的连接“谓语动词”, 由此可见, “连词”可以并列地连接句子中地任意成分(部分)。

### 16. 提高、改进、有利于、发展、健康运行

(1) Control improvements often result from the development of new (hardware) sensors to facilitate the measurement of key process variables.

Note1: 名词可以具有“动词性质”, 如此处的“development of sth1 to facilitate sth1”

(2) For the operational health of the engine, such measurable parameters as pressures, temperatures, fuel flow are required.

Note: 形容词有时可以完成“动词”的任务, 不一定非要用“动词”, 如此处的“measurable”

(3) In terms of classification accuracy, some *experimental evidence* suggests that *splitting* the pattern recognition *into* a series of two-class improves prediction performance.

Note1: experimental evidence: 试验证据

Note2: split sth1 into sth2: 此处, 动名词作主语

Note3: improve ... performance

## 17.进行、执行、实现、贯彻、完成

(1) Information in the open literature shows the level of research being carried out in fault diagnosis using ANN.

Note: carry out = perform: 进行、执行; perform training; perform classification

(2) Generally, all classification networks performed well except CLASS3 where some DCFs were misclassified as either SCF or MCF.

Note: perform: 运行良好, 此处的“perform”是不及物动词。

(3) The level of accuracy achieved by this decentralized application of ANN shows derivable benefits over techniques that require *just a single* network to perform fault detection.

(4) Implementation of these sensor systems in the laboratory *or* process monitoring applications is straightforward since all of the major chemical interferences are either known or eliminated *prior to* interacting with the sensors.

Note: prior to n. / doing: 先于、在...以前、在...之前

(5) For many applications, the database of training ANN will need to be updated *periodically*, thus requiring the algorithm to “relearn” its classification rules. This procedure must be performed as simply and quickly as possible.

Note1: need to do sth1: 需要

Note2: require sth1 to do sth2: 要求

Note3: as simply and quickly as possible

Note4: perform procedure: 执行手续、执行程序、执行工序、执行过程

Different: process, program, procedure.

(6) In an attempt to determine the optimal classifier, several researchers have performed studies comparing pattern recognition algorithms on many types of data sets.

Note1: in an attempt to do = in order to: 力图, 试图

Note2: compare sth1 on sth2: 在sth2 (基础)上对sth1进行比较; 在sth2方面对sth1进行比较

Note3: perform study; perform research; perform task; perform

(7) Each of the seven pattern recognition algorithms employed in this study were implemented *in* MATLAB.

Note: be implemented in Matlab.

(8) The classification of new patterns is accomplished by propagating the new pattern through the neural network.

Note: accomplish = perform

(9) The only approach that can perform this task, and also does it very well in terms of classification accuracy, is PNN.

## 18.解决、克服、突破、避免

(1) This was overcome by relating each of the fields to a common field.

(2) We have addressed this problem by applying a hierarchical neural network structure.

(3) Other networks showed similar performance to those presented above, but generally, as the complexity of the problem being addressed increased, the degree of accuracy of the network in addressing the problem reduced.

(4) In reality, gas turbine parameter interrelationships are highly nonlinear. Hence, Escher and

Singh [17] developed an iterative approach to the problem with the principles based on Urban's formulation.

(5) Based on the types of environments and situations that chemical sensor arrays are expected to operate in, we can select six qualities that the ideal pattern recognition algorithm will have.

Note1: 定语从句, 用 “that” 引导, 比 “which” 引导看上去要 “正规和顺畅”。

Note2: 引导定语从句的 “that 或 which” 在从句中, 既可以作 “主语”, 也可以作 “状语” (一般为介词短语中的名词), 如此句中的 “that chemical sensor arrays are expected to operate in”, 还可以作从句中的 “宾语”, 如此处的 “that the ideal pattern recognition algorithm will have”。

Note3: the types of : ...的类型

Note4: in ...environments / in ... situations / in ... environments and situations

Note5: choose 和 select 的区别: choose 通常是强调在 “选择” 某物时的意愿, 特别是当供挑选物只有两个时, 我们应当用 choose; select 通常指 “精挑细选”。有好几个东西供选择时, 最好用 select, 因为有较多的被挑选物, 挑选人就必须加以鉴别。

(6) In this paper, we attempt to fill that gap by comparing seven classification algorithms, commonly used in the chemical sensor and pattern recognition communities, for their ability to meet the criteria.

Note1: fill the gap by doing

Note2: meet the criteria

(7) Thus, for applications requiring a large number of pattern vectors to adequately describe the data space, this is a major drawback, *although* this limitation can be partially overcome by judiciously choosing the patterns in the training subset.

Note1: drawback; judicious

Note2: (partially) overcome this limitation

(8) Although many ANN researchers have attempted to overcome these limitations, there are *no* generally *acceptable* solutions to these problems.

Note1: attempt to do sth1

Note2: overcome these limitations

Note3: no generally acceptable solutions to these problems

Note4: there be sth1 + 地址/地点 (此 “地址/地点” 在不确定或不需要指明或比较笼统时可以省略)

(9) For applications involving a large number of sensors (i.e. *high* dimensionality of the pattern vector) or requiring many pattern vectors to describe the data space, the memory requirement may *overcome* the amount available on most microcontroller cards.

Note1: involve: 牵涉、卷入、包含, 一般指 “不利的事情”

Note2: require sth1 to do sth2

Note2: 此处的 “overcome” 不是 “克服、战胜、征服” 的意思 (指好的事情), 而是 “超过、胜过、比...多” (通常指好的事情, 但也可能是坏事, 如此例句中的意思)。

Note4: the amount

(10) To overcome this practical difficulty, we developed a new animal model, the Burmese python, to study the regulatory mechanisms of GI response.

## 19.使...简单 (容易)、简洁、简便、方便、简单

(1) For the sake of brevity, we have omitted a numerical example.

- (2) as a matter of convenience 为方便起见
- (3) as a convenience
- (4) To avoid complication at this stage, it will be assumed that ...
- (5) for simplicity
- (6) for the concision of the form, 为了形式的简洁
- (7) Control improvements often result from the development of new (hardware) sensors to facilitate the measurement of key process variables.
- (8) The idea was first sketched in [1].
- (9) Some of the above results can be rewritten in a straightforward manner for the class of multivariable systems which have vector relative degrees.
- (10) It is convenient to illustrate the results obtained *so far* with the aid of a simple example and to analyze some other characteristics of the decomposition.

## 20. 优点、利益、好处

- (1) It also has the basic advantage of novelty detection.
- (2) BP-ANNs have become the *de facto* standard *for* chemical sensor pattern recognition due to the increasing power of personal computers and their inherent *advantages* in modeling complex data spaces.
- (3) They also reported that each method has its own relative advantages and disadvantages and that the practitioner would be wise to choose the *appropriate* algorithm for the application at hand.

Note1: be wise to (介词) + n./pron.: 明白..., 知道..., 了解...

be wise to do: 明智的做..., 具有博学知识来做..., 有能力来做...

Note2: at hand

- (4) Future work in our laboratory will focus on methods of combining the LVQ and PNN approaches, in order to exploit the advantages of both methods.

## 21. 有价值、具有理论价值、应用价值（工程应用、价值）

- (1) However, the development of new sensors is often prohibitively costly exercise. Hence, in the context of low cost automation, it is of great interest to consider the use of soft sensors instead of hardware sensors.
- (2) It is of practical as well as theoretical interest.
- (3) Become a question of practical importance and of theoretical interest insofar as the properties of...

# 常用名词

## 一、中性词

### I. 单纯性名词

### II. 动词的名词形式

### III.动名词

## 二、褒义词

### I. 单纯性名词

#### 1. 进展，提高（计算能力）等

(1) At the same time, recent advances in model development from first principles and increasing computational capabilities encourage the development of such a framework in this direction.

Note1: advances in: 在...方面的进展

Note2: increasing computational capabilities: 日益增长的计算能力

Note3: in this direction: 在这个方向上（方面）

#### 2. 可获得、可获得性

(1) The availability of estimators for unutilized glucose substrate and biomass in a fermentation process *can lead to* improved optimization and control.

Note1: estimator for sth1; lead to sth1

Note2: 现在分词和过去分词在作定语时，同样可以表达“动词的意思”，如此句中的 improved.

### II. 动词的名词形式

### III.动名词

## 三、贬义词

### I. 单纯性名词

#### 1. 困难、麻烦

(1) One of the main difficulties in the development of such a sensor is the variation in the process behavior from batch-to-batch, such as divergences in the weight of the initial inoculum or the quality of raw material feed.

Note1: difficulty in sth

Note2: development of such a sensor

### II. 动词的名词形式

### III.动名词



# 常用连词

## 一、比、象、如、连（联）

### 1. 象、如、例如、正如

- (1) Like in the previous Section, we need some background material.
- (2) He defines it as before, and introduces...
- (3) As did (does) Wang, suppose that the input function  $u(t)$  to the system.

### 2. 联系、相关、联合、连接、关联、关系

- (1) We now relate the list of ranks to (with) the list of ...
- (2) It can be used to establish links between these algorithms and the differential algebraic approach, as well as to solve some static and dynamic noninteracting problems.
- (3) There is no connection between them.
- (4) It is important to remark that the relationship of...
- (5) The pattern recognition algorithm must be able to produce a statistical measure *concerning* the certainty of the classification.

Note: concerning = about = on = associated with = related / relating to = in reference to

- (6) LVQ combines some of the *features* of NN and competitive learning ANNs.

Note: some of sth.

- (7) Given enough pattern vectors, an external distribution of classification scores could *be used* in conjunction with any of the seven algorithms studied here to provide some confidence levels, but requires *extensive calculations* and *large amounts of available data*.

Note1: Given sth1, sth2...

Note2: in conjunction with: 与...协力、与...合力

Note3: provide some confidence levels: 提高置信水平，提供具有信心的水平，增加信心。

Note4: extensive = a large amount of = large amounts of

### 3. 相似、类似、与...一样（相似）

- (1) Before proceeding further with the analysis, we want to stress that the recursive construction indicated by algorithm (8) can be interpreted as a nonlinear analogue of the construction in a linear system. We return now to the analysis of the properties of the sequence of distributions in the nonlinear setting.
- (2) The classification accuracy achieved (Table 5) is similar to that from Fig. 5.
- (3) Other networks showed similar performance to those presented above, but generally, as the complexity of the problem being addressed increased, the degree of accuracy of the network in addressing the problem reduced.

Note: be similar to ----- similar sth1 to sth2. 类似于: generalization of sth1 to sth2

- (4) It is quite analogous to that given by .....
- (5) Analogously to Theorem 1 this problem is approached as follows.
- (6) Thus, we conclude that locally the system displays a behavior *strictly* analogous to *the one* described in Section 1.

Noet: be analogous to sth.: to 是介词。

synonym: be similar to, in a similar vein (介词短语, 做状语用的)

antonym: as opposed to sth.

(7) Similar to SAW1, one of the sensors in the array did not provide any additional information and was removed, resulting in a five-dimensional pattern vector.

Note1: 用 “similar to sth1”, 而不是用 “similarly to”, 尤其是作为开头

Note2: provide additional information

(8) The PNN will produce *the same* classification decisions *as* a NN classifier.

Note: the same sth1 as sth2

(9) LVQ uses a competitive learning algorithm to define a smaller set of reference vectors that span the same space as the original training set patterns.

Note: a smaller set of

(10) Analogous to SIM1, a large number of patterns *were available for* each class *and were normally distributed* about the mean vector.

Note1: analogous to = similar to

Note2: a large number of = a large amount of

Note3: sth1 be available for sth2: sth2 可以获得 (利用) sth1

(11) Since the training and prediction subsets are similar and more training patterns are available, the PNN and NN classification performances should *improve over* the SAW1 results.

Note1: be similar (to): 相似的, 后面可以跟 “to”, 但如果单纯作 “表语”, 也可以单独使用。再如, 此句中的 “available” 也是如此。

Note2: over: 介词: 比...高、超过、超出 (通常指好的方面)

Note3: improve over sth1, 此处的 improve 是 “不及物动词”。

(12) However, even for the *applications where* the pattern vectors are normally distributed about a mean vector, the neural network approaches *still* classify them *as accurately as* the other approaches.

Note1: for the applications where + 从句

Note2: as + adj. / adv. + as

#### 4. 比、比较、对比

(1) The MSE and RMS defined by Eqs. (2) and (3), respectively, are the statistical parameters used to examine the performance of the networks as well as make comparisons with other diagnostic techniques in this work.

(2) This is in contrast with the ANN results, which shows that the instrumentation suite is sufficient.

Note: (be) in contrast with

(3) Had noise been included in the NLGPA measurements, the ANN diagnostic results may have compared favourably with those from NLGPA or even better since no noise filtering algorithm exist in the NLGPA tool.

(4) Probabilistic neural networks (PNN), back-propagation artificial neural networks (BP-ANN), and the nearest-neighbor (NN) pattern recognition algorithms are compared for their ability to classify chemical sensor array data (不定式做后置定语).

Note: be compared for:

(5) Comparisons are made based on five qualitative criteria (speed, training difficulty, memory

requirements, robustness to outliers, and the ability to produce a measure of uncertainty) and one quantitative criterion (classification accuracy).

(6) Both, LDA and SIMCA are *computationally* simpler and easier to train than a BPANN, but have trouble with multimodal.

(7) In an attempt to determine the optimal classifier, several researchers have performed studies comparing pattern recognition algorithms on many types of data sets.

Note1: in an attempt to do = in order to: 力图, 试图

Note2: compare sth1 on sth2: 在sth2 (基础)上对sth1进行比较; 在sth2方面对sth1进行比较

Note3: perform study; perform research; perform task; perform comparison (= make comparison);

(8) Derde and Massart performed a qualitative comparison of several classifiers popular in the general chemometrics community (形容词短语作后置定语) including SIMCA, LDA, and ALLOC (similar to PNN) (现在分词作补语).

Note1: perform a comparison of = make a comparison of

Note2: be popular in somewhere/ in some aspects

(9) Their comparisons were based on four technical (optimal decision boundaries, overlapping regions, degree of certainty, and outliers) and four practical (updates, variables of mixed type, irrelevant parameters, and ease of use) aspects of supervised pattern recognition.

(10) They studied 23 types of machine-learning, statistical, and neural-classification methods (including LDA, ALLOC, BP-ANN and LVQ) and compared them on both, qualitative and quantitative aspects.

