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## Automatically populating paper forms

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## **Automatically populating paper forms**

### **ABSTRACT**

This disclosure describes techniques to automatically populate paper forms. A scanned image of a paper form, e.g., obtained via a device camera of a user device is analyzed using a trained model to detect fields in the form. With user permission, stored user information is accessed to automatically populate the fields. The user is provided with options to edit the automatically filled in information. Confidential information is obtained and filled in upon specific user approval.

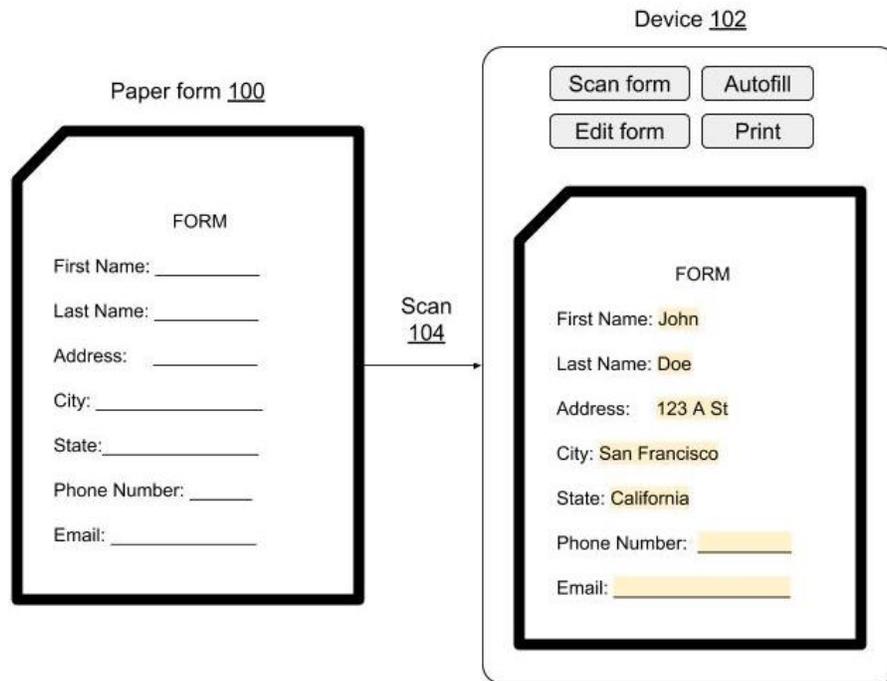
### **KEYWORDS**

- autofill
- autocomplete
- form input
- paper form

### **BACKGROUND**

Software such as browser and password management applications include functionality to securely store information and automatically populate online forms, e.g., web-based forms, PDF forms, etc. that require entry of such information. For example, when user permit, manual entry of information such as name, address, phone number, email address, etc. is detected, and the user-entered information is securely stored. When the user opens another form that requests some of this information, a suggestion is provided to the user to automatically populate fields based on the stored information. This saves the user the time and effort for repeatedly entering such data. However, no such automated solution exists for paper forms.



DESCRIPTION

**Fig. 1: Suggestions to automatically populate a scanned paper form**

Fig. 1 illustrates an example in which a device that implements the techniques described provides suggestions to automatically populate a scanned paper form. With user permission, entry of user information in online forms (or in scanned paper forms) is detected and such information is stored.

Automatically populating paper forms works as follows:

1. The user scans (104) a paper form (100), e.g., using a device camera of a user device (102). To obtain a high quality scan, the scanning operation might involve capturing multiple images of the form and stitching those into a single image.
2. The scanned is processed on the device to determine fields in the form, e.g., name, address, etc. For example, such determination can be performed using a trained machine learning model that executes on the device.

3. The fields from the form are compared with stored information and suggestions are provided to fill matching fields with the available information. For example, in Fig. 1, the fields “first name” and “last name” are automatically populated as “John” and “Doe” respectively. Automatic completion of fields is performed with user permission. Fields that are recognized as corresponding to highly confidential information, e.g., credit card or other payment information, etc. are indicated as available, e.g., via a prompt, and filled in only upon specific confirmation from the user. The user is able to optionally leave blank any fields they choose. The automatically completed form can also be edited by the user at any time, e.g., the user can modify or remove any of the suggested answers. Users can fill data in the fields for which no stored information is available.
4. Once the scanned form is completed, the user is provided with the option to print out the completed scanned form.

The techniques described herein provide autocomplete functionality for paper forms. The techniques can save time and cost for users that fill out forms and businesses that process forms and can reduce errors. The described techniques can be implemented as part of a software application, e.g., a virtual assistant, a file management application, an image recognition/library application, a document scanning application, etc. in devices such as smartphones, tablets, smartwatches, personal computers, etc. The described techniques are implemented with specific user permission. If the user denies or restrict permission to access personal information, only such data are accessed as permitted by the user. Users are provided with options to disable access to personal information and to turn off the technique.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may

enable collection of user information (e.g., information about a user's social network, social actions or activities, profession, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

## CONCLUSION

This disclosure describes techniques to automatically populate paper forms. A scanned image of a paper form, e.g., obtained via a device camera of a user device is analyzed using a trained model to detect fields in the form. With user permission, stored user information is accessed to automatically populate the fields. The user is provided with options to edit the automatically filled in information. Confidential information is obtained and filled in upon specific user approval.

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