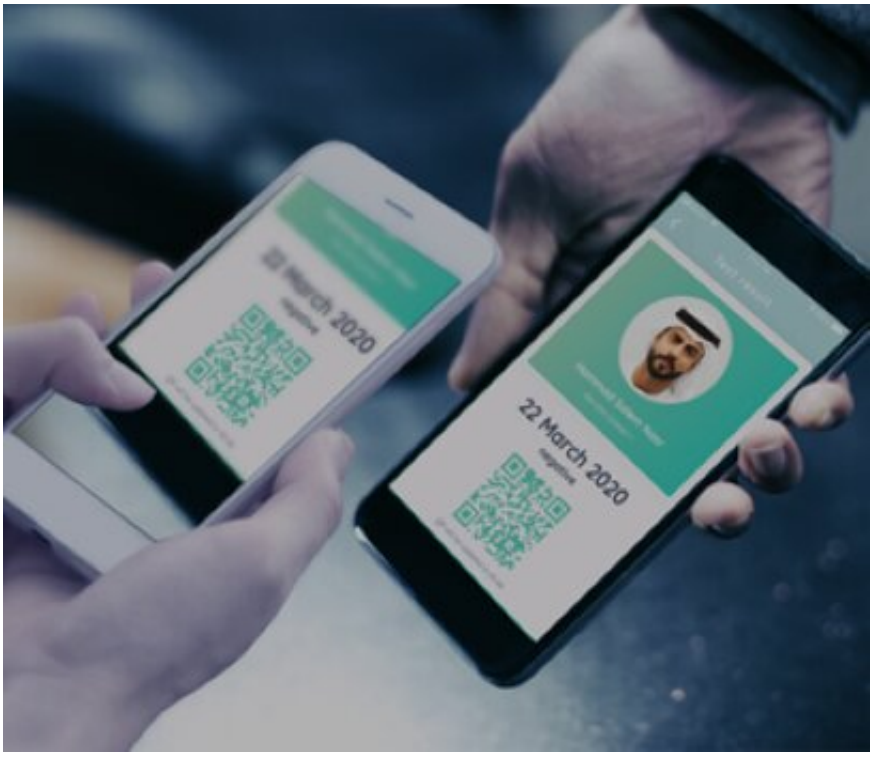
Sharjah University patents application for distance COVID-19 diagnosis

May 27 2024



Smart Identification of Health Status based on QR Code and User Health Data. Credit: author's own creation

The University of Sharjah has been granted a patent for inventing a smart gadget with the ability to filter user information that will allow doctors to diagnose COVID-19 and other ailments from a distance.

The patent, granted by United States Patent and Trademark Office on 1

August 2023, comprises "a display unit, a color code detection unit, an image filter, an optical character recognition unit, a code detection unit and an elimination unit," writes the university in the application it filed on 30 December 2022.

"This system proposes a framework to identify individual information for COVID-19 mobile health applications. It evaluates individual data based on PCR test results and vaccine results. This kind of framework allows for validation of data as well as to access places with lower face-to-face contact," says Prof. Abdul Kadir Hamid, Acting Director of the Smart Automation Communication Technologies Research Center.

The patent is the brainchild of Prof. Hamid who came up with the invention following the publication of research he and colleagues had published in the journal IEEE on how to diagnose health issues by filtering smart information that is available on COVID-19 APPs.

Prof. Hamid's system relies on a color code detection unit linked to a display screen that filters user information by analyzing at least three colors in each image. The concept of the invention draws on the field of health monitoring or remote health screening. It is a system of smart information recognition that can easily be used to identify health conditions through currently available COVID-19 applications.

Identification of PCR test information based on the analysis of color in each image and recognition of text information. Credit: Author's own creation