(11) Compared with BP-ANN, LVQ classifiers are simpler to construct and *get stuck in* local optima less frequently, but have a large random component in training that results in *longer training times* compared with the statistical methods.

Note1: be + 形容词 / 名词 + to do: 这个句型的主语可以是代词 “it” (此时后面的不定式是真正的主语), 也可以是 “真正的名词作主语” (此作主语的名词其实是 to do 的宾语)

Note2: get stuck in: 受骗于, 被...欺骗, 使劲干 (通常指不知情的蛮干)。这个词通常用在 “否定句” 中, 如此处的 “less frequently”, 或其他的 do not 等。

Note3: result in longer training times.

Note4: less frequently: 表示否定意义

(12) SIMCA did perform the best and PNN also did very well, but MLDA and BLDA did not *achieve satisfactory results*. NN performed the worst *on* this data set.

Note1: achieve satisfactory results

Note2: perform the best / worst: 做得 (完成的) 最好 / 最差

Note3: *on* data

(13) Additional variation is seen in Fig. 6 since these pattern vectors *were obtained from* different vapor concentrations *than* the training subset.

Note1: be obtained from sth1

Note2: than: 此处是 “介词”, 与...比较: in comparison with

(14) For this data set, LVQ performed the best with PNN, NN, and BP-ANN also doing very well.

Note1: with sth1 doing: with引导的复合结构 (可理解为一种独立主格结构)

- (15) One is better off now than one has ever been before.

词句可简化为:

One is better off now *than ever before*.

Note1: *than ever before*: 比以前..., 比以往...

再如:

It was a chance to explore and document the punk rock community more extensively *than ever before*.

It is better than it is ever been before. 可简化为: It is better *than ever before*.

We want everything better, faster, easier, and more personalized *than ever before*

## 5. 比...好, 优于、超过、比...高、不亚于

- (1) Had noise been included in the NLGPA measurements, the ANN diagnostic results may have compared favourably with those from NLGPA or even better since no noise filtering algorithm exist in the NLGPA tool.

Note1: compare favourably with: 优于; 不亚于

Note2: “Had noise been included in the NLGPA measurements” 是虚拟语气的一种, 本质上表示“强调”。

Note3: 此处的“or even better”是与“favourably”相连接的。

- (2) The level of accuracy achieved by this decentralized application of ANN shows derivable benefits over techniques that require *just a single* network to perform fault detection.

- (3) When considering the qualitative criteria, the LVQ and PNN approaches fare well compared to BP-ANN due to their simpler training methods.

Note: fare well compare to = compare favourably with

- (4) Its prediction performance is much better than its *relatively poor* classification of the patterns in the training subset.

Note1: be much better than

Note2: relatively poor

- (5) Since the training and prediction subsets are similar and more training patterns are available, the PNN and NN classification performances should *improve over* the SAW1 results.

Note1: be similar (to): 相似的, 后面可以跟“to”, 但如果单纯作“表语”, 也可以单独使用。再如, 此句中的“available”也是如此。

Note2: over: 介词: 比...高、超过、超出(通常指好的方面)

Note3: improve over sth1, 此处的 improve 是“不及物动词”。

## 6. 比...差、不如、不比...好、比...少

- (1) However, it was noticed that, *despite having* the best training results, the performance of BP-ANN in prediction was no better than the other algorithms.

Note1: despite sth1 / doing sth1: 尽管...

Note2: be no better than: 比...差、不比...好, 与...差不多

Note3: performance in sth1: 在...方面的性能

- (2) Both PNN and LVQ require *fewer* adjustable parameters *than* BP-ANN, which results in faster training times and implies a more reliable classifier.

Note1: 比较级可以出现在“表语、定语、状语”等任意一处。

Note2: which 引导的是“非限制性定语从句”, which 代表前面整个句子。

总结：比较的对象可以是句子中的“任何成分”（如主语、谓语、宾语、表语，甚至是整个句子），而比较级（形容词或副词）既可以作“表语”，又可以作“状语”，还可以作“定语”。记住如下原则：凡是“形容词和副词可以出现的地方都可以进行比较（作比较级）”。

## 二、因为、为了、所以、目标、观点、角度

### 1. 因为、由于、鉴于、归功于、归因于

(1) His algorithm is in fact a generalization of previous algorithms, due to Silverman [1] and Zhang [2] that are only applicable under some restrictive conditions.

(2) In view of the changes in world economy towards globalization and openness of the market, any efforts that can reduce the total cost of ownership and life-cycle cost of the equipment will be added advantages.

Note1: in view of = in consideration of: 考虑到, 鉴于

Note2: change in somewhere; increase in somewhere;

Note3: 定语从句用“that”引导, 看上去比“which”要纯正和顺畅

Note4: added: 更多的, 附加的, 额外的; added advantages

(3) This is because these components are normally not held in spares, either by the users or manufacturers, due to their high costs but low in demand.

Note1: This is because + 从句;

Note2: but 的用法: due to their high costs but low in demand.

(4) The new maintenance downtime is then only due to actual repair time.

Note: be due to something:

(5) This is because when one or both components included in the DCF are lightly affected by fault, the fault pattern becomes basically similar to that of a SCF and is classified as such.

Note: as such: 同样的, 如所指的, 照那样

(6) Considering the level and complexity of the faults being diagnosed, especially with the level of noise added, this degree of accuracy is satisfactory even in actual applications.

(7) The technique presented, combined with inference tools such as expert system or fuzzy logic could be expanded to produce an engine health monitoring scheme since ANN also has the ability to fuse data from other associated performance monitoring techniques such as vibration and oil analysis (介词短语直接做后置定语).

Note1: have ability to do

(8) The ANN structure described above forms a part of the diagnostic tool that includes other aspects involved in parameter corrections as well as aspects that provide linguistic information on the nature and type of fault since ANN only gives qualitative and quantitative results without any explanation for them.

(9) Since multiple concentrations were available for each vapor, the pattern vectors obtained

from SAW data collected from an exposure to amid-level concentration of each vapor were placed in the prediction subset.

Note1: be available for sth1

Note2: exposure to sth1

(10) *On account of* the overlapping clusters and multimodality, chemical sensor data often requires nonlinear classifiers.

Note: on account of = because of

## 2. 因此, 所以

(1) The initial assignment of the classification for each reference vector is done using the relative distribution of the output data classes so that the hidden layer is a *statistically accurate* representation of the pattern space.

Note: statistically accurate: 统计(学)上准确的; 从统计学的观点来看是准确的 (??)

## 3. 为、为了、为了...目的

(1) Therefore, in order to increase the overall profit and be competitive in the open market, the users are left to manage the life-cycle costs of the engine during its operation and maintenance.

(2) The precision values were applied to all simulated data before introduction to the ANN program for training and testing purposes.

(3) *For* application of the chemical sensor system to field measurements, the pattern recognition algorithm must *accurately* classify new sensor signals.

Note: “名词”动词化: 名词具有动词的属性, 如: application of sth1 to sth2.

For application of sth1 to sth2: 为了将 sth1 应用于 sth2.

(4) In an attempt to determine the optimal classifier, several researchers have performed studies comparing pattern recognition algorithms on many types of data sets.

Note1: in an attempt to do = in order to: 力图, 试图

Note2: compare sth1 on sth2: 在sth2 (基础)上对sth1进行比较; 在sth2方面对sth1进行比较

Note3: perform study; perform research; perform task; perform

(5) Pattern vectors from *replicate* exposures were kept together in order to make the classification as realistic as possible.

## 4. 目标、目的

(1) The primary objectives of all maintenance strategies are to reduce equipment downtime, increase reliability and availability of the equipment which at the same time optimizes the life-cycle costs of the equipment.

Note1: be to do: 是要做, 要做

(2) Our aim in this paper is that...

(3) The main goal of this paper is to find this property by extending the definition of essential orders and showing that they represent the smallest structure at infinity that is reachable by a compensator that can decouple a nonlinear system.

## 5. 从...观点来看、从...角度讲、在...意义下、以...意义来看

(1) Once the input-output differential equation is obtained, the computations are constructive in

the sense that the required input-output injection and linearizing coordinate are derived for differential forms.

in the sense of = in the sense that

(2) Urban [1] considered this relationship from a linear perspective and his work is now more commonly termed the linear gas path analysis (LGPA).

(3) They found that, in general, neural-network methods performed very well in terms of predictive performance but required long training times and an expert's intuition to implement.

Note1: perform very well

Note2: require: 要求 (有), 需要 (有)

Note3: in terms of: 在...方面, 就...而言, 根据...来看, 用...的话, 根据, 按照。与“with reference to”相同, 而不同于“according to”, 也不同于“in view of / due to / because of”等。

## 常用短语/习语、常用副词/介词

### 1. 在...的前沿, 在...领域

### 2. 在...框架内

(1) The concept of relative order of an output with respect to an input, extended to include disturbance as well as manipulated inputs, is generalized in a MIMO context and it is used to obtain a characterization of the dynamic interactions among the input and the output variables.

Note1: in a/the ... context; in the context of

(2) It was the differential geometric framework that allowed an elegant formulation and geometric interpretation of these problems and their solutions.

Note1: in ... framework; in the framework of

### 3. 事先、预先、先于、在...以前、先前的、在前的

(1) Implementation of these sensor systems in the laboratory *or* process monitoring applications is straightforward since all of the major chemical interferences are either known or eliminated *prior to* interacting with the sensors.

Note: prior to n. / doing: 先于、在...以前、在...之前

(2) Field measurements *offer* additional challenges not seen in the laboratory or controlled environments, such as the need to detect and identify the target analyte(s) *in the presence of* large concentrations of interfering species that may or may not be known *beforehand*.

(3) Also, the optimal architecture (e.g. number of hidden units and layers) is not known *in advance* and must be found through *trial and error*.

Note1: in advance = beforehand: 事先、预先、提前

Note2: trial and error: 试错法、反复试验

### 4. 适合于、适用于、可行的

(1) For real-time analysis, the pattern recognition algorithm must be able to produce a classification *quickly*. Thus, algorithms that are computationally intense may not be appropriate for this application.

Note1: algorithms that are computationally intense: 那些计算强度很高的算法

Note2: be appropriate for = be suitable for = be applicable to : 适合于、适宜于、适用于  
be applicable to : 强调 “适用于”, “用”

否定: be not appropriate for = be inappropriate for

(2) Such an approach will not be feasible for many applications.

Note: be feasible for sth1: 适用于, 对...是可行的

(3) For pattern recognition algorithms with long training times, expressing the application as a series of two-class problems may not be feasible.

## 5. 重要的、有用的、本质的、关键的、有益的、作为工具的

(1) In general, the key to solving a decoupling problem lies in modifying the system's relative degrees and/or structure at infinity in order to achieve equality between these two lists of integers.

(2) We illustrate now a property of the matrix which is *instrumental* in achieving involutivity.

(3) The two local decomposition thus obtained are very useful in understanding the input-state and state-output behavior of the control system (1).

(4) It turns out that the sufficient conditions for DDPO are less restrictive than the existing ones, and most importantly they provide specific procedures to construct a dynamic output feedback.

(5) We introduce now another distribution, which plays an important role in the study of local decompositions of the form (7).

(6) The proposition is useful in studying the state-output interactions.

Note: be useful in doing sth.

(7) Pattern recognition algorithms have become a critical component in the successful implementation of chemical sensor arrays and electronic noses.

(8) The key variables for LVQ are the number of hidden layer neurons and the learning rate. In this work, the learning rate was set initially to 0.05 and *decreased by 10%* every 500 epochs.

Note1: the number of: ...的数目; a number of: 大量的

Note2: the learning rate

Note3: be set to sth1

Note4: decreased by 10% every 500 epochs.

## 6. 剩余的、其余的、剩下的

(1) Two of these data sets involved manufactured or simulated data, while the *remaining* data were collected using SAW chemical sensor systems.

Note: by using, 通常可以将 “by” 省略掉, 构成 “分词的悬垂结构”, 逻辑主语为 “we, people, person” 等, 当然, 不省略也可以; 而其他的及物动词前面的 “by” 通常不能省略。

## 7. 详细的、详细地

(1) This SAW sensor system is discussed in detail in Refs. [20,21].

## 8. 以... (速度、顺序、尺寸、步长、字体等等)

(1) After initialization, the patterns in the training set are repeatedly presented to the hidden layer in a random order.

Note: in a random order

(2) The percentages that are listed *in bold typeface* are the prediction performance for each data



set that *was judged* by the authors *as* the best.

Note1: judge sth1 as sth2

Note2: the best: 最好的（东西）

## 9. 就...而言、从...方面来看、在...方面

(1) In terms of the speed of operation, only NN and PNN do not meet the necessary requirements because *the distance* between the new pattern and every pattern in the training set *must be performed for each calculation*.

(2) The only approach that can perform this task, and also does it very well in terms of classification accuracy, is PNN.

## 10. 倾向于、易于

(1) The BP training algorithm used in a BP-ANN is both slow and prone to local minima, *requiring* many replicate optimizations *to ensure convergence*.

Note1: be prone to sth1

## 11. 可接受的、能接受的

(1) However, for applications *involving* simple pattern spaces, the choice of architecture is not critical and training speeds *are usually acceptable*.

## 12. 直接的、直截了当的、显然的、平凡的、容易的

(1) SIMCA methods train quickly but sometimes determining the optimum number of PCs *is not straightforward*.

Note1: train quickly

Note2: 动名词直接作主语: determining the optimum number of PCs

Note3: be straightforward

(2) However, *in* such distance-based *schemes*, the choice of a rejection criterion is not straightforward.

Note: in such distance-based scheme

(3) The SIMCA and neural network (LVQ and BPANN) algorithms have many configuration options. To make this comparison as fair as possible, several configuration options for each approach were used.

Note1: have many options: 有多种选择

Note2: as fair as possible: 尽可能直接地（清楚地、公正地）

## 13. 可利用的、可获得的、空闲的

(1) For applications involving a large number of sensors (i.e. *high* dimensionality of the pattern vector) or requiring many pattern vectors to describe the data space, the memory requirement may *overcome* the amount available *on* most microcontroller cards.

