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Automated Checks to Detect and Remove Locally Inappropriate Products from Marketplace Listing

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Automated Checks to Detect and Remove Locally Inappropriate Products from Marketplace Listing

ABSTRACT

Online marketplace platforms enable any interested seller to list, advertise, and sell their products to a broad audience of buyers. Detecting product listings that violate local laws or norms is difficult. The effectiveness of manual evaluation of product is slow, limited in scale and scope and constrained by the knowledge and experience of the individuals tasked with evaluating appropriateness. This disclosure describes techniques to automate the detection of online marketplace listings for products that can potentially violate regionality specific regulations or norms. A set of automated checks are performed to validate product information that third-party sellers provide to the marketplace platform. Only those products that pass the automated checks are cleared for listing on the platform and are made available to buyers in a given region. Products that fail one or more of the checks are removed from the platform or restricted from being listed until the seller provides appropriate explanation and/or modification.

KEYWORDS

- Online marketplace
- E-marketplace
- Third party seller
- Product listing
- Inappropriate product
- Illegal product
- Regional sentiment
- Compliance check

BACKGROUND

Online marketplace platforms enable any interested seller to list, advertise, and sell their products to a broad audience of buyers. To list a product for sale, sellers upload detailed information about the product to the platform which in turn provides a product listing that is

available to potential buyers. Buyers can use such e-marketplace platforms to search for products and compare relevant products based on information, such as price, quality, etc.

Some online marketplace platforms serve a specific country or region whereas many are available widely across a number of countries and regions. Sellers on platforms that reach wide audiences are typically required to provide classification information for each product offering. The classification information can be used to ensure that certain products are made available only to specific audiences and/or in specific regions based on relevant laws and regulations. For instance, in most countries, sellers are prohibited from selling tobacco products to minors.

However, malicious sellers may intentionally manipulate product names or descriptions and/or misclassify their products to circumvent regional selling restrictions of the platform. For e-marketplaces that span multiple regions/countries, it can often be challenging to be proactive in detecting whether a product being offered by a seller on the platform violates local laws and regulations of the region in which they are offered and/or go against local sensibilities. For instance, individuals have been known to be offended by doormats depicting their national flag [1] or images related to their religion.

Detection of products offered for sale that violate the rules and policies of the marketplace and/or may violate local laws and regulations is driven primarily by an individual or a community flagging such products upon encountering the product listing on the platform. Any flagged products subsequently require manual evaluation by the platform to determine whether it is being made available intentionally for illegal purposes and/or nefarious goals in violation of the platform rules and/or applicable local laws. The effectiveness of such manual evaluation is constrained by the knowledge and experience of the individuals tasked with evaluating the appropriateness of the product listing. Since flagging and evaluation can be slow, the violating

product may be sold to a large number of buyers before any action (e.g., delisting the product) can be taken. Moreover, such an approach is limited because it may not detect all potentially problematic products.

DESCRIPTION

This disclosure describes techniques to automate the detection of online marketplace listings for products that can potentially violate regionality specific regulations or norms. A set of automated checks are performed to validate product information that third-party sellers provide to the marketplace platform. Only those products that pass all automated checks are cleared for listing on the platform and are made available to buyers in a given region. Products that fail one or more of the checks are removed from the platform or restricted from being listed until the seller provides appropriate explanation and/or modification.

When listing a product on a marketplace platform, third-party sellers typically provide multimedia product information such as title and description text, images, videos, etc. In addition, sellers include relevant metadata, such as brand, price, keywords, product category, region of origin, audience, etc. The product information can be validated by cross-checking using relevant off-the shelf artificial intelligence (AI) techniques. For instance, off-the-shelf computer vision techniques can be applied to extract product information from images or videos and validate the extracted information against the corresponding text title and description. Products for which such validation fails can be flagged as potentially misleading or counterfeit.

