

QUIT SMOKING FOR SEVERELY MENTALLY ILL (SMI)

Product Design Specifications

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Problem Statement:

To design a case for holding cigarettes that is augmented to specifically help the severely mentally ill (SMI) quit smoking. The case will always be locked. When the user attempts to access the case it will open only after a specified time delay. The case will house a sensor to detect if the user attempts to open the case, another sensor to detect whether the case was actually opened and a third sensor will be used to detect how many cigarettes were removed from the case. The data from access attempts will be continuously transmitted to the smartphone wirelessly. The phone will analyze this data on access attempts. Each time the user access the case the phone application will deploy countermeasures to discourage smoking behavior (display picture of smoke damaged lung, post on social media, call friends or family...). In addition, the application will send weekly updates to the subject and to any mentor the subject specifies.

Client Requirements:

- The case should be metal and hold at least 10 cigarettes (should be modeled after the cases in current use).
- The case should have an onboard battery.
- The case should lock on open attempt and log this information.
- The system should interact (can be through phone) with the user to encourage less smoking and punish more (possible countermeasures: annoying noises , tweet, facebook post, pictures displayed of smoker organs, have app be a game-gain points).

- The device and the application should be usable by severely mentally ill individuals.
- We should have a working prototype (five copies).

Design requirements:

- **Physical and Operational Characteristics**

- a. *Performance requirements:*

The device is required to be augmented for daily and frequent use.

Severely mentally ill patients may attempt to access it in different time delays that vary from few minutes or sometimes few seconds in the case of severe addiction to few hours in less severe cases.

- b. *Safety:*

The cigarette case should be developed for mentally ill patients so it should be totally safe and free of warnings because we cannot rely on the patient to take precautions.

- c. *Accuracy and Reliability:*

The case should record and send reliable data about the access times the opening of the case and the number of cigarettes taken because this information can lead to faulty interpretations if it lacks accuracy. For example if the open button is pressed but the patient did not open the case because he controlled his urge but the data collected showed that the case was opened this will affect the treatment.

- d. *Life in Service:*

This case should serve the patient for the whole period of the treatment and remain useful after the treatment is done for future uses. It should work in different countries and operate 24/7 but the battery needs to be recharged every 8 hours.

- e. *Shelf Life:*

The battery that is included in the case should be a rechargeable battery for efficiency and ease of use and also because it is more environmentally friendly.

- f. *Operating Environment:*

The cigarette case must adapt to different working environments. It can be exposed to different temperatures and different humidity ranges. It can also be exposed to dust, vibrations and accidental hits. We have to make sure that the accuracy of the data is not affected by those factors

- **Production Characteristics**

- a. *Quantity:*

- We should have five devices for the research purpose.

- b. *Target Product Cost:*

- The cost of this cigarette case will be higher than the cost of a normal cigarette case but it has to be a feasible price not above 100\$. The case will be purchased once only and it can be refilled with cigarettes so this is an initial cost only.

- **Miscellaneous:**

- a. *Patient-related concerns:*

- The patients we are dealing with are mentally ill patients so extra precautions should be taken regarding the shape of the case. The collected data should be confidential and provided only to the specified mentor and to the doctor.