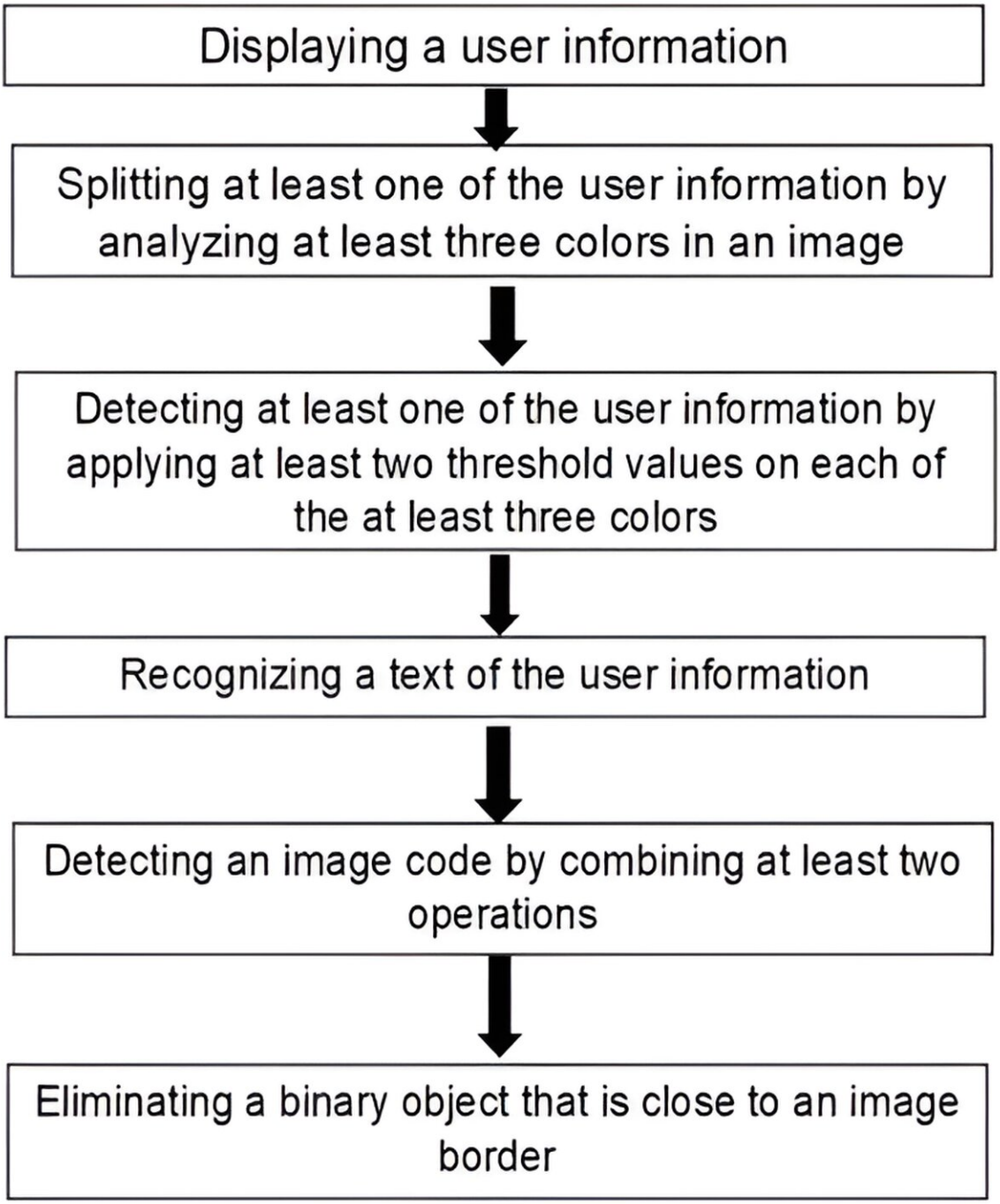
"The image filters users' information. Further, the optical character recognition unit recognizes a text of the user information," writes Prof.

Hamid in his application. "The code detection unit detects an image code and the elimination unit is used for eliminating a binary object that is close to an image border. The proposed system and method ensure complete security to prevent abuse of an individual's personal information."

Asked whether his invention considered patients' privacy, Prof. Hamid said, "The proposed framework will provide complete security to prevent the abuse and fabrication of personal health information. The framework uses Gaussian image segmentation as a way of validating the image layers to understand the true nature of the given health data.

"Detection of COVID states effectively by applying Image thresholding and filtering based on RGB color components. Effectively maintaining security of data through optical character recognition."

In the Gaussian imaging method, pixels are partitioned into arrays and segments for further analysis. The resultant image is filtered between two threshold values and filtered using a Gaussian filter afterward.



