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A Novel Frame Work For Mitigating Software Piracy

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Abstract

Many corporations face troubles with software piracy of their products. As an end result there are many solutions available markets to deal with this problem, but in reality, majority of these systems does not provide organizations with an exact solution. To mitigate software piracy, a variety of solutions has been proposed till date. These different solutions could be categorised as either preventive solutions or deterrent solutions. Deterrent options answer to fear of the penalties of getting arrested because of which a person or the organization is forced to buy the licence. The solutions are profitable if individuals refrain themselves from criminal acts due to the estimated chance or concern of penalty or sanctions. The preventive control makes use of present-day technologies to expand the costs of piracy. In this paper a novel framework to mitigate the software piracy is propose using angular and PYpot.

Keywords- *Software piracy, security, code obfuscation*

1. Introduction

Software's are integral for productiveness in all spheres of life. Software development requires a lot of sources and experts, and as such, a widespread budget ought to be handy to drive the software improvement undertaking based totally on the project scope. After a successful software program and implementation, the developer wants to monetize the investment, and this is done through sales of a number of licences for the use of the developed application, but this is often challenged through software piracy. Annually, the software industry loses billions of dollars to piracy, and this has triggered efforts towards detecting and preventing software applications. To illustrate, suppose a person A had an executable of a popular software on one of his devices. The person could create a replication of the software and provide to another person B so that he could use it on his device computer. After that, person A and B both own copies of the software which makes the software an illegal copy Even though the of piracy of software might not be obvious, but the concerns are sincerely no longer new one.

One of the most recent is plagiarism which has now affected not only software enterprises but also the literature and publication industry. The problem in detecting and preventing software piracy can mostly be linked to the way in which software programs are delivered to the user. Consider example, in the case of stealing of source code, the source code file may be compiled with the help of a distinct compiler which will also yield an executable file that looks same as the original. Adding to this, the implications on the company whose software's

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are stolen and replicated can be extremely severe both financially and economically. Software companies are the ones who gains a massive portion of their income before the launch of a competitor's product in the market. If any component or some part of their software is stolen, then competitors are able to decrease production time significantly and launch their products in the market sooner than the other companies.

The other major problem is the distribution of software illegally. Generally, the pirated copies of software are sold at discounted price, with major of the functionality. The ramifications associated with piracy and distribution of the software's at some point have an adverse effect on the IT industry. The direct victims are the IT companies but the indirect victims are also not often recognized. Most of the people have a notion of software producers as IT giants which generate a large lump-sum, missing the fact that those employees who work in those companies experience the wrath of piracy via reduction in job opportunities in the companies. Majority of software functions in the software are unprotected while others have a reasonable protection. Software protection is a never-ending mission especially with the ever-growing military of hackers, expert at reverse engineering and data recovery.[4] This has made it obligatory to preserve evolving improved strategy using new software and hardware protection solutions, coupled with penalties and sanctions. At times unlawful software program use can additionally be in the form of a couple of installation of legally acquired single user licence, and this can also go unnoticed if not monitored by the organization.

Software safety may also be in the use of license keys that are checked at the time of installation. This requires that the licence validation be embedded in the software program providing an opportunity for hackers. The use of hardware signatures is also frequent and this entails extracting key information from the hardware on which the software is hooked up and using it to generate a key. This creates a hassle for the user if the user replaces his hardware with a new one.[2] The study proposes a method of use of hardware signatures and obfuscating the signature to generate the key. Code obfuscation method is some other technique that tries to cover the program behaviour making it difficult for hackers to understand and manipulate the key. Some network-based protections solutions have also been deployed, which performs license checks every time the software is run, making it challenging for users with irregular access to the internet.

There are 2 types of controls for the piracy control :-

A. Deterrent Control
B. Preventive Control

There are some deterrent solutions provided to citizens of India. Basically, A deterrent solution depends on a man or woman anxious of getting arrested and do not increment the amount of the genuine act of pirating directly. In India, four important intellectual property rights laws had been passed in the protection of software. The laws comprise of Indian patent Act 1957, Indian trademark Act 1999, Indian Copyright Act and exchange secret.

i. Indian Copyright Act of 1957

In India, software program can be protected beneath the Copyright Act, 1957 or the Patents Act, 1970, and a contact of ingenuity, too, is required to shield it correctly. It can be blanketed below the Patent Act solely if it has a technical effect. Otherwise it can be

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blanketed only beneath Copyright Act, 1957. Section 2 (o) of the Copyright Act defines "literary work" and includes pc programs, tables and compilations together with pc databases. Thus, it is explicitly protected. The equal redress will observe from the infringement of the copyrighted pc software program which are allowed in case of any other infringements.

ii. Indian Patent Act 1970

The Patent Act of 1970 was passed by the pressure on twentieth April 1972, reviewing the Indian Patent and Designs Act 1911. After that, India also became one of the signatory to many international preparations for an important goal of formulating and strengthening its patent regulation and becoming the part of a league in the current world. One of the important hurdle toward achieving this objective was crossed by becoming the one of the member of the Trade Related Intellectual Property Rights (TRIPS) system.