A set of automated checks can be performed to evaluate the multimedia product information and corresponding metadata via one or more suitably trained machine learning models. The model output can indicate whether the product can be potentially inappropriate in specific regions based on whether it is similar to one or more previously blocklisted products or

related to one or more potentially sensitive elements. Examples of potentially sensitive elements include revered persons in the region, religion or religious symbols, flags, statues, monuments, etc. The automated detection avoids the blind spots of the current manual process of detection that can result from people in one region not necessarily being aware that certain elements carry special importance for people in other regions.

Additional checks can include analyzing the sentiment in product-related information generated on the platform, such as user reviews, comments, feedback, etc., to check if users in a given region report concerns regarding specific products or product categories. If data for a region of interest is unavailable, the likely reaction of users from that region can be predicted based on product and sentiment information regarding the product or similar products listed in other regions. For example, if a doormat depicting the national flag of a country was found offensive in a country, it can be predicted that a doormat depicting the national flag of another country is likely to be deemed offensive in the other country.

The checks can further include analyzing historical and current product prices to detect potential price manipulation. For instance, unusual peaks or drastic changes in prices of certain items in times of shortage can indicate price gouging. When determining whether price variations are appropriate, the analysis of prices can take into account relevant external context, such as inflation, sociopolitical events, etc.

If one or more of the above automated checks suggest a potential violation with a threshold amount of confidence, an alert can be raised, and the seller can be asked for additional justification and explanation regarding the particular product. Alternatively, or in addition, the product can be assigned a score for appropriateness that can be incremented or decremented at each step in the set of checks based on the corresponding assessment. Restrictions or sanctions

for the product can be determined based on comparing the final score at the end of all checks with one or more threshold values.

For example, products can be scored on a scale of 0 to 1, with 1 indicating highest estimated potential inappropriateness. In this example, products with scores below 0.50 can be listed without further scrutiny; those with scores of 0.50-0.069 can be listed with age restrictions (e.g., shown only to those 18 year of age or older); those scoring 0.70-0.79 can be deprioritized and the seller requested to provide a justification; those having scores 0.80-0.89 can be put on hold awaiting seller explanation; and those scoring above 0.90 can be removed immediately from the platform.