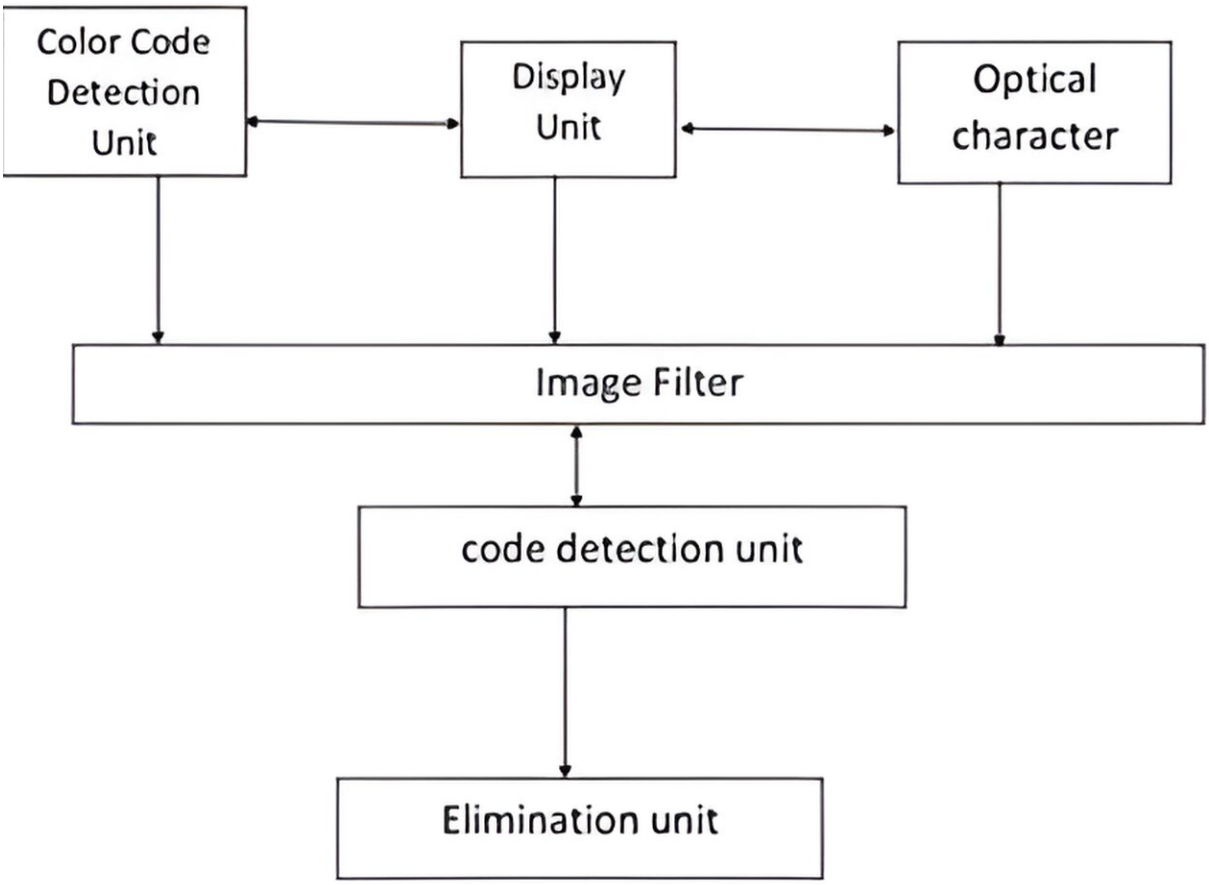
Systematic Procedure Applying Image filtering based on Gaussian Techniques and Optical Character Recognition. Credit: Author's own creation

The application targets the use of QR code recognition and optical character recognition to identify and validate users' information. "This allows for enhancing data security and preventing misusing of such data for other purposes," adds Prof. Hamid.

Besides smart information recognition and identification, the application, according to Prof. Hamid, allows for the reduction of face-to-face contact with security personnel, a requirement that is pivotal to curbing the spread of contagious diseases like COVID-19.

Prof. Hamid claims that the invention's remote diagnosis capability and smart recognition can be extended to other disease-related applications and not only COVID-19.

"My invention provides a practical and feasible way of reducing face-to-face contract in institution access during COVID-19 while maintaining data integrity and validity. Also, developing hardware prototypes to validate such framework.



Hierarchical process for validation of Color Status in health applications by applying detection mechanisms to facilitate secure and reliability reading. Credit: Author's own creation

"COVID-19 has reshaped our world in ways we couldn't have imagined. As we navigate this new reality, let's not forget the lessons we've learned and the resilience we've shown."

Prof. Hamid is currently awaiting the industry's reaction to his application. He said he was not looking for the employment of the algorithms he has on a large-scale as that may "pose a challenge.

Therefore, small prototypes should be developed."

More information: Waleed Obaid et al, Smart Information Recognition on COVID-19 APPs for User Health Identification, *2022 Advances in Science and Engineering Technology International Conferences (ASET)* (2022). DOI: 10.1109/ASET53988.2022.9735044 , ieeexplore.ieee.org/document/9735044

Provided by University of Sharjah