On and after the date of the booking the software's for patent and till the time of furnishing of patent to the recognition of patent, the applicant will be having facilities like privileges and rights as if the patent has been granted on date of application booking. But the applicant does not have the provision to file the lawsuits except after the patent is granted. This type of provision is an add-on to the applicant for the purpose of claiming damage from the date of booking.

iii. Indian Trademark Act 1999

Indian trademark act of 1999 statutorily protects logos and additionally underneath the common act remedy of passing off. Protection of trademarks is controlled through the Controllers General of Patents, Designs and Trade Marks, a prime authority's employer which also review the cases with the Department of Industrial Policy and Promotion (DIPP), under the Ministry of Commerce and Industry.

The regulations of trademark deals with the process of registration, protection of trademark and prevention of fraud trademark. The regulation affords for the rights received by means of registration of trademark, different modes of transfer and mission of the rights, nature of infringements, penalties for such infringement and redressal on hand to the owner in case of such infringement.

iv. Indian Official Secret Act of 1923

The Indian Official Secrets Act of 1923 is India's anti-espionage law which has existed over from the time of British colonial period. Simply, it clearly states that actions that support an enemy nation in any form of opposition to India are condemned. Additionally, it states that one can't approach or even omit details on a prohibited government web site. According to which, supporting any anti state which can be in form of speaking in favour of the enemy, plan, model of a professional secret, or of legitimate codes or passwords leaked to the enemy.

Once the right regulations are chosen, the only difficulty faced is implementing the law passed. It is the duty and accountability of the intellectual property proprietor to make certain that the rights of the proprietor are no longer violated by anyone. To end this, a number of preventive solutions have been formulated They consist of auditing of businesses and hardware and software program-based techniques.

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Some of the preventive controls could be ***Auditing.*** Business Software Alliance (BSA) function is one of the organizations that perform auditing to affirm whether the organizations are using authorized and legal software. A proper auditing includes taking a collection of all material and data which is part to the software program on the computer systems.[3]

Some solutions are also available in the market, those could be Software and Hardware solutions. Hardware solutions are typically used for proof of ownership of the software and also grant an impenetrable execution for safety sensitive applications. Such hardware solutions are generally difficult to use for the user but are boon to the software vendors as compared to different software-based Solutions. Software Solutions are including the software's serial number along with product key are one of the most widely and frequently used solutions to verify validity of users. The core concept behind this to validate legitimate users with a serial or a product key, which is checked by application using a validation algorithm. During the installation, the installer requests the user to insert or provide a serial key, and if it is invalid the installation procedure asks the user to again insert the correct serial key or terminates the procedure. Usually the serial key is displayed on the page bundled with the software or is provided digitally.[1]

2. Literature Review

E Cohen et al. describes a study conducted on university college students to decide their attitude toward replicating pc software. This find out about builds and replicates of two studies before, by Schuster with the aid of Christoph. In addition to questions used via these two previously studies, additional questions about use of software and perceptions of the extent of their piracy via others had been asked. The study was administered to over 300 students from a number of different disciplines and from exceptional levels. [1]Furtherly, Darren Bibby and Amie White, focused on the losses to software's providers from piracy and license misuse are nicely documented in the annual Business Software Alliance (BSA) learn about of world PC software program piracy. What has by no means been documented is the impact they have on all the other groups in the software ecosystems, VARs, provider firms, and many different ISVs. This study does simply that, constructing on IDC tasks studying the advantages of reducing piracy for local economies and which have an impact on of the Microsoft ecosystem on these identical economies.[6] For each dollar that Microsoft earns from decrease software piracy in 2008, other businesses in the same software ecosystem will earn 5.50 dollars. The study by The International Planning and Research Corporation explains that Information and Communication Technology (ICT) has a very terrible impact on software piracy prices in addition to which the consolidating prior research negatively affect piracy rates. By using information for fifty-nine nations from 2000 - 2005, the reports show that science development and monetary well-being as measured via Information and Communication Technology expenses provide an explanation for between 70% and 82% of the version in software program piracy charges for that duration. The results also provide significant implications for coverage makers in order to help minimize the software piracy.[5]

Khadka et al. contributed by finding out about utilized quantitative lookup technique to acquire information from students in the college. For this purpose, an on line survey was

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conducted amongst forty-six undergraduate students of the same university and respondents answered that high software prices by the IT companies, and also pirated software being reachable on the Internet by anyone and economically vulnerable users not being able to have the funds to buy the software program were the primary motives in the back of the growing software piracy. [7]

3. Methodology

To exhibit the implementation of the project, serial key based protection system; an interface is developed in angular, Node.js and PyQt. The submitted details is encrypted, uploaded on-line to the admin's data base with a special identification for each particular user. A user's unique user id is created on the app and will be submitted on the interface while purchasing by the user. Using python script, the accumulated unique hardware id is concatenated into strings and divided into a couple of parts based on pre-classified precise attributes, which will subsequently be used for user verification after it is activated by using the developer during online payment. At the developer's end, a special serial key is generated for the user using the received unique id. After a successful online payment, the email with the respective product key and serial number is sent, the consumer verification process in which he/she puts the serial number and product key on the app to get the software activated.