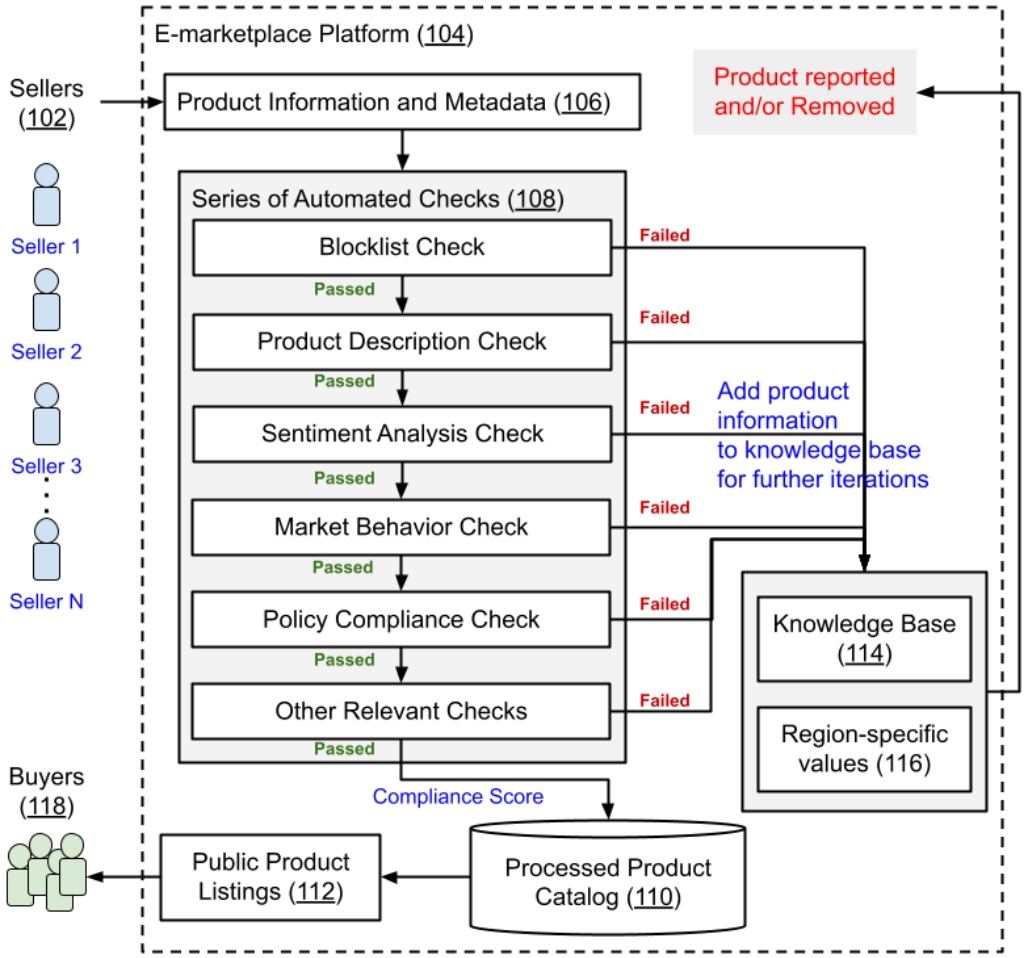

Fig. 1: Automated checks to check third-party product listings for regional appropriateness

Fig. 1 shows an example operational implementation of the techniques described in this disclosure. Various third-party sellers (sellers 1…N, 102) list their products by providing product information and metadata (106) to an e-marketplace platform (104). The product information and metadata are subjected to a series of automated checks (108) as described above. As needed, the checks utilize information obtained from a knowledge base of product-related sentiment and previously blocklisted products (114) and/or region-specific values of relevant parameters (116), such as religion, public figures, flags, etc. If a product fails any of the checks, the seller is informed that the product listing is put on hold until the seller provides additional information and an explanation regarding the particular reason. The knowledge base is updated accordingly.

During the checks, a progressively updated compliance score for the product is generated at each stage. Products with compliance scores for inappropriateness that do not meet a threshold are added to the processed product catalog (110). Any relevant restrictions based on the compliance score are applied in public product listings (112) available to buyers (118).

The described techniques herein can be implemented by any online platform or service that permits third-party sellers to list any types of products. Additionally, the techniques can be integrated with permission within any application that includes product listings, e.g., payment applications. The implementation can support checks for appropriateness for any region. The checks can be performed in any suitable order or, if appropriate, multiple checks can be performed in parallel instead. Although Fig. 1 shows the knowledge base and regionally-specific values for relevant parameters being stored by the marketplace, these can be generated by and/or stored by a third-party.

If a product is detected to be similar to a previously blocklisted item, a comparison score can be generated to indicate the degree of similarity between the product and the previously

blocklisted item. Implementation of the techniques described in this disclosure enables online marketplace platforms to take a proactive approach at scale to detecting and restricting product listings that are potentially objectionable in a given region. The approach can additionally be applied to detect and remove potentially deceptive or counterfeit product listing and/or price manipulation. Individual checks can be performed by employing existing standard artificial intelligence techniques and infrastructure. Further, the automated techniques can operate alongside any existing manual flagging and evaluation mechanisms. Implementation of the techniques can increase the speed, scale, and effectiveness of performing quality and compliance checks and excluding locally objectionable products from being listed in that region.

CONCLUSION

This disclosure describes techniques to automate the detection of online marketplace listings for products that can potentially violate regionality specific regulations or norms. A set of automated checks are performed to validate product information that third-party sellers provide to the marketplace platform. Only those products that pass the automated checks are cleared for listing on the platform and are made available to buyers in a given region. Products that fail one or more of the checks are removed from the platform or restricted from being listed until the seller provides appropriate explanation and/or modification.

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