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## SYSTEM FOR ANOMALY DETECTION IN PRICES IN A GOODS PURCHASING SYSTEM TO SUPPORT CONTROLLING

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# SYSTEM FOR ANOMALY DETECTION IN PRICES IN A GOODS PURCHASING SYSTEM TO SUPPORT CONTROLLING

## **Background to better understand this idea:**

- Currently, the purchase prices of parts and goods in a company are often negotiated by buyers.
- Controlling usually monitors the purchase prices.
- Often there are many variants of a component. For example, there is a four-digit (!) number of number plate holders in the VW Group.
- It can be very difficult for Controlling, the person responsible for the component, the purchasing manager, etc. to keep an overview.
- Some of the parts have widely differing purchase prices. There are sometimes conspicuous price "outliers" that are 20 times the "usual" and "expected" purchase price.
- Currently, these "price outliers" are determined manually.
- Currently, it is difficult to manually determine the "price outliers" in view of the large number of components. These can therefore remain undetected.

## **1. Current status:**

Currently, there is no system for automatically determining "price outliers" in a goods purchasing system.

## **Disadvantages:**

- Price outliers can remain undetected, especially if there are many component variants.
- Purchase prices can be higher than necessary / usual.
- Alternative solutions (omission of a component, replacement of a component with another, similar component) cannot be used (e.g. replacement of a start/stop button with a similar head or a steering wheel with a similar steering wheel) because the potentials can remain undiscovered.
- Companies cannot purchase components and goods optimally.

## **2. New idea:**

System for anomaly detection in prices in a goods purchasing system to support controlling

## **3. Technical implementation:**

The technical implementation is based on artificial intelligence (machine learning, or alternative methods)

### **3.1 Learning the usual costs for components and goods (pre-processing step):**

In a pre-processing step, the AI learns "usual prices / price ranges" for component groups:

#### **Example**

- Steering rims usually cost between € XX and € YYY in purchasing
- Start / stop buttons usually cost between X € and Y € at the point of purchase
- Licence plate holders usually cost between X € and Y € to purchase
- Etc.

### **3.2. processing of real data and detection of price outliers:**

In this step, the AI works on real data (with the actual data). The AI processes the real data and detects price outliers based on the learned knowledge. These price outliers are stored in a list.

### **3.2. automatic listing of the anomalies:**

The users of the system (e.g. component managers, buyers, controllers, etc.) are shown the price outliers. This gives them the chance to examine them and optimise them if necessary (e.g. through renegotiation, use of alternative components, omission of components).

### **3.optional: Automatic listing of similar components / component alternatives:**

With a similarity search (e.g. via geometric similarity search on 3D data, or similarity search on properties, such as 18" steel rim with offset 45, yoghurt with strawberry flavour with BIO label, etc.) similar goods, components can be suggested to the users of the system. For example, similar start-stop buttons, similar number plate holders. This makes it easier for the users to find further potential for improvement.

**Furthermore:**

The system can optionally sort or group the conspicuities found according to installation rate / number of units.

The system consists of:

- A computing unit on which the operating logic of the system is executed
- A computing unit on which the AI is executed
- A database on which the learned data is stored
- A database on which the user data is stored and the results are saved

**Advantages:**

- Price outliers are automatically detected
- Reduction of manual labour
- Alternative components can be suggested
- Companies can purchase components and goods at lower prices