This study offers a software protection solution that combines online authentication and validation. It attempts to direct user interest at the serial key however with subtlety, it actually uses a combination of unique id, serial key and product key for software validation.

Although, in accordance to abstract there is honestly no secure solution in software program protection field; in order to find this out an attempt is made to make a easy software program validation process tricky and tough to hack via subtly misdirecting the focus of expert hackers to the serial key while performing other strings along with the product key.

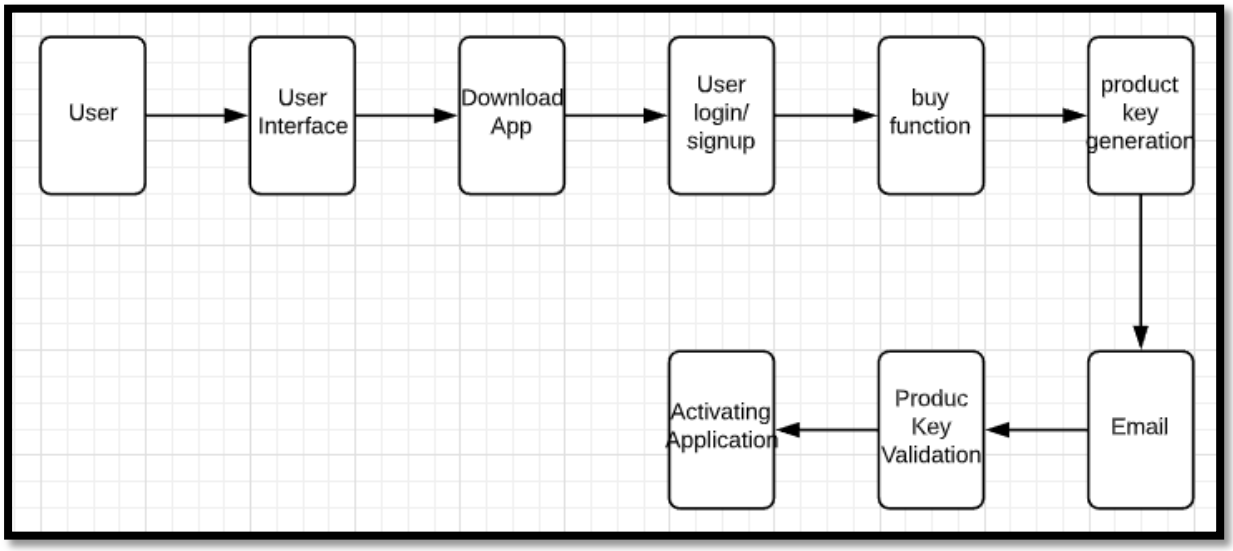

Figure 1: The proposed subtle software protection scheme

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5. Results and Discussion

The model demonstration using web form confirms the feasibility of the implementation of the project on a commercial scale. Using sample user data, serial keys were generated using the serial key generator which is working at the backend using a python script.

The following are the steps below to be followed.

1. User logins the website with valid credentials.

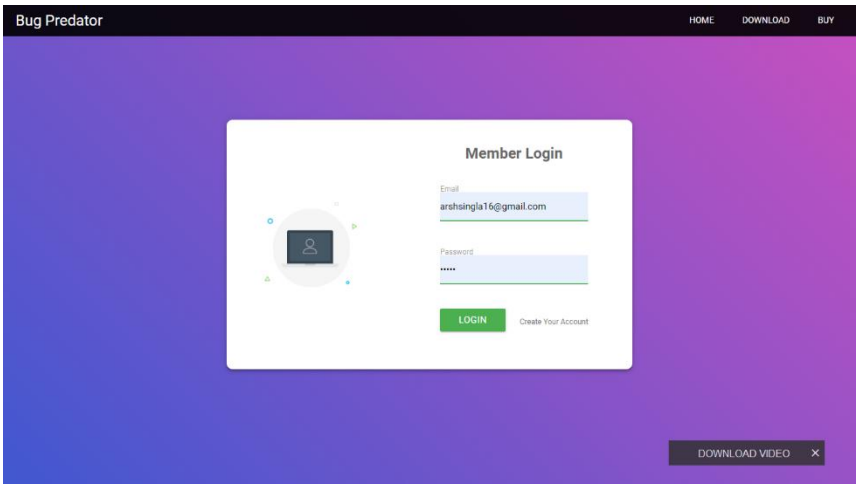

Figure 2: Login Page

2. User then gets redirected to buy page where he has to select the subscriptions. He could choose more than 1 subscriptions.