Note1: involve: 牵涉、卷入、包含，一般指“不利的事情”

Note2: require sth1 to do sth2

Note2: 此处的“overcome”不是“克服、战胜、征服”的意思（指好的事情），而是“超过、胜过、比...多”（通常指好的事情，但也可能是坏事，如此例句中的意思）。

Note4: the amount

(2) Analogous to SIM1, a large number of patterns *were available for each class and were normally distributed* about the mean vector.

Note1: analogous to = similar to

Note2: a large number of = a large amount of

Note3: sth1 be available for sth2: sth2 可以获得（利用）sth1

(3) However, unlike SAW1, *plenty of* training patterns were available *for learning* the structure of the data space.

Note1: plenty of: 大量的，丰富的

Note2: be available for doing sth1 / sth1

## 14.上（半）部分、下（半）部分、左（右）上部、左（右）下部

(1) The *upper half* of Table 4 lists the percentages of patterns in the training set that were correctly classified for each pattern recognition algorithm in each data set.

(2) The *bottom half* of Table 4 lists the percentages of patterns in the prediction set that were correctly classified for each algorithm and data set.

## 15.稍微的（地）、稍稍的（地）、稍许

(1) The SIM1 data set featured six data classes that *were slightly overlapped* as seen in Fig. 1.

Note1: feature: 作动词时：展示、展现、刻画...的特色；由...主演；以...为特色

Note2: slight; slightly = somewhat

## 16.显然、明显的

(1) It is evident from these plots that the pattern vectors for the training and prediction subsets do not match up perfectly since the prediction data was collected during later experiments and included vapors not in the training subset.

Note1: it is evident from sth1 that

Note2: match (up): 相配，匹配

Note3: “介词短语作后置定语”的否定形式: not in the training subset.

## 17.大量的、丰富的

(1) However, unlike SAW1, *plenty of* training patterns were available *for learning* the structure of the data space.

Note1: plenty of: 大量的，丰富的

Note2: be available for doing sth1 / sth1

## 18.怎样、怎么

(1) However, we are primarily interested in *how* (连词) these algorithms perform on data obtained from chemical sensor arrays.

## 19.无论如何...、不管如何...、无论何事

(1) The values of A and B are the same, no matter what input *u* we take.

(2) synthesis, survey, tutorial, overview, perspective 综述

(3) In the following = in what follows

# 语法及特殊结构、用法

## 1. 现在分词的用法

- (1) It is unfortunate that I had not written the generalized inverter concept as a separate paper, making (用的好) it difficult to trace in a literature search.
- (2) Beginning with system (1), differentiating  $y$ , and performing row reordering and reduction, we obtain the following system.
- (3) Using the generalized notion of controlled invariance, a condition for the controlled invariance was derived.
- (4) Before proceeding further with the analysis, we want to stress that the recursive construction indicated by algorithm (8) can be interpreted as a nonlinear analogue of the construction in a linear system. We return now to the analysis of the properties of the sequence of distributions in the nonlinear setting.
- (5) The representation thus obtained is particularly interesting when studying the behavior of the system under the action of the control  $u$ .
- (6) Methods utilizing multivariate statistical techniques are presented, with applications to soft sensing and fault detection.
- (7) Gas turbines are mechanical devices operating on a thermodynamic cycle with (用) air as the working fluid.

Note: with sth1 as sth2

- (8) The air is compressed in a compressor, mixed with fuel and burnt in a combustor with the gas expanded in a turbine to generate power used in driving the external loads depending on requirements.
- (9) However, when the turbines are removed from operation due to forced outages, the downtime incurred depends on the time required to complete the necessary repair or maintenance action, hence affecting its availability.
- (10) Unfortunately, sensor measurements are often distorted by noise and bias, thereby masking the true condition of the engine and leading to incorrect estimation results.

Note: 现在分词做状语: thereby masking sth. and leading to sth.

- (11) A hierarchical approach to gas path diagnostic for a two-shaft simple gas turbine involving multiple neural networks has been presented.
- (12) Four sample data sets from our laboratory, involving simulated data and chemical sensor array data, are used to estimate classification accuracies for each method.
- (13) When considering the qualitative criteria, the LVQ and PNN approaches fare well compared to BP-ANN due to their simpler training methods.
- (14) This general approach can be applied to any group of chemical sensors operating together when the signals from each sensor numerically encode different types of chemical information.

Note1: any group of; any kind of

Note2: operating together: 此处是作“后置定语”，当然也可以理解为作“伴随状语”

- (15) The young sitting between my sister and my brother is my cousin Jack.

Note: 现在分词短语作“后置定语”。

- (16) The pattern dimensionality for a sensor array is considerably smaller, *typically* ranging from

3 to 16 (现在分词作“补语”), thus *greatly* decreasing the computation load on the classification algorithm (现在分词作“目的状语”).

Note1: the computation load: 计算量。

Note2: 现在分词可以作“目的 / 时间 / 原因 / 伴随 状语”等, 也可作“补语”

Note3: decrease the computation load: 减少计算量

(17) For many applications, the database of training ANN will need to be updated *periodically*, thus requiring the algorithm to “relearn” its classification rules. This procedure must be performed as simply and quickly as possible.

Note1: need to do sth1: 需要

Note2: require sth1 to do sth2: 要求

Note3: as simply and quickly as possible

(18) However, in *recent* work at the NRL, using simulated chemical sensor array data, the probabilistic neural network (PNN) was shown to be a potentially powerful alternative to the *conventional* BP-ANN approaches.

Note1: sth1 is shown to be + adj. / n.

Note2: a potentially powerful alternative to sth1

Note3: conventional = traditional

Note4: in recent work, in recent research

(19) One of the criteria, namely classification accuracy, will be studied separately using training and classification results obtained from the four example data sets *from* our laboratory.

(10) Four data sets representing typical chemical sensor data (现在分词做定语) were employed *in* this research.

(21) *For* a description of the SAW system, the methods of collecting the data, and the procedure for extracting pattern vectors from the raw SAW data, please see Refs. [5,18].

(22) The final data set (SAW2) *consists of* 664 pattern vectors obtained from SAW data collected using a six sensor array with a preconcentrator sampling system.

Note: “定语的定语的定语”

(23) Thus, for applications requiring a large number of pattern vectors to adequately describe the data space, this is a major drawback, *although* this limitation can be partially overcome by judiciously choosing the patterns in the training subset.

Note1: drawback; judicious

Note2: (partially) overcome this limitation

(24) The primary disadvantage of *formulating* the classification *as* a series of binary decisions is that for applications involving multiple classes (e.g. each of the four data sets in this study), formulating several two-class problems becomes computationally *cumbersome*.

Note1: the primary disadvantage of doing sth1

Note2: formulate sth1 as sth2: 将 sth1 简单叙述 (公式化) 为 sth2, formulate = express

Note3: 现在分词作后置定语; 动名词作主语

Note4: become / be computationally cumbersome

(25) SIMCA, BLDA, and MLDA, all had *trouble* defining classification boundaries due to the multimodal nature of some of the data classes, resulting in poor classification ability.

Note1: all 代词的用法

Note2: poor ability

Note3: resulting in 的逻辑主语是“前面的整个句子”。由此可见: 现在分词短语作状

语时，其逻辑主语可以是句子的“主语”，也可以是“整个句子”。

## 2. 过去分词的用法

- (1) It is unfortunate that I had not written the generalized inverter concept as a separate paper, making (用的好) it difficult to trace in a literature search.
- (2) Using the generalized notion of controlled invariance, a condition for the controlled invariance was derived.
- (3) Before proceeding further with the analysis, we want to stress that the recursive construction indicated by algorithm (8) can be interpreted as a nonlinear analogue of the construction in a linear system. We return now to the analysis of the properties of the sequence of distributions in the nonlinear setting.
- (4) The representation thus obtained is particularly interesting when studying the behavior of the system under the action of the control  $u$ .
- (5) Some of the above results can be rewritten in a straightforward manner for the class of multivariable systems which have vector relative degrees.
- (6) The hierarchical diagnostic methodology adopted involves a number of decentralized networks trained to handle specific tasks.
- (7) All sets of networks were tested with data not used for the training process.
- (8) The results when compared with available diagnostic tools show that significant benefits can be derived from the actual application of this technique.

Note: when (or if) + done / doing

- (9) The long time for maintenance action results in low availability of the engine for usage, when required.
- (10) The air is compressed in a compressor, mixed with fuel and burnt in a combustor with the gas expanded in a turbine to generate power used in driving the external loads depending on requirements.
- (11) Because they are not measurable, the thermodynamic relationship between these performance parameters such as efficiencies and flow capacities and the measurements taken from the engine can be used to detect, isolate and assess the level of fault present on any component.  
Note1: “形容词短语”可作“后置定语”，如此处的“present on any component”  
Note2: “过去分词”同样可以用作“后置定语”，如此处的“taken from the engine”
- (12) However, when the turbines are removed from operation due to forced outages, the downtime incurred depends on the time required to complete the necessary repair or maintenance action, hence affecting its availability.
- (13) Unfortunately, sensor measurements are often distorted by noise and bias, thereby masking the true condition of the engine and leading to incorrect estimation results.

Note: 现在分词做状语: thereby masking sth. and leading to sth.

- (14) We first obtain a thermodynamic model of the engine from which simulation data would be generated for training and testing the networks. This approach was applied because it is extremely expensive to sacrifice actual engines for such an analysis and the probability of obtaining erroneous data from actual fault implantations cannot be ruled out.
- (15) The technique presented, combined with inference tools such as expert system or fuzzy logic could be expanded to produce an engine health monitoring scheme since ANN also has the

ability to fuse data from other associated performance monitoring techniques such as vibration and oil analysis (介词短语直接做后置定语).

Note1: have ability to do

(16) When considering the qualitative criteria, the LVQ and PNN approaches fare well compared to BP-ANN due to their simpler training methods.

(17) This general approach can be applied to any group of chemical sensors operating together when the signals from each sensor numerically encode different types of chemical information.

Note1: any group of; any kind of

Note2: operating together: 此处是作“后置定语”，当然也可以理解为作“伴随状语”

(18) For many applications, the database of training ANN will need to be updated *periodically*, thus requiring the algorithm to “relearn” its classification rules. This procedure must be performed as simply and quickly as possible.

Note1: need to do sth1: 需要

Note2: require sth1 to do sth2: 要求

Note3: as simply and quickly as possible

(19) However, in *recent* work at the NRL, using simulated chemical sensor array data, the probabilistic neural network (PNN) was shown to be a potentially powerful alternative to the *conventional* BP-ANN approaches.

Note1: sth1 is shown to be + adj. / n.

Note2: a potentially powerful alternative to sth1

Note3: conventional = traditional

Note4: in recent work, in recent research

(20) One of the criteria, namely classification accuracy, will be studied separately using training and classification results obtained from the four example data sets *from* our laboratory.

(21) Four data sets representing typical chemical sensor data (现在分词做定语) were employed *in* this research.

(22) The final data set (SAW2) *consists of* 664 pattern vectors obtained from SAW data collected using a six sensor array with a preconcentrator sampling system.

Note: “定语的定语的定语”

### 3. 不定式的用法：作宾语、作后置定语

(1) It is obvious that the ability to accurately determine engine health largely depends on the accuracy of measurements available.

Note: 不定式和某些形容词（如此处的 available）都可做“后置定语”

(2) We should determine the sensors to be monitored.

(3) The classification accuracy of CLASS1 is very high which indicates the networks ability to adequately distinguish between a faulty and non-faulty engine.

(4) Both, LDA and SIMCA are *computationally* simpler and easier to train than a BPANN, but have trouble with multimodal.

(5) They found that, in general, neural-network methods performed very well in terms of predictive performance but required long training times and an expert's intuition to implement.

Note1: perform very well

Note2: require: 要求（有），需要（有）

Note3: in terms of: 在...方面，就...而言，根据...来看，用...的话，根据，按照。与“with

reference to” 相同，而不同于 “according to”，也不同于 “in view of / due to / because of” 等。

#### 4. 缩写、略写、省略句

- (1) The classification accuracy achieved (Table 5) is similar to that from Fig. 5.

Note: from 前面省略了 “achieved”。

- (2) All the networks here were trained with RB training algorithm with the transfer function for all nodes, tan sigmoid.

- (3) The MSE errors, both for training and testing of the network here again, indicate a very high level of prediction accuracy.

- (4) The PNN is recommended for applications where a confidence measure and fast training are critical, while speed and memory requirements are not. LVQ is suggested for all other applications of chemical sensor array pattern recognition.

- (5) For chemical sensor array applications *in* uncontrolled environments, the pattern recognition algorithm must be able to reduce the potential for false alarms by being able to differentiate between sensor signals which it was trained on and those which it was not.

Note1: “it” stands for “the pattern recognition algorithm”.

Note2: differentiate between sth1 and sth2

Note3: 省略句及代词 “those” 的用法。

- (6) Such a measure will aid in reducing the occurrence of *false alarms* by requiring that the sensor system be >80% or 90% certain of a classification decision before a warning is given or an alarm sounded.

Note1: aid in doing sth. = be helpful in doing

Note2: be certain of sth1: 确信..., 信任..., 相信...

be certain to do: 一定会...

Note3: require that + 从句: 从句要用虚拟语气: (should) do

Note4: 百分比的用法: 可直接用作状语

Note5: 省略句: a warning is given or an alarm (is) sounded

- (7) As (was) outlined earlier, the classification of chemical sensor array data offers a unique situation compared to pattern recognition in general.

Note: offer a unique situation

- (8) One of the criteria, namely classification accuracy, will be studied separately using training and classification results obtained from the four example data sets *from* our laboratory.

- (9) Although many ANN researchers have attempted to overcome these limitations, there are *no* generally *acceptable* solutions to these problems.

Note1: attempt to do sth1: 努力...; 试图...; 尝试...

Note2: overcome these limitations

Note3: no generally acceptable solutions to these problems

Note4: there be sth1 + 地址/地点 (此 “地址/地点” 在不确定或不需要指明或比较笼统时可以省略)

- (10) The optimal PNN configuration was determined by selecting the kernel width value that *minimized* the cross-validation classification *error*, where  $N_m$  is the total number of patterns misclassified,  $n$  the number of patterns in the training subset, and  $p_i$  the PNN classification probability for the known classification.

Note1: determine sth1 by doing sth2

Note2: minimize error

## 5. 特殊符号的用法

(1) It necessary to note that the engine under consideration has four basic components—one compressor, one combustor and two turbines.

