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# CV19 SelfDefense: Situational Awareness in a Pandemic Through mHealth Intervention

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**Abstract.** CV19 SelfDefense is an mHealth approach to providing mobile phone users with situational awareness during the coronavirus pandemic, with the goal of protecting and defending personal health. Several individual risk reduction measures were studied and then developed as tools to help users manage personal health. This mHealth intervention is user-centric and privacy-centric approach empowering users with tools, utilities and services to bolster the ability to manage complex health information, as well as their rights to personal information privacy. The demo features the capabilities of the app, as well as a discussion of future work.

**Keywords:** COVID-19, mHealth, public health, situational awareness, infodemic, social distance nudge, voluntary contact tracing, coronavirus pandemic.

## 1 Introduction

CV19 SelfDefense<sup>1</sup> is an Android mobile app designed to support personal health management during COVID-19 pandemic crisis. As antiviral therapies and vaccines are still under research development, various public health and social measures have either been officially imposed or encouraged to curb the spread of the coronavirus. Individual risk reduction measures such as social distancing, self-quarantining, wearing of masks, and testing have been widely promoted to help control the spread of the infection at the community level. It is vitally important for individuals to remain vigilant in awareness of their role in helping control future waves of coronavirus.

mHealth approaches have increasingly been used to promote health and prevent disease. Mobile phones are particularly effective tools for delivering health interventions because of: (1) the widespread adoption of increasingly powerful technical capabilities, (2) people's tendency to carry their phones with them everywhere, (3) context awareness features enabled through sensing and phone-based personal information. Mobile apps can facilitate various aspects of self-management by providing tools to support journaling, providing access to social support and health information, enabling personal

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<sup>1</sup> Available at iSensor Lab: <https://isensoranalytics.com>

health tracking, enabling notifications and reminders, etc. In the case of pandemic crises, automated sensing capabilities of mobile phones can support proximity tracking and contact tracing. Systematic reviews of mHealth interventions have also found mHealth approaches to be effective in chronic disease management [1]. Even low-tech applications using SMS reminders have been found to be effective in improving medication schedule adherence and attendance for doctor appointments.

## 2 Study Description

CV19 SelfDefense was developed through a seed grant awarded by FSU Office of Research during May through August 2020. The responding research team conducted a need analysis, identified several individual risk reduction measures, and incorporated them into the app. The app as an artifact of this research includes a set of tools and services that can help users adopt risk reduction measures that are critically important during a public health crisis. In particular, the app provides the following capabilities:

### 2.1 RSS Feeds from Health Authority Against Infodemic

False information spreads quickly—at roughly the same speed as the disease itself. People’s lives are directly impacted. For instance, a Florida teen died as a result of following advice gleaned through fake news [2]; after parents treated her with unapproved drugs [3]. The propagation of false information through social media can be caused by ignorance, bias, malicious intent, or competition among social influencers, and this phenomenon was termed by World Health Organization [4] and United Nations [5] as infodemic. The app provides up-to-date RSS News Feeds from World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), and the U.S. Department of Health & Human Services (HHS) so to defend mobile phone users from false and misinformation.

### 2.2 Test Center Locator

The app supports mobile phone users to locate nearby test centers based on the dynamic geo-location positioning.

### 2.3 Symptom Checker

The app gives users the ability to document, check and monitor personal health symptoms based on the CDC guidelines<sup>2</sup>.

### 2.4 Social Distance Nudge

The concept of nudging the users was brought by Thaler and Sunstein [6] with the idea of influencing users and modifying their behaviors while respecting individual choices. The nudge theory is commonly applied in economic policy [7], financial context [8], online privacy [9, 10], and fostering social interaction [11]. Nudging users for healthy behavior has also been adopted in public health context [12, 13]. This ‘social distance

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<sup>2</sup> Symptoms of coronavirus: <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>

nudge’ is an innovative approach to reminder users in response to unexpected social contacts as well as the provides users the ability to build a safe zone within their own social “pods.” Furthermore, the logs resulting from the social distancing nudges can render contact tracing simple and effective. As privacy is a major concern for contact tracing app across the globe [14], this feature allows users to control their personal contact information. Release of information requires users’ voluntary actions and consent.

### 2.5 Quarantine Monitor

The ‘quarantine monitor’ is user-centric, and bolsters users’ right to information privacy while providing a secure log of their whereabouts during quarantine period. The quarantine monitor helps users document their personal whereabouts, and this information is controlled and protected by the users unless there is an agreement to release this information to anyone else.

## 3 Conclusion and Future Work

The CV19 SelfDefense mHealth approach provides Android mobile phone users with situational awareness in response to coronavirus pandemic. This mHealth intervention is a user-centric and privacy-centric approach to protect users’ right to information privacy while helping manage and defend personal health during pandemic crisis. Future work includes evaluating the effectiveness of this mHealth approach for increasing awareness and reducing personal health risk, improving social distancing practices, increasing self-efficacy to manager potential symptoms, and monitoring quarantine status. Moreover, additional studies should examine the impact and collective benefits of CV19 SelfDefense on the community and the public health.

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