Note: 折号的用法: 表示解释、说明, 相当于 “that is”.

(2) Comparisons are made based on five qualitative criteria (speed, training difficulty, memory requirements, robustness to outliers, and the ability to produce a measure of uncertainty) and one quantitative criterion (classification accuracy).

Note1: make comparisons: 做比较

Note2: 括号表示 “解释说明”, 相当于 “i.e., that is”

Note3: ability to do sth.: 做...的能力。

(3) To meet this challenge, researchers have coupled arrays of partially selective sensors with pattern recognition algorithms to interpret the complex sensor signals and provide automated decision-making capabilities (i.e. presence, or absence, of the targeted analyte).

Note: 括号的用法

(4) Chemical fingerprints for the target analyte(s) will form clusters in m-dimensional space (where m is the number of sensors in the array).

(5) Their comparisons were based on four technical (optimal decision boundaries, overlapping regions, degree of certainty, and outliers) and four practical (updates, variables of mixed type, irrelevant parameters, and ease of use) aspects of supervised pattern recognition.

(6) Also, the optimal architecture (e.g. number of hidden units and layers) is not known *in advance* and must be found through *trial and error*.

Note1: in advance: 事先、预先、提前

Note2: trial and error: 试错法、反复试验

Note3: e.g.

## 6. 特殊句式

(1) The MSE and RMS defined by Eqs. (2) and (3), respectively, are the statistical parameters used to examine the performance of the networks as well as make comparisons with other diagnostic techniques in this work.

Note: as well as 作为连词, 也可以连接两个 “动词”。

(2) Traditional chemical sensing methods have relied on the inherent selectivity of the sensor to determine the presence, or absence, of the target analyte(s).

(3) Treated together, these sensor signals produce what is commonly called a “chemical fingerprint”.

Note1: 以 “形容词/分词/不定式” 开头, 有两个方面的作用: 变换句式以增加灵动性; 另外更重要的是, 表示 “强调”。

Note2: 此处的 “what” 具有双重身份, 相当于 “something that, all that”。

(4) Both, LDA and SIMCA are *computationally* simpler and easier to train than a BPANN, but have trouble with multimodal.

(5) Probably the most comprehensive *comparison study* was published in a 1994 textbook *by Michie, Spiegelhalter, and Taylor*.

(6) Five of these criteria, namely (2-6), will be treated in a qualitative manner (e.g. *whether or*



not the algorithm can meet a particular criterion).

(7) The BP training algorithm used in a BP-ANN is both slow and prone to local minima, *requiring many replicate optimizations to ensure convergence.*

Note1: be prone to sth1

Note2: be both slow and prone to sth1.

(8) Perhaps less well known, the other methods (e.g. NN, LVQ, and BP-ANN) can also use Bayes theorem to obtain *posterior* probabilities.

Note1: 整个句子可以“以分词、形容词开头”，如此处的“perhaps less well know”，对其表示强调。

(9) This method of determining *when* to stop training is sometimes referred to as Train-and-Test [15].

Note1: determine when to do sth1: 此处“when”是名词（或代词）：什么时候

Note2: be referred to as: 被称为...

(10) The conclusions will be biased if the *prediction* set is used to decide *which set of conditions* is optimal.

Note1: decide which set of conditions is optimal

(11) The position of the discriminant computed by the BLDA procedure *was such that* most of the patterns that it missed in the training subset were not included in the prediction subset.

Note1: sth1 be such that +从句: sth1 使得...

(12) The only approach that can perform this task, and also does it very well in terms of classification accuracy, is PNN.

## 7. （特殊）语法结构：独立主格结构、虚拟语气等等

(1) Considering the level and complexity of the faults being diagnosed, especially with the level of noise added, this degree of accuracy is satisfactory even in actual applications.

Note: with + n./porn. + done/doing/不定式/形容词/介词短语: 构成“独立主格结构”（其实是 with 引导的复合结构）

Note: level: 本身隐含有“高水平”的意思。

(2) From Table 7(b), it is shown that over 70% of the test patterns fall within one standard deviation of the mean error, with the mean *effectively* equal to zero in this case.

(3) Had noise been included in the NLGPA measurements, the ANN diagnostic results may have compared favourably with those from NLGPA or even better since no noise filtering algorithm exist in the NLGPA tool.

Note1: compare favourably with: 优于；不亚于

Note2: “Had noise been included in the NLGPA measurements”是虚拟语气的一种，本质上表示“强调”。

Note3: 此处的“or even better”是与“favourably”相连接的。

(4) These *recent* results suggest that other classification algorithms may be better suited than BP-ANN for this application.

(5) BP-ANN is considered the slowest and most difficult *to train* among the algorithms studied.

Note1: consider sth1: 考虑...； consider sth1 sth2: 认为sth1 是（或具有）sth2, 把sth1 看作是sth2, 相当于“regard (sth1) as (sth2)”。

Note2: the + adj. 相当于“名词”（...的），直接作主语或宾语

(6) Compared with BP-ANN, LVQ classifiers are simpler to construct and *get stuck in* local

optima less frequently, but have a large random component in training that results in *longer training times* compared with the statistical methods.

Note1: be + 形容词 + to do: 这个句型的主语可以是代词“it”（此时后面的不定式是真正的主语），也可以是“真正的名词作主语”（此作主语的名词其实是 to do 的宾语）

Note2: get stuck in: 受骗于，被...欺骗，使劲干（通常指不知情的蛮干）。这个词通常用在“否定句”中，如此处的“less frequently”，或其他的 do not 等。

Note3: result in longer training times.

Note4: less frequently: 表示否定意义

(7) Perhaps less well known, the other methods (e.g. NN, LVQ, and BP-ANN) can also use Bayes theorem to obtain *posterior* probabilities.

Note1: 整个句子可以“以分词、形容词开头”，如此处的“perhaps less well know”，对其表示强调。

(8) This method of determining *when* to stop training is sometimes referred to as Train-and-Test [15].

Note1: determine when to do sth1: 此处“when”是名词（或代词）：什么时候

Note2: be referred to as: 被称为...

(9) When comparing pattern recognition algorithms, it is imperative that the predictive performance be an unbiased indication of *what* can be expected from the classifier when used on the general population.

Note: what = a thing that / things that / all that

(10) The conclusions will be biased if the *prediction* set is used to decide *which set of* conditions is optimal.

Note1: decide which set of conditions is optimal

(11) The number of hidden neurons necessary to describe the SAW data was less due to the fact that these data sets *featured* several replicate pattern vectors for each vapor.

Note1: it is + adj. + to do sth1: it 是形式主语，真正主语是“不定式”

sth1 is + adj. + to do: sth1 其实是 do 的宾语

sth1 is + adj. + to do sth2, 如词句中的“necessary to describe the SAW data”

Note2: 同位语从句: the fact that + 从句

(12) The position of the discriminant computed by the BLDA procedure *was such that* most of the patterns that it missed in the training subset were not included in the prediction subset.

Note1: sth1 be such that + 从句: sth1 使得...

(13) With this information in mind, the BP-ANN and LVQ approaches performed the best on this data set.

Note1: with this information in mind: with 引导的复合结构（可以称为一种独立主格结构）

(14) The SAW2 data set included seven data classes, several of which featured highly overlapping clusters.

Note1: several of which: 定语从句的用法

(15) For this data set, LVQ performed the best with PNN, NN, and BP-ANN also doing very well.

Note1: with sth1 doing: with 引导的复合结构（可理解为一种独立主格结构）

(16) The assumption used in MLDA and BLDA, that the structure of the covariance matrix for each class is similar, is no longer satisfied.

Note1: that the structure of the covariance matrix for each class is similar: 同位语从句

Note2: no longer: 不再

## 负面表述

### 一、否定形式

#### 1. Not 及 No 的形式否定

(1) The above (articles) *are of* no interest to us at present.

Note: no+名词: 表示“没有” .....

(2) No analogy exists between them.

(3) neither...nor..., none of... (lacking illustrations)

(4) It is nothing good to ...

(5) All sets of networks were tested with data not used for the training process.

(6) If there is no fault detected in the patterns and if the network is sufficiently accurate, then there is no need for further diagnostic checks.

(7) This network requires no “training”.

(8) Had noise been included in the NLGPA measurements, the ANN diagnostic results may have compared favourably with those from NLGPA or even better since no noise filtering algorithm exist in the NLGPA tool.

(9) There is no connection between them.

(10) The described methodology has been tested with data not used for training and generalization is found to be appropriate for actual application of this technique.

Note: be appropriate for: 对...合适, 适合于

(11) The PNN is recommended for applications where a confidence measure and fast training are critical, while speed and memory requirements are not. LVQ is suggested for all other applications of chemical sensor array pattern recognition.

(12) Field measurements *offer* additional challenges *not* seen in the laboratory or controlled environments, such as the need to detect and identify the target analyte(s) *in the presence of* large concentrations of interfering species that may or may not be known *beforehand*.

Note: 不定式、现在分词、过去分词的“否定形式”, 是在它们前面直接加“not”。

(13) Although many ANN researchers have attempted to overcome these limitations, there are *no* generally *acceptable* solutions to these problems.

Note1: attempt to do sth1

Note2: overcome these limitations

Note3: no generally acceptable solutions to these problems

Note4: there be sth1 + 地址/地点 (此“地址/地点”在不确定或不需要指明或比较笼统时可以省略)

(14) It should be noted that, while possible, *the use of* probabilistic outputs in NN, LVQ and BPANN *is not yet common*.

Note1: while possible = if possible

Note2: not yet: 尚未, 还未

(15) It is evident from these plots that the pattern vectors for the training and prediction subsets do not match up perfectly since the prediction data was collected during later experiments and

included vapors not in the training subset.

Note1: it is evident from sth1 that

Note2: match (up): 相配, 匹配

Note3: “介词短语作后置定语”的否定形式: not in the training subset.

(16) The assumption used in MLDA and BLDA, that the structure of the covariance matrix for each class is similar, is no longer satisfied.

Note1: that the structure of the covariance matrix for each class is similar: 同位语从句

Note2: no longer: 不再

(17) The only criterion that LVQ fails *is that* it has no simple measure for each classification decision.

Note: fail 此处是“及物动词”

## 2. 介词意义否定

(1) Without loss of generality, it may be assumed that...

注释: Without +名词, 表示“不.....”

(2) The ANN structure described above forms a part of the diagnostic tool that includes other aspects involved in parameter corrections as well as aspects that provide linguistic information on the nature and type of fault *since* ANN only gives qualitative and quantitative results without any explanation for them.

## 3. 动词意义否定

(1) In Table 10 however, NLGPA failed to converge on some fault scenarios.

Note: fail to (do): 不....., 未能.....

(2) However, in this case, ample measures were taken to prevent overtraining (e.g. using a small number of hidden neurons and employing the network with the minimum training and monitoring error) *and since* the degree of overtraining was minimal, we feel that for these data sets it was unavoidable.

Note1: in this case: 在这种情况下

Note2: take (ample) measures to do sth1: 采取措施做...

Note3: prevent sth1 (overtraining 是名词); prevent sb1 / sth1 from doing sth2

Note4: the degree of overtraining

(3) The only criterion that LVQ fails *is that* it has no simple measure for each classification decision.

Note: fail 此处是“及物动词”

## 4. 短语意义否定

(1) .....rather than..... 是.....而非..... (lacking illustrations)

(2) Improving availability and reducing life-cycle costs require maintenance schemes such as condition-based maintenance (CBM) that advocates maintenance only when it is necessary and at the appropriate time instead of (而不是) after a fixed number of operating hours or cycles.

Note: instead of = rather than

(3) The inversion algorithm as detailed in [1] is now given, with the exception that, instead of allowing a large class of analytic transformations, we will use a particular meromorphic transformation.

Note1: with the exception of, with the exception that

(4) However, the development of new sensors is often prohibitively costly exercise. Hence, in the context of low cost automation, it is of great interest to consider the use of soft sensors instead of hardware sensors.

(5) Improving availability and reducing life-cycle costs require maintenance schemes such as condition-based maintenance (CBM) that advocates maintenance only when it is necessary and at the appropriate time instead of after a fixed number of operating hours or cycles.

(6) A probable alternative diagnostic structure to that shown in Fig. 5 is also presented in the next section.

(7) However, in *recent* work at the NRL, using simulated chemical sensor array data, the probabilistic neural network (PNN) was shown to be a potentially powerful alternative to the *conventional* BP-ANN approaches.

Note1: sth1 is shown to be + adj. / n.

Note2: a potentially powerful alternative to sth1

Note3: conventional = traditional

Note4: in recent work, in recent research

## 5. 形容词短语意义否定

(1) Be far from +adj. 远远不....., 远非..... (lacking in illustrations)

Note1: far from, adv. 远远不, 远非; be far from + adj. (形容词), 远远不....., 远非.....

## 6. 形容词、副词及其比较级意义否定

(1) It turns out that the sufficient conditions for DDPO are less restrictive than the existing ones, and most importantly they provide specific procedures to construct a dynamic output feedback.

(2) The main gas path components of the GT, which are compressor, combustor and turbines, are usually very reliable, but could result in low availability of the whole unit if a forced unexpected outage is encountered as it can take some considerable time to effect repairs on them.

(3) This is made worse if the breakdown occurred when the maintenance crew was unprepared for it.

(4) Normally, costs associated with the design and manufacture of the engine are fixed and rarely influenced by the users.

(5) BLDA, PNN, and NN require the *least* effort in training.

Note1: the least + n. / pron. : 表达了否定的意思

Note2: effort at / in (sth / doing sth) = attempt at (sth / doing sth)

(6) Compared with BP-ANN, LVQ classifiers are simpler to construct and *get stuck in* local optima less frequently, but have a large random component in training that results in *longer training times* compared with the statistical methods.

Note1: be + 形容词 + to do: 这个句型的主语可以是代词“it”（此时后面的不定式是真正的主语），也可以是“真正的名词作主语”（此作主语的名词其实是 to do 的宾语）

Note2: get stuck in : 受騙于, 被...欺騙, 使劲干（通常指不知情的蛮干）。这个词通常用在“否定句”中，如此处的“less frequently”，或其他的 do not 等。

Note3: result in longer training times.

Note4: less frequently: 表示否定意义

(7) However, computational power is increasing rapidly and this is becoming less of a concern.

Note: become less of a concern: 变得无足轻重; 变得不关心; 不予考虑

(8) Perhaps less well known, the other methods (e.g. NN, LVQ, and BP-ANN) can also use Bayes theorem to obtain *posterior* probabilities.

Note1: 整个句子可以“以分词、形容词开头”，如此处的“perhaps less well know”，对其表示强调。

## 7. 前缀及后缀否定

- (1) There are unavoidable performance penalties associated with the use of soft-sensors.
- (2) It is unfortunate that I had not written the generalized inverter concept as a separate paper, making it difficult to trace in a literature search.
- (3) This is made worse if the breakdown occurred when the maintenance crew was unprepared for it.
- (4) Unfortunately, sensor measurements are often distorted by noise and bias, thereby masking the true condition of the engine and leading to incorrect estimation results.
- (5) In addition, the results from the GPA techniques (LGPA and NLGPA) do not include measurement noise unlike those from ANN.

Note: “介词短语”可以直接做“后置定语”

(6) It should be mentioned that the Euclidean distance metric can sometimes produce *unexpected* results *unless* normalization or scaling of the pattern vector is performed.

Note1: unless: conj. 如果不, 除非

Note2: perform normalization (进行归一化处理); perform scaling of sth. (对...进行比例放缩)

(7) However, in this case, ample measures were taken to prevent overtraining (e.g. using a small number of hidden neurons and employing the network with the minimum training and monitoring error) *and since* the degree of overtraining was minimal, we feel that for these data sets it was unavoidable.

Note1: in this case: 在这种情况下

Note2: take (ample) measures to do sth1: 采取措施做...

Note3: prevent sth1 (overtraining 是名词); prevent sb1 / sth1 from doing sth2

Note4: the degree of overtraining

## 8. 连词意义否定

(1) It should be mentioned that the Euclidean distance metric can sometimes produce *unexpected* results *unless* normalization or scaling of the pattern vector is performed.

Note1: unless: conj. 如果不, 除非

Note2: perform normalization (进行归一化处理); perform scaling of sth. (对...进行比例放缩)

## 二、贬义动词

### 1. 出现、发生、遇到、遭遇

- (1) This situation of ... can not occur (emerge).
- (2) The main gas path components of the GT, which are compressor, combustor and turbines, are usually very reliable, but could result in low availability of the whole unit if a forced unexpected

outage is encountered as it can take some considerable time to effect repairs on them.

Note1: effect: 实现、达到; 效果、作用。

Note2: take some considerable time to do

Note3: effect repairs on sth.

(3) This is made worse if the breakdown occurred when the maintenance crew was unprepared for it.

Note1: make sth. + adj. (to do)

Note2: be prepared for sth.-----antonym: be unprepared for sth.----- prepare for

(4) Because they are not measurable, the thermodynamic relationship between these performance parameters such as efficiencies and flow capacities and the measurements taken from the engine can be used to detect, isolate and assess the level of fault present on any component.

(5) Gas path faults can occur during the operation of a gas turbine and because they affect performance, it is necessary that they should be diagnosed and corrected.

(6) The MSE from the training and testing process in the presence of measurement noise indicates the high estimation quality of the networks for the faults being diagnosed.

(7) The amount of sensor noise that may be present is also determined.

(8) It should be noted that the presence of a fault is indicated by a change in the independent variables which would thus affect the measurements taken from the engine.

(9) Traditional chemical sensing methods have relied on the inherent selectivity of the sensor to determine the presence, or absence, of the target analyte(s).

Note: in the presence of; in the absence of

(10) Field measurements *offer* additional challenges not seen in the laboratory or controlled environments, such as the need to detect and identify the target analyte(s) *in the presence of* large concentrations of interfering species that may or may not be known *beforehand*.

(11) Such a measure will aid in reducing the occurrence of *false alarms* by requiring that the sensor system be >80% or 90% certain of a classification decision before a warning is given or an alarm sounded.

Note1: aid in doing sth. = be helpful in doing

Note2: be certain of sth1: 确信..., 信任..., 相信...

be certain to do: 一定会...

Note3: require that + 从句: 从句要用虚拟语气: (should) do

Note4: 百分比的用法: 可直接用作状语

Note5: 省略句: a warning is given or an alarm (is) sounded

Note6: occurrence: 发生, 发生的事情, 引申为“出现(的事情)”(take place)

presence: 出现、存在(描述一种客观的情况), 实际的存在。

(12) The slight *drop-off* in classification performance between the training and prediction data suggests that overtraining might have occurred.

Note1: drop off = decrease; drop-off: 名词: 下降, 降低

Note2: suggest that + 从句(当“暗示”讲时, 用虚拟语气)

Note3: overtrain: 过度训练

(13) The LVQ approach was able to select the important pattern vectors that occur near the class boundaries and performed very well in prediction.

(14) As seen in Figs. 3 and 4, scatter and multimodality for the three data classes *are present* in the pattern space.

## 2. 牵扯、牵涉、卷入、包含

(1) For applications involving a large number of sensors (i.e. *high* dimensionality of the pattern vector) or requiring many pattern vectors to describe the data space, the memory requirement may *overcome* the amount available on most microcontroller cards.

Note1: involve: 牵涉、卷入、包含, 一般指“不利的事情”

Note2: require sth1 to do sth2

Note2: 此处的“overcome”不是“克服、战胜、征服”的意思(指好的事情), 而是“超过、胜过、比...多”(通常指好的事情, 但也可能是坏事, 如此例句中的意思)。

Note4: the amount

## 3. 阻止

(1) However, in this case, ample measures were taken to prevent overtraining (e.g. using a small number of hidden neurons and employing the network with the minimum training and monitoring error) *and since* the degree of overtraining was minimal, we feel that for these data sets it was unavoidable.

Note1: in this case: 在这种情况下

Note2: take (ample) measures to do sth1: 采取措施做...

Note3: prevent sth1 (overtraining 是名词); prevent sb1 / sth1 from doing sth2

Note4: the degree of overtraining

## 4. 导致、引起、招致、受困于

(1) In the sequel we argue that the chain of subspace gives a linear algebraic framework that clarifies many structural properties of nonlinear systems and leads to a synthesis of many previous works on rank invariants of nonlinear systems.

(2) However, when the turbines are removed from operation due to forced outages, the downtime incurred depends on the time required to complete the necessary repair or maintenance action, hence affecting its availability.

(3) When a forced outage is caused by these components, the maintenance downtime can be excessive.

(4) The long time for maintenance action results in low availability of the engine for usage, when required.

(5) The new maintenance downtime is then only due to actual repair time.

(6) Compared with BP-ANN, LVQ classifiers are simpler to construct and *get stuck in* local optima less frequently, but have a large random component in training that results in *longer training times* compared with the statistical methods.

Note1: be + 形容词 + to do: 这个句型的主语可以是代词“it”(此时后面的不定式是真正的主语), 也可以是“真正的名词作主语”(此作主语的名词其实是 to do 的宾语)

Note2: get stuck in: 受骗于, 被...欺骗, 使劲干(通常指不知情的蛮干)。这个词通常用在“否定句”中, 如此处的“less frequently”, 或其他的 do not 等。

Note3: result in longer training times.

Note4: less frequently: 表示否定意义

(7) Unlike the simulated data sets (SIM1 and SIM2), the pattern vectors for each class are not Gaussian distributed around a mean vector, but have considerable scatter due to experimental error



and multimodality caused by having different chemical vapors within each data class.

Note1: unlike + n. / doing

Note2: not..., but...: 不是..., 而是...

Note3: cause sth1; be caused by sth1 / doing...

(8) This can be described as instrument non-repeatability or precision error, and can be of the same order of magnitude as changes induced by a real engine fault.

## 5. 掩盖、遮住、隐瞒、隐藏

(1) Unfortunately, sensor measurements are often distorted by noise and bias, thereby masking the true condition of the engine and leading to incorrect estimation results.

## 6. 欺骗、被骗

(1) Compared with BP-ANN, LVQ classifiers are simpler to construct and *get stuck* in local optima less frequently, but have a large random component in training that results in *longer training times* compared with the statistical methods.

Note1: be + 形容词 + to do: 这个句型的主语可以是代词“it”（此时后面的不定式是真正的主语），也可以是“真正的名词作主语”（此作主语的名词其实是 to do 的宾语）

Note2: get stuck: 受骗于，被...欺骗，这个词通常用在“否定句”中，如此处的“less frequently”，或其他的 do not 等；get stuck in: 使劲干（通常指不知情的蛮干，暗含被欺骗之意）。

Note3: result in longer training times.

Note4: less frequently: 表示否定意义

(2) It was observed that the BP-ANN training was easily trapped in local minima, thus *requiring that* the training runs for each configuration be repeated *10 times* to increase the probability of convergence.

Note1: be trapped = get stuck: 只是“get stuck”通常用于“否定句”中

Note2: 10 times: 表示“补语”，前面不加介词，如“for”等。

Note3: require + 从句: 需要用虚拟语气，(should) do

Note4: increase the probability of convergence

## 7. 忽略、忽视、省略、避免

(1) The underlying assumption is that the algorithm has been trained to recognize all the important compounds. Thus, any new or ambiguous sensor signal (e.g. a chemical vapor which it has not been trained to recognize) should be ignored.

Note: ignore: （主动的、故意的，有意的，人为的）不理睬，忽略，不考虑

avoid: （主动的、有意的）避免（不利因素、不利之物）

disregard: 忽视、轻视、漠视、不尊重：思想不集中或缺乏应有的考虑： pay no attention to sth1

## 8. 除...外、除...外（还有）

(1) Generally, all classification networks performed well except CLASS3 where some DCFs were misclassified as either SCF or MCF.

## 9. 排除、去除、删除、去掉、移动

- (1) However, when the turbines are removed from operation due to forced outages, the downtime incurred depends on the time required to complete the necessary repair or maintenance action, hence affecting its availability.
- (2) We first obtain a thermodynamic model of the engine from which simulation data would be generated for training and testing the networks. This approach was applied because it is extremely expensive to sacrifice actual engines for such an analysis and the probability of obtaining erroneous data from actual fault implantations cannot be ruled out.
- (3) The combustor is excluded in this analysis because its efficiency is relatively stable with time and thus its performance deterioration does not provide sufficient information from the measurable parameters which is a requirement for assessing its health using our technique.

## 10. 降低、减少、退化、恶化、减小

- (1) Soft failures may generally not degrade the system performance for sometime.  
Note: degrade ... performance
- (2) The mean RMS errors from the three techniques show that the estimation accuracy depreciates from NLGPA through ANN to LGPA.
- (3) The pattern dimensionality for a sensor array is considerably smaller, *typically* ranging from 3 to 16 (现在分词作“补语”), thus *greatly* decreasing the computation load on the classification algorithm (现在分词作“目的状语”).

Note1: the computation load: 计算量。

Note2: 现在分词可以作“目的 / 时间 / 原因 / 伴随 状语”等, 也可作“补语”

Note3: decrease the computation load: 减少计算量。

“decrease”表示“不好之物”的必然的稳定的减少。

- (4) BLDA is based on the Bayes' strategy for minimizing risk associated with the classification decision.

Note: minimize risk associated with sth1

- (5) The key variables for LVQ are the number of hidden layer neurons and the learning rate. In this work, the learning rate was set initially to 0.05 and *decreased by 10%* every 500 epochs.

Note1: the number of: ...的数目; a number of: 大量的

Note2: the learning rate

Note3: be set to sth1

Note4: decreased by 10% every 500 epochs.

- (6) The slight *drop-off* in classification performance between the training and prediction data suggests that overtraining might have occurred.

Note1: drop off = decrease; drop-off: 名词: 下降, 降低

Note2: suggest that + 从句 (当“暗示”讲时, 用虚拟语气)

Note3: overtrain: 过度训练

## 11. 失败、失效、舍弃

- (1) The only criterion that LVQ fails *is that* it has no simple measure for each classification decision.

Note: fail 此处是“及物动词”

## 12.歪曲、曲解、扭曲

- (1) Unfortunately, sensor measurements are often distorted by noise and bias, thereby masking the true condition of the engine and leading to incorrect estimation results.

## 13.滥用、混淆、盲目

- (1) We use the simplified abuse of notation  $y(x)=c(x)$  for the output function.  
(2) Note also that we abuse notation slightly because ...  
slightly, somewhat  
(3) We get somewhat abusing notations.

## 14.要求、需要、必需、必需品、必须

- (1) In this paper, we review the need for engine diagnostics and maintenance, present some aspects of the ANN application to diagnostic problems, highlight some features of ANN that make it amenable to GT diagnostics as well as its limitations and finally discuss its application to gas path fault diagnosis of a developed case study.

Note1: the need for sth.

Note2: highlight sth: 强调、使显著、加亮、突出

Note3: be amenable to: 有义务, 顺从, 经得起检验

- (2) For the operational health of the engine, such measurable parameters as pressures, temperatures, fuel flow are required.

- (3) For many applications, the database of training ANN will need to be updated *periodically*, thus requiring the algorithm to “relearn” its classification rules. This procedure must be performed as simply and quickly as possible.

Note1: need to do sth1: 需要

Note2: require sth1 to do sth2: 要求

Note3: as simply and quickly as possible

- (4) Such a measure will aid in reducing the occurrence of *false alarms* by requiring that the sensor system be >80% or 90% certain of a classification decision before a warning is given or an alarm sounded.

Note1: aid in doing sth. = be helpful in doing

Note2: be certain of sth1: 确信..., 信任..., 相信...

be certain to do: 一定会...

Note3: require that + 从句: 从句要用虚拟语气: (should) do

Note4: 百分比的用法: 可直接用作状语

Note5: 省略句: A warning is given or an alarm (is) sounded.

- (5) Unfortunately, no pattern recognition algorithm is able to fully meet *each* of these requirements.

Note1: (fully) meet requirements: (完全) 满足要求

- (6) An NN classifier requires no training.

- (7) NN and PNN have larger memory requirements than the other pattern recognition algorithms in this study.

Note1: 比较级的用法: be + 比较级的形容词 (表语) + than

be / 实意动词 + 比较级形容词 (定语) + n. / pron. + than

比较级副词 (状语) + 实意动词 + 宾语 + than

Note2: have ... requirements: 要求有.....

(8) NN and PNN have larger memory requirements than the other pattern recognition algorithms in this study.

Note1: 比较级的用法: be + 比较级的形容词 (表语) + than

be / 实意动词 + 比较级形容词 (定语) + n. / pron. + than

比较级副词 (状语) + 实意动词 + 宾语 + than

Note2: have ... requirements: 要求有.....

(9) For applications involving a large number of sensors (i.e. *high* dimensionality of the pattern vector) or requiring many pattern vectors to describe the data space, the memory requirement may *overcome* the amount available on most microcontroller cards.

Note1: involve: 牵涉、卷入、包含, 一般指“不利的事情”

Note2: require sth1 to do sth2

Note2: 此处的“overcome”不是“克服、战胜、征服”的意思(指好的事情), 而是“超过、胜过、比...多”(通常指好的事情, 但也可能是坏事, 如此例句中的意思)。

Note4: the amount

(10) Given enough pattern vectors, an external distribution of classification scores could *be used* in conjunction with any of the seven algorithms studied here to provide some confidence levels, but requires *extensive calculations* and *large amounts of available data*.

Note1: Given sth1, sth2...

Note2: in conjunction with: 与...协力、与...合力

Note3: provide some confidence levels: 提高置信水平, 提供具有信心的水平, 增加信心。

Note4: extensive = a large amount of = large amounts of

(11) Because some of the algorithms studied here require the *optimization* of classification algorithm settings (e.g. the number of hidden neurons in BP-ANN) in addition to regular training, multiple training runs will need to be performed.

Note1: require the optimization of sth1: 动词名词化

Note2: in addition to sth1 = besides sth1

Note3: perform multiple training runs

(12) Applications involving multimodal classes require a nonlinear boundary between the classes. Thus, this data set would appear to favor the neural network and NN algorithms.

Note1: applications *involving* sth1 require sth2

Note2: appear to do: 看起来, 表现出, 显现出

Note3: favor: 支持、赞成

(13) PNN *features* the fastest training, but has the highest computational requirements for prediction.

Note1: have requirements for

### 三、贬义短语、名词、形容词、介词、连词

#### 1. 不便, 麻烦, 繁重

(1) Note that, when n is large, Step5 is computationally cumbersome (or burdensome), but the

following proposition can be used to reduce its complexity.

(2) It reduces the burden of calculation.

reduce the computational burden

(3) The primary disadvantage of *formulating* the classification *as* a series of binary decisions is that for applications involving multiple classes (e.g. each of the four data sets in this study), formulating several two-class problems becomes computationally *cumbersome*.

Note1: the primary disadvantage of doing sth1

Note2: formulate sth1 as sth2: 将 sth1 简单叙述（公式化）为 sth2

Note3: 现在分词作后置定语；动名词作主语

Note4: become / be computationally cumbersome

## 2. 破费、昂贵、在损害...的情况下、以损害...为代价

(1) However, the development of new sensors is often prohibitively costly exercise. Hence, in the context of low cost automation, it is of great interest to consider the use of soft sensors instead of hardware sensors.

Note: at the expense of: 以损害（牺牲）...为代价，在坑害/损害...（利益）的情况下

(2) We first obtain a thermodynamic model of the engine from which simulation data would be generated for training and testing the networks. This approach was applied because it is extremely expensive to sacrifice actual engines for such an analysis and the probability of obtaining erroneous data from actual fault implantations cannot be ruled out.

Note1: the probability of doing

Note2: rule out: 排除出去、避免、排除在外、划去、排除、取消、不考虑

(3) Drug companies profit at the expense of older Americans.

（药品公司以坑害老年美国人来牟取利润）

(4) Experts said that China's rapid economic growth has been achieved at the expense of environment.

## 3. 冒险、风险

(1) BLDA is based on the Bayes' strategy for minimizing risk associated with the classification decision.

Note: minimize risk associated with sth1

## 4. 挑战

(1) To meet this challenge, researchers have coupled arrays of partially selective sensors with pattern recognition algorithms to interpret the complex sensor signals and provide automated decision-making capabilities (i.e. presence, or absence, of the targeted analyte).

Note1: meet this challenge: 应对挑战、迎接挑战、应付挑战。

Note2: automated decision-making capability: 自动决策能力。

(2) The attacks posed a new challenge to President Putin's hardline policy on Chechen.

Note: sth1 pose / offer challenge to sb1 or sth2: sth1 对 sb1 or sth2 提出了挑战；sth1 造成（引起）了对 sb1 or sth2 的挑战

(3) Field measurements *offer* additional challenges not seen in the laboratory or controlled environments, such as the need to detect and identify the target analyte(s) *in the presence of* large concentrations of interfering species that may or may not be known *beforehand*.

Note: 过去分词的否定: not+分词

## 5. 缺点、缺陷、局限、不利条件

(1) Traditional techniques for gas path fault diagnosis such as visual inspection, fault trees, fault matrixes and gas path analysis, have their limitations.

(2) Table 1 shows the strengths of ANN which are juxtaposed with its perceived weaknesses.

(3) They also reported that each method has its own relative advantages and disadvantages and that the practitioner would be wise to choose the *appropriate* algorithm for the application at hand.

Note1: be wise to (介词) + n./pron.: 明白..., 知道..., 了解...

be wise to do: 明智的做..., 具有博学知识来做..., 有能力来做...

Note2: at hand

(4) Thus, for applications requiring a large number of pattern vectors to adequately describe the data space, this is a major drawback, *although* this limitation can be partially overcome by judiciously choosing the patterns in the training subset.

Note1: drawback; judicious

Note2: (partially) overcome this limitation

(5) Although many ANN researchers have attempted to overcome these limitations, there are *no* generally *acceptable* solutions to these problems.

Note1: attempt to do sth1

Note2: overcome these limitations

Note3: no generally acceptable solutions to these problems

Note4: there be sth1 + 地址/地点 (此“地址/地点”在不确定或不需要指明或比较笼统时可以省略)

(6) The primary disadvantage of *formulating* the classification as a series of binary decisions is that for applications involving multiple classes (e.g. each of the four data sets in this study), formulating several two-class problems becomes computationally *cumbersome*.

Note1: the primary disadvantage of doing sth1

Note2: formulate sth1 as sth2: 将 sth1 简单叙述(公式化)为 sth2

Note3: 现在分词作后置定语; 动名词作主语

Note4: become / be computationally cumbersome

## 6. 困难、麻烦、障碍、损失(不利结果)

(1) The main difficulty in comparing the various algorithms was that each algorithm was working over its own, unique, field.

(2) There are unavoidable performance penalties associated with the use of soft-sensors.

(3) It is unfortunate that I had not written the generalized inverter concept as a separate paper, making it difficult to trace in a literature search.

(4) Both, LDA and SIMCA are *computationally* simpler and easier to train than a BPANN, but have trouble with multimodal.

(5) BP-ANN is considered the slowest and most difficult *to train* among the algorithms studied.

Note: consider sth1: 考虑...; consider sth1 sth2: 认为sth1 是(或具有)sth2, 把sth1 看作是sth2, 相当于“regard (sth1) as (sth2)”.

## 7. 苛刻的、苛求的、受限的、有限的

(1) However, for applications *involving* simple pattern spaces, the choice of architecture is not critical and training speeds *are usually acceptable*.

(2) In terms of outlier rejection, any of the algorithms that can produce a measure of uncertainty have some limited outlier rejection capabilities.

Note: limited: 有限的, 有限制的 (指不充分)

## 8. 差、差的、最差、最差的

(1) SIMCA did perform the best and PNN also did very well, but MLDA and BLDA did not *achieve satisfactory results*. NN performed the worst *on* this data set.

Note1: achieve satisfactory results

Note2: perform the best / worst: 做得 (完成的) 最好 / 最差

Note3: *on* data

(2) Due to the nonlinear nature of the pattern space, neural networks and NN should *exhibit good classification ability*.

Note1: nonlinear nature = nonlinearity

Note2: exhibit (good / poor) ability

(3) SIMCA, BLDA, and MLDA, all had *trouble* defining classification boundaries due to the multimodal nature of some of the data classes, resulting in poor classification ability.

Note1: all 代词的用法

Note2: poor ability

Note3: resulting in 的逻辑主语是“前面的整个句子”。由此可见: 现在分词短语作状语时, 其逻辑主语可以是句子的“主语”, 也可以是“整个句子”。

(4) Its prediction performance is much better than its *relatively poor* classification of the patterns in the training subset.

Note1: be much better than

Note2: relatively poor

(5) SIMCA did perform the best and PNN also did very well, but MLDA and BLDA did not *achieve satisfactory results*. NN performed the worst *on* this data set.

Note1: achieve satisfactory results

Note2: perform the best / worst: 做得 (完成的) 最好 / 最差

Note3: *on* data

## 9. 尽管、不管、不论

(1) However, it was noticed that, *despite having* the best training results, the performance of BP-ANN in prediction was no better than the other algorithms.

Note1: despite sth1 / doing sth1: 尽管...

Note2: be no better than: 比...差、不比...好

Note3: performance in sth1: 在...方面的性能

(2) *Despite* these limitations, our laboratory has successfully implemented a PNN for a three-sensor SAW *involving* more than 500 pattern vectors using a simple microprocessor.

## 四、矛盾（常用于反证法）

- (1) The relation between (1) and (2) yields a contradiction when combined with (3).
- (2) Combining A and B yield a contradiction.
- (3) It contradicts the assumption of the dynamic compensator.
- (4) This is the desired contradiction that establishes the theorem.

## 五、区别、不同、与...不同

- (1) Another important point to be stressed, which emphasizes the difference between the general problem here and its local version described in Section 1, is that the elements are immersed submanifolds.

注释：

固定短语：the difference between A and B; A is different from B; as opposed to, adv./ prep.; distinct notions, various, different

- (2) It is essential to remark that this is an ordinary, non-differential vector space as opposed to the setting proposed in [2].
- (3) Note that *this* differs from the form (1).
- (4) Unlike the simulated data sets (SIM1 and SIM2), the pattern vectors for each class are not Gaussian distributed around a mean vector, but have considerable scatter due to experimental error and multimodality caused by having different chemical vapors within each data class.

Note1: unlike + n. / doing

Note2: not..., but...: 不是..., 而是...

Note3: cause sth1; be caused by sth1 / doing...

## 图、表、例

### 1. 图

- (1) A system as shown in Fig. 5
- (2) Figs. 1 and 2 are plots of the 480 patterns in the training sets for the SIM1 and SIM2 data sets, explaining 77.33 and 82.54% of the variance.
- (3) These figures illustrate that clustering among the various classes is present, but in many cases is highly overlapping.

- (4) The SIM1 data set featured six data classes that *were slightly overlapped* as seen in Fig. 1.

Note1: feature: 作动词时：展示、展现、刻画；由...主演；以...为卖点；以...为特色；另外，最重要的是：它有“包含”的意思，而被包含的通常是具有“特征、特色及代表性”的“东西”（宾语），此例句中就是这个意思。

Note2: slight; slightly = somewhat

Note3: as seen in Fig.1 = as shown in Fig.1

- (5) As seen in Figs. 3 and 4, scatter and multimodality for the three data classes *are present* in the pattern space.
- (6) The PC scores plots shown in Figs. 5 and 6 illustrate the overlapping clusters for the GB and GD classes.



## 2. 表

- (1) Table 1 shows the strengths of ANN which are juxtaposed with its perceived weaknesses.
- (2) Table 1 lists the number of pattern vectors.
- (3) Table 3 outlines a comparison of the seven pattern recognition algorithms based on the five qualitative guidelines or criteria for the ideal pattern recognition algorithm.
- (4) The *upper half* of Table 4 lists the percentages of patterns in the training set that were correctly classified for each pattern recognition algorithm in each data set.

## 3. 例

# 文章的结尾部分

## 1. 经验、教训

- (1) The lesson to be derived from here is that a modular diagnostic structure like the one proposed in Fig. 5 allows for optimization of each aspect of the structure, by using the best network configuration suitable for that aspect.

Note1: allow for: 考虑、考虑到了、照顾到了、顾及、酌留

Note2: 形容词短语做“后置定语”，如此处的“suitable for that aspect”。

## 2. 总结、概括、报告、结论

- (1) A summary of the classification networks developed in this work are presented including results obtained in terms of correctly classified test patterns.
- (2) A similar conclusion can be drawn from Table 10.

Note: draw a conclusion from

- (3) They concluded that the choice of the best algorithm was application specific and that hybrid approaches offered great potential.

Note1: 动词名词化: the choice of the best algorithm

Note2: offer great potential

- (4) They also reported that each method has its own relative advantages and disadvantages and that the practitioner would be wise to choose the *appropriate* algorithm for the application at hand.

Note1: be wise to (介词) + n./pron.: 明白..., 知道..., 了解...

be wise to do: 明智的做..., 具有博学知识来做..., 有能力来做...

Note2: at hand

- (5) To our (best) knowledge, no studies comparing multiple pattern recognition algorithms on several chemical sensor array data sets have been reported.

Note1: to our (best) knowledge: 就我们的所掌握的知识(情况)而言, 据(尽)我们所知

Note2: on data

- (6) The conclusions will be biased if the *prediction* set is used to decide *which set of* conditions is optimal.

Note1: decide which set of conditions is optimal

- (7) The percentages that are listed *in bold typeface* are the prediction performance for each data

set that *was judged* by the authors *as* the best.

Note1: judge sth1 as sth2

Note2: the best: 最好的（东西）

(8) This conclusion will not surprise anybody *in* the chemical sensor *community*.

Note1: surprise sb1: 使某人感到吃惊

Note2: community: 有共同利益的一群人, 如 the scientific community: 科学界

Note3: in ... community: 在...界、在...领域

(9) Thus, based on the results in this paper, *we recommend* the LVQ for most applications of chemical sensor arrays *and the PNN for special cases* where a statistical measure is required.

Note1: recommend sth1

Note2: 省略句

Note3: required: 形容词: 必需的、必不可少的、必要的、需要的

### 3. 将来的工作（研究）、开放性的问题

(1) This paper leaves some interesting open questions, which are a topic for further research.

(2) This, hopefully, is expected to open ways for studies of other dynamic output feedback design problems, which, together with some open questions left in this paper, are the topic for further research.

(3) The generalization of these conditions to MIMO systems is open for further researches, as well as the use of minimal number of output time-derivative.

(4) Further study of this anomaly indicated that this result *was due to* the fact that the training and prediction subsets do not cover *the same* data space exactly.

Note1: be due to: 由于, 因为, 归功于, 归因于

Note2: 同位语从句 (that)

Note3: the same sth1

(5) Future work in our laboratory will focus on methods of combining the LVQ and PNN approaches, in order to exploit the advantages of both methods.

### 4. 附录

(1) The proof of this theorem is given in Appendix 1.

(2) The following lemma established in the Appendix is basic to our development.

### 5. 感谢、感激

(1) The authors are grateful to anonymous referees for their constructive comments on an early version of the paper.

(2) The author is grateful to Prof. W. A. Wolovich for his valuable (helpful; useful) discussions, comments and suggestions.

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(4) The author would like to thank Teng Zhang for his encouragement in pursuing this line of research.

(5) This research was performed while Ronald E. Shaffer was a National Research Council---Naval Research Laboratory *postdoctoral research associate*. Dr. Mark Anderson is thanked for helpful discussions of PNN and providing the two simulated data sets. Dr. David

Venezky *is acknowledged for* his interest in this work.

Note1: 此处 while = when

Note2: be thanked for = be acknowledged for

Note3: his interest in

## 6. (文献) 引用、参考

(1) To the best of our knowledge, no results are available in the literature for such a general situation.

(2) In recent years there has been considerable interest in the problem of decoupling nonlinear multivariable systems by state variable feedback and a necessary and sufficient condition for the existence of decoupling control law has been obtained [2].

(3) There is a considerable amount of literature dealing with ...

(4) Has only recently received much attention *in the literature*.

(5) Has received a great deal of interest in...

(6) Have only been a few contributions ...

(7) Most previous research has centered on ...

(8) More recent and appealing works are due to ...who posed and solved for the first time ...

(9) The problem of inverting a dynamical system has received a great deal of attention since the works of [12] in the case of linear systems and the extensions given in [24] to the case of nonlinear systems.

(10) The most pertinent paper related principally to... appears to be the work of ...

(11) The works of ...also treats certain aspects of the problem under consideration here as do the papers of ...

(12) The study of dynamic state feedback solutions was carried out in [6].

(13) In the recent literature, there have been many attempts to extend concepts and tools from the linear setting to the class of nonlinear systems.

(14) The main stream (主流) in the research for nonlinear control systems is based on the state space representation.

(15) For more (further) details on...see ...

(16) GPA as a tool for engine diagnostics was initially introduced by Urban [1].

(17) In recent research by Johnson et al., neural networks based upon learning vector quantization (LVQ) were also found to work well with chemical sensor array data [12].

Note1: sth1 be found to do:

Note2: work (well) with sth1: 对...起(很好的)作用, 对... (很)有效

(18) Probably the most comprehensive *comparison study* was published in a 1994 textbook *by* Michie, Spiegelhalter, and Taylor.

(19) *For* a description of the SAW system, the methods of collecting the data, and the procedure for extracting pattern vectors from the raw SAW data, please see Refs. [5,18].

(20) To our knowledge, only one other publication *has advocated* the use of this algorithm for chemical sensor array pattern recognition [12].

Note1: advocate the use of: 拥护; 提倡; 主张

# 专业知识

## 一、 控制

- (1) One of the main advantages of the proposed approach is its robustness to the disturbance.

Note: disturbance rejection: 扰动抑制

- (2) Each of the seven pattern recognition algorithms employed in this study were implemented *in* MATLAB (version 4.2c, Mathworks, Natick, MA) on a Dell Pentium-120 personal computer running Windows 3.1 (Microsoft, Redmond, WA).

Note: be implemented in Matlab on computer running Window XP.

- (3) The BP-ANN algorithms were taken from the Neural Network toolbox in Matlab.

- (4) The classification of the new pattern is assigned to that of the closest pattern (i.e. smallest  $d$ ) in the training set.

Note: be assigned to do sth (不定式):

be assigned to sth (介词)

## 二、 测量

- (1) Field measurements *offer* additional challenges not seen in the laboratory or controlled environments, such as the need to detect and identify the target analyte(s) *in the presence of* large concentrations of interfering species that may or may not be known *beforehand*.

Note1: field: 此处为“现场的、田间的、野外的”: field measurements: 现场测量得到的量

Note2: 不定式、现在分词、过去分词的“否定形式”，是在它们前面直接加“not”。

- (2) Similar to SAW1, one of the sensors in the array did not provide any additional information and was removed, resulting in a five-dimensional pattern vector.

Note1: 用“similar to sth1”，而不是用“similarly to”，尤其是作为开头

Note2: provide additional information

- (3) These data sets will *provide* a good test bed *for* the pattern recognition algorithms in this study.

Note: provide sth1 for sth2

## 三、 神经网络

### 1. 数据及其处理

- (1) Four data sets representing typical chemical sensor array data were employed in this research. Two of these data sets involved manufactured or simulated data, while the remaining data were collected using SAW chemical sensor systems. The simulated data were obtained from Dr. Mark Anderson and were used in Ref. [13]. The 960 pattern vectors in these data sets were generated by using a Gaussian probability distribution about a mean vector with a predetermined variance for each sensor. The mean vectors were chosen to mimic the distribution of data obtained using an actual chemical sensor array. Training and prediction subsets were created by randomly subdividing the available pattern vectors (480 for training and 480 for prediction) while keeping the number of pattern vectors in each class equal (i.e., 80 and 120 patterns in each class for SIM1 and SIM2, respectively). Random subdivision of the data should be done carefully when the

numbers of samples in each class are not equal [15]. The class distribution of the training and prediction sets should be similar. The first simulated data set (SIM1) was based on a four-sensor array with six data classes. The second simulated data set (SIM2) was based on a six-sensor array with four data classes.

(2) For a description of the SAW system, the methods of collecting the data, and the procedure for extracting pattern vectors from the raw SAW data, please see Refs. [5,18].

Note1: extract sth1 from sth2

(3) The pattern vectors in each data set were vector normalized to remove concentration information where necessary. (???)

(4) Data normalization was performed by *dividing* each element of the pattern by the square root of the sum of the squares.

Note1: perform normalization: 进行归一化

Note2: the square root of the sum of the squares: 平方和的平方根

## 2. 神经网络的结构与算法

(1) Using a network with architecture 6-35-35-3, resilient back propagation as training algorithm and tan sigmoid transfer function on all nodes, we obtained improved classification accuracy for this class.

(2) A close view at one of these approximation networks presented in Table 6 shows that it has architecture of 6-30-30-4 with 23,064 patterns used for training while a different 23,064 patterns were involved in the testing of the network.

(3) ANNs are nonlinear, nonparametric algorithms that typically use the back-propagation (BP) method for training.

(4) B-PANN consists of an input layer, one or two hidden layers, and an output layer of neurons. A neuron is simply a processing unit that outputs a linear or nonlinear transformation of its inputs (i.e. a weighted sum). The neurons, as a group, serve to map the input pattern vectors to the *desired* outputs (the known data class of the pattern vector).

Note1: processing: 现在分词作“前置定语”，再如“separating”等

Note2: map sth1 to sth2

Note3: the desired outputs

(5) The summation layer consists of one neuron for each data class and sums the outputs from all hidden neurons.

(6) The SIMCA and neural network (LVQ and BPANN) algorithms have many configuration options. To make this comparison as fair as possible, several configuration options for each approach were used.

Note1: have many options: 有多种选择

Note2: as fair as possible: 尽可能直接地（清楚地、公正地）

(7) The optimal PNN configuration was determined by selecting the kernel width value that *minimized* the cross-validation classification *error*; where  $Nm$  is the total number of patterns misclassified,  $n$  the number of patterns in the training subset, and  $p_i$  the PNN classification probability for the known classification.

Note1: determine sth1 by doing sth2

Note2: minimize error

(8) The BP-ANN training procedure employed the Levenberg-Marquardt technique to optimize

the weights of the hidden layer.

Note1: optimize the weights of

(9) The number of hidden layer neurons was varied from 25 to 150.

Note: vary sth1 from A to B

(10) A close view at one of these approximation networks presented in Table 6 shows that it has architecture of 6-30-30-4 with 23,064 patterns used for training while a different 23,064 patterns were involved in the testing of the network.

### 3. 神经网络的训练

(1) A summary of the approximation networks are presented.

(2) All the networks here were trained with RB training algorithm with the transfer function for all nodes, tan sigmoid.

(3) The described methodology has been tested with data not used for training and generalization is found to be appropriate for actual application of this technique.

Note: be appropriate for: 对...合适, 适合于

(4) For many applications, the database of training ANN (动名词) will need to be updated *periodically*, thus requiring (现在分词作目的状语) the algorithm to “relearn” its classification rules. This procedure must be performed as simply and quickly as possible.

Note1: need to do sth1: 需要

Note2: require sth1 to do sth2: 要求

Note3: as simply and quickly as possible

(5) SIMCA methods train quickly but sometimes determining the optimum number of PCs *is not straightforward*.

Note1: train quickly

Note2: 动名词直接作主语: determining the optimum number of PCs

Note3: be straightforward

(6) This method of determining *when* to stop training is sometimes referred to as Train-and-Test [15].

Note1: determine when to do sth1: 此处 “when” 是名词 (或代词): 什么时候

Note2: be referred to as: 被称为...

(7) The key variables for LVQ are the number of hidden layer neurons and the learning rate. In this work, the learning rate was set initially to 0.05 and *decreased by 10%* every 500 epochs.

Note1: the number of: ...的数目; a number of: 大量的

Note2: the learning rate

Note3: be set to sth1

Note4: decreased by 10% every 500 epochs.

(8) The BP-ANN training procedure employed the Levenberg-Marquardt technique to optimize the weights of the hidden layer.

Note1: optimize the weights of

### 4. 神经网络训练的偏差与精度

(1) Using BP, the weights and biases associated with the neurons are modified to minimize the *mapping* error.

(2) The optimal PNN configuration was determined by selecting the kernel width value that

*minimized* the cross-validation classification *error*; where  $N_m$  is the total number of patterns misclassified,  $n$  the number of patterns in the training subset, and  $p_i$  the PNN classification probability for the known classification.

Note1: determine sth1 by doing sth2

Note2: minimize error

(3) In this approach, the kernel width is modified *at* each iteration to reduce the cross-validation training error Eq. (4).

Note1: be modified to reduce the training error

Note2: *at* each iteration

(4) The optimal kernel widths for the four data sets in this study *were found to be* 0.0358, 0.0678, 0.0138, and 0.0062 for SIM1, SIM2, SAW1, and SAW2, *respectively*.

(5) It was observed that the BP-ANN training was easily trapped in local minima, thus *requiring that* the training runs for each configuration be repeated *10 times* to increase the probability of convergence.

Note1: be trapped (诱捕) = get stuck: 只是“get stuck”通常用于“否定句”中

Note2: 10 times: 表示“补语”，前面不加介词，如“for”等。

Note3: require + 从句: 需要用虚拟语气，(should) do

Note4: increase the probability of convergence

## 5. 神经网络训练的收敛性（稳定）

(1) However, in this case, ample measures were taken to prevent overtraining (e.g. using a small number of hidden neurons and employing the network with the minimum training and monitoring error) *and since* the degree of overtraining was minimal, we feel that for these data sets it was unavoidable.

Note1: in this case: 在这种情况下

Note2: take (ample) measures to do sth1: 采取措施做...

Note3: prevent sth1 (overtraining 是名词); prevent sb1 / sth1 from doing sth2

Note4: the degree of overtraining

(2) The weights and biases of the neurons become stabilized and the ANN is said to be trained.

Note: be said to be: 被称为

(3) The BP training algorithm used in a BP-ANN is both slow and prone to local minima, *requiring* many replicate optimizations *to ensure convergence*.

(4) Compared with BP-ANN, LVQ classifiers are simpler to construct and *get stuck in* local optima less frequently, but have a large random component in training that results in *longer training times* compared with the statistical methods.

Note1: be + 形容词 + to do: 这个句型的主语可以是代词“it”（此时后面的不定式是真正的主语），也可以是“真正的名词作主语”（此作主语的名词其实是 to do 的宾语）

Note2: get stuck in: 受骗于，被...欺骗，使劲干（通常指不知情的蛮干）。这个词通常用在“否定句”中，如此处的“less frequently”，或其他的 do not 等。

Note3: result in longer training times.

Note4: less frequently: 表示否定意义

(5) In this work, ten iterations *were found to be sufficient to* achieve convergence.

Note: be sufficient to do sth1

(6) Each training *run* was replicated thrice to ensure convergence.

(7) It was observed that the BP-ANN training was easily trapped in local minima, thus *requiring that* the training runs for each configuration be repeated *10 times* to increase the probability of convergence.

Note1: be trapped (诱捕) = get stuck: 只是“get stuck”通常用于“否定句”中

Note2: 10 times: 表示“补语”，前面不加介词，如“for”等。

Note3: require + 从句: 需要用虚拟语气，(should) do

Note4: increase the probability of convergence

## 6. 神经网络的逼近性能与特点

(1) BP-ANNs have become the *de facto* standard *for* chemical sensor pattern recognition due to the increasing power of personal computers and their inherent advantages in modeling complex data spaces.

(2) They found that, in general, neural-network methods performed very well in terms of predictive performance but required long training times and an expert's intuition to implement.

Note1: perform very well

Note2: require: 要求(有)，需要(有)

Note3: in terms of: 在...方面，就...而言，根据...来看，用...的话，根据，按照。与“with reference to”相同，而不同于“according to”。

(3) BLDA, PNN, and NN require the *least effort* in training.

Note1: the least + n. / pron.: 表达了否定的意思

Note2: effort at / in (sth / doing sth) = attempt at (sth / doing sth)

(4) The slight *drop-off* in classification performance between the training and prediction data suggests that overtraining might have occurred.

Note1: drop off = decrease; drop-off: 名词: 下降，降低

Note2: suggest that + 从句(当“暗示”讲时，用虚拟语气)

Note3: overtrain: 过度训练

# 数学常用语

## 1. 向量、空间、系统的维数

(1) Vectors and matrices in (5) have the same dimension as in the preceding section.

(2) Chemical fingerprints for the target analyte(s) will form clusters in *m*-dimensional space (where *m* is the number of sensors in the array).

## 2. 微分、求导、初等变换、可微的(可导的)、导数

(1) By successively differentiating the equation ..., we have

(2) Perform elementary column operations with an analytic square and nonsingular matrix.

Note1: Full rank; Full column (row) rank; Column (row) rank; Singular matrix; Nonsingular matrix; A  $m \times n$  matrix of rank  $m$ ; Identity matrix

Note2: perform elementary column operation / transformation

(3) To proceed, suppose that the input function  $u(t)$  to the system (1) is  $N$  times continuously differentiable.

(4) The generalization of these conditions to MIMO systems is open for further researches, as



well as the use of minimal number of output time-derivative.

(5) Taking \ computing the derivative of ..., we have...

Note1: the k-th order derivative; The lowest order derivative, the highest derivative

Note2: the derivative of optional order

Note3: take / compute the derivative of sth1

### 3. 解方程、给出...的解

(1) Solving the latter equation for  $u$  and substituting the result in (10) gives...

### 4. 张成向量空间、取秩

(1) It is important to note that in (1) the span and dimension are both taken with respect to the field  $K$ , and *not* the real numbers.

(2) The rank is taken over the field of meromorphic functions of  $x$ .

(3) The rank is over the field of meromorphic functions of  $x$ .

(4) The rank is taken with respect to the field of rational functions of  $x$  with coefficients in the field of meromorphic functions of  $y$ .

### 5. 距离、度量

(1) The MLDA algorithm employed in this work is based on the Mahalanobis distance metric.

### 6. 平方根

(1) Vector normalization was performed *by dividing* each element of the pattern by the square root of the sum of the squares.

Note1: perform normalization

Note2: the square root of the sum of the squares: 平方和的平方根

### 7. 区间

(1) The patterns in the smaller training subset were employed in training and at various intervals during the training procedure, the classification of the patterns in the monitoring set were predicted.

Note: at various intervals: 在不同的区间（时间段）

### 8. 精度、准确性、精确性

(1) The classification accuracy of CLASS1 is very high which indicates the networks ability to adequately distinguish between a faulty and non-faulty engine.

### 9. 前提、前提条件、充要条件

(1) Consequently these are equivalent necessary and sufficient conditions for ...

(2) Sufficiency was established previously.

Note1: a necessary condition; a sufficient condition; sufficiency(充分性), necessity (必要性); if and only if; necessary and sufficient conditions

(3) It turns out that the sufficient conditions for DDPO are less restrictive than the existing ones, and most importantly they provide specific procedures to construct a dynamic output feedback.

- (4) To establish (1), it suffices to show (or prove) that...
- (5) The basic premise is that the *underlying* PDF for each class can be estimated using a small number of references vectors.

Note1: premise, precondition

Note2: a large number of ----- a small number of

## 10. 在...情况/条件/背景/前提下、背景、情况、前提

- (1) If this is the case, the pair is an observable pair.
- (2) However, the development of new sensors is often prohibitively costly exercise. Hence, in the context of low cost automation, it is of great interest to consider the use of soft sensors instead of hardware sensors.
- (3) Like in the previous Section, we need some background material.
- (4) Although many important contributions have been given to the decoupling problem during the last 20 years, its most general case has been solved only recently for linear systems by Zhang.
- (5) Under certain conditions, the algorithm characterizes the input space on which the input-output map is injective.
- (6) His algorithm is in fact a generalization of previous algorithms, due to Silverman [1] and zhang [2] that are only applicable under some restrictive conditions.
- (7) Before proceeding further with the analysis, we want to stress that the recursive construction indicated by algorithm (8) can be interpreted as a nonlinear analogue of the construction in a linear system. We return now to the analysis of the properties of the sequence of distributions in the nonlinear setting.
- (8) Many sensors installed on the engine operate in very hostile environments.
- (9) Generating data to cover all the possible fault scenarios as well as the required operating conditions defined by the power setting parameter and ambient conditions.
- (10) This is based on the premise that faults in the gas path of a gas turbine cause changes in efficiencies and flow capacities which are not directly measurable but because relationship exists between the measurements such as pressures, temperatures, speeds, etc. taken from different stations of an engine and the performance parameters, it is exploited to determine the magnitude of changes in the independent variables.
- (11) Based on the types of environments and situations that chemical sensor arrays are expected to operate in, we can select six qualities that the ideal pattern recognition algorithm will have.

Note1: 定语从句，用“that”引导，比“which”引导看上去要“正规和顺畅”。

Note2: 引导定语从句的“that 或 which”在从句中，既可以作“主语”，也可以作“状语”（一般为介词短语中的名词），如此句中的“that chemical sensor arrays are expected to operate in”，还可以作从句中的“宾语”，如此处的“that the ideal pattern recognition algorithm will have”。

Note3: the types of : ...的类型

Note4: in ...environments / in ... situations / in ... environments and situations

Note5: choose 和 select 的区别: choose 通常是强调在“选择”某物时的意愿，特别是当供挑选物只有两个时，我们应当用 choose; select 通常指“精挑细选”。有好几个东西供选择时，最好用 select，因为有较多的被挑选物，挑选人就必须加以鉴别。

- (12) The *underlying* assumption is that the algorithm has been trained to recognize all the important compounds.

(13) As (was) outlined earlier, the classification of chemical sensor array data offers a unique situation compared to pattern recognition in general.

Note: offer a unique situation

(14) However, in this case, ample measures were taken to prevent overtraining (e.g. using a small number of hidden neurons and employing the network with the minimum training and monitoring error) *and since* the degree of overtraining was minimal, we feel that for these data sets it was unavoidable.

Note1: in this case: 在这种情况下

Note2: take (ample) measures to do sth1: 采取措施做...

Note3: prevent sth1 (overtraining 是名词); prevent sb1 / sth1 from doing sth2

Note4: the degree of overtraining

(15) However, this is often the case in many applications due to the constantly changing environments found in *field measurements*.

Note1: this is often the case

Note2: constantly changing environments: 不断变化的环境

(16) Under certain conditions, the algorithm characterizes the input space on which the input-output map is injective.

surjection (满射), injective (单射的), surjective (满射的), map (映射)

## 11. 满足条件、满足要求、条件成立、结论成立

(1) First of all, we examine (=check) when the stopping condition identified in lemma 8 can be met and then we discuss the involutivity.

(2) The conditions for the existence of state and output transformations are easy to check via a step-by-step procedure and have been implemented with Maple.

(3) The *underlying* assumption is that the algorithm has been trained to recognize all the important compounds.

(4) Unfortunately, no pattern recognition algorithm is able to fully meet *each* of these requirements.

Note1: (fully) meet requirements: (完全) 满足要求

(5) In this paper, we attempt to fill that gap by comparing seven classification algorithms, commonly used in the chemical sensor and pattern recognition communities, for their ability to meet the criteria.

Note1: fill the gap by doing

Note2: meet the criteria

(6) The assumption used in MLDA and BLDA, that the structure of the covariance matrix for each class is similar, is no longer satisfied.

Note1: that the structure of the covariance matrix for each class is similar: 同位语从句

Note2: no longer: 不再

## 12. 可能性、概率、百分比、很可能

(1) From Table 7(b), it is shown that over 70% of the test patterns fall within one standard deviation of the mean error, with the mean *effectively* equal to zero in this case.

(2) We first obtain a thermodynamic model of the engine from which simulation data would be generated for training and testing the networks. This approach was applied because it is extremely

expensive to sacrifice actual engines for such an analysis and the probability of obtaining erroneous data from actual fault implantations cannot be ruled out.

(3) For military applications, such as the detection of toxic chemical vapors, classification rates of >90% accuracy are necessary.

Note1: of >90% accuracy = of over 90% accuracy.

(4) Such a measure will aid in reducing the occurrence of *false alarms* by requiring that the sensor system be >80% or 90% certain of a classification decision before a warning is given or an alarm sounded.

Note1: aid in doing sth. = be helpful in doing

Note2: be certain of sth1: 确信..., 信任..., 相信...

be certain to do: 一定会...

Note3: require that + 从句: 从句要用虚拟语气: (should) do

Note4: 百分比的用法: 可直接用作状语

Note5: 省略句: A warning is given or an alarm (is) sounded.

(5) Figs. 1 and 2 are plots of the 480 patterns in the training sets for the SIM1 and SIM2 data sets, explaining 77.33 and 82.54% of the variance.

(6) For classifying new patterns, the PDF is used to estimate the probability that the new pattern belongs to each data class (同位语从句).

(7) If the certainty for a classification is <80 or 90%, then the pattern can be rejected as an outlier.

Note: be rejected as: 当作(作为)... 被拒绝

(8) Once the optimal classifier for each pattern recognition algorithm is chosen, the percentage of patterns correctly identified in the prediction subset can be used as an *unbiased* measure of predictive performance.

(9) PNN and NN performed very well on the training set data and correctly identified >90% of the patterns in the prediction subset.

Note1: >90% of the patterns = over 90% of the patterns: 名词短语, 作主语或宾语

(10) From Table 7(b), it is shown that over 70% of the test patterns fall within one standard deviation of the mean error, with the mean *effectively* equal to zero in this case.

(11) very likely: 很可能, means at least 90 percent probability.

### 13. (作) 差、距离、差值

(1) Random error is the difference in values between repeated measurements.

(2) To classify a new pattern, the Euclidean distance between the new pattern and each pattern in the training set is computed. The Euclidean distance metric *is given by* Eq. (1), where  $d$  is the Euclidean distance between patterns  $i$  and  $j$ , each with  $n$  variables. On the other hand, the Mahalanobis distance metric *is computed as*

***insert the suitable equations .*** (1)

Note: *each* with  $n$  variables

### 14. 带入、替代

(1) With substitution of (1), (2), and (3) into (4), it is found that...

(2) But upon substitution of (36) into (37), we find that...

(3) Substituting this relationship into (20) yields

Note: substitute sth1 into sth2, 将 sth1 代入 sth2;  
substitute sth1 for sth2, 用 sth1 取代 sth2.

(4) The classification of new patterns is performed in the same way as NN *except* the LVQ hidden layer replaces the training set.

## 15. 迭代

(1) In this approach, the kernel width is modified *at* each iteration to reduce the cross-validation training error Eq. (4).

Note1: be modified to reduce the training error

Note2: *at* each iteration

## 16. 划分、分类、分组、分解

(1) Now consider a system whose outputs have been grouped into blocks: ...

(2) Measurement errors may be broken down into two distinct components, a random error and a fixed error.

Note: break down: 分解, 分类---break down sth1 into sth2, or sth1 break down into sth2  
e.g. The population breaks down into three main groups.

(3) The 664 pattern vectors were subdivided into training and prediction subsets.

(4) Vector normalization was performed *by dividing* each element of the pattern by the square root of the sum of the squares.

Note1: perform normalization

Note2: the square root of the sum of the squares: 平方和的平方根

(5) For BP-ANN and LVQ, the training subset was further subdivided into a smaller training subset (80%) and a monitoring subset (20%).

(6) The state space can be partitioned into  $d$ -dimensional smooth surfaces.

Note1: the two-dimensional vector; The M-dimensional space; A finite-dimensional vector space; Five dimensional systems; A second order Taylor expansion

Note2: partition sth1 into sth2

(7) Vector normalization was performed *by dividing* each element of the pattern by the square root of the sum of the squares.

Note1: perform normalization

Note2: the square root of the sum of the squares: 平方和的平方根

## 17. 逐步、逐点、逐渐

(1) The conditions for the existence of state and output transformations are easy to check via a step-by-step procedure and have been implemented with Maple.

## 18. 等价、等于

(1) In this way, the equivalence of four topics, which previously had only been studied separately, was established.

(2) The error is equal to zero.

## 19. 收敛、收敛速度

(1) The simplest practical situation in which the algorithm (1) converges *in a finite number of steps* is when all the distributions of the sequence are nonsingular.

The usage of when is very good, needing to be followed. when is pron. here. 那时

(2) In Table 10 however, NLGPA failed to converge on some fault scenarios.

(3) The BP training algorithm used in a BP-ANN is both slow and prone to local minima, *requiring* many replicate optimizations *to ensure convergence*.

(4) The simplest practical situation in which the algorithm (1) converges *in a finite number of steps* is when all the distributions of the sequence are nonsingular.

注释: is when / is that / is to / is that of

## 20. 有限步内

(1) The simplest practical situation in which the algorithm (1) converges *in a finite number of steps* is when all the distributions of the sequence are nonsingular.

## 21. 计算、计算量

(1) The pattern dimensionality for a sensor array is considerably smaller, *typically* ranging from 3 to 16 (现在分词作“补语”), thus *greatly* decreasing the computation load on the classification algorithm (现在分词作“目的状语”).

Note1: the computation load: 计算量。

Note2: 现在分词可以作“目的 / 时间 / 原因 / 伴随 状语”等, 也可作“补语”

Note3: decrease the computation load: 减少计算量

(2) An MLDA classifier is trained by computing a mean vector for each class and the pooled covariance matrix.

(3) This can be determined by computing the scalar dot product of the pattern vector with each weight vector.

Note: the scalar dot product of sth1 with sth2

(4) In terms of the speed of operation, only NN and PNN do not meet the necessary requirements because *the distance* between the new pattern and every pattern in the training set *must be performed for each calculation*.

(5) However, computational power is increasing rapidly and this is becoming less of a concern.

Note: become less of a concern: 变得无足轻重; 变得不关心; 不予考虑

(6) Given enough pattern vectors, an external distribution of classification scores could *be used* in conjunction with any of the seven algorithms studied here to provide some confidence levels, but requires *extensive calculations* and *large amounts of available data*.

Note1: Given sth1, sth2...

Note2: in conjunction with: 与...协力、与...合力

Note3: provide some confidence levels: 提高置信水平, 提供具有信心的水平, 增加信心。

Note4: extensive = a large amount of = large amounts of

(7) The primary disadvantage of *formulating* the classification *as* a series of binary decisions is that for applications involving multiple classes (e.g. each of the four data sets in this study), formulating several two-class problems becomes computationally *cumbersome*.

Note1: the primary disadvantage of doing sth1

Note2: formulate sth1 as sth2: 将 sth1 简单叙述（公式化）为 sth2

Note3: 现在分词作后置定语；动名词作主语

Note4: become / be computationally cumbersome

(8) PNN features the fastest training, but has the highest memory and computational requirements for prediction.

(9) Taking \ computing the derivative of ..., we have...

Note1: the k-th order derivative; The lowest order derivative, the highest derivative

Note2: the derivative of optional order

Note3: take / compute the derivative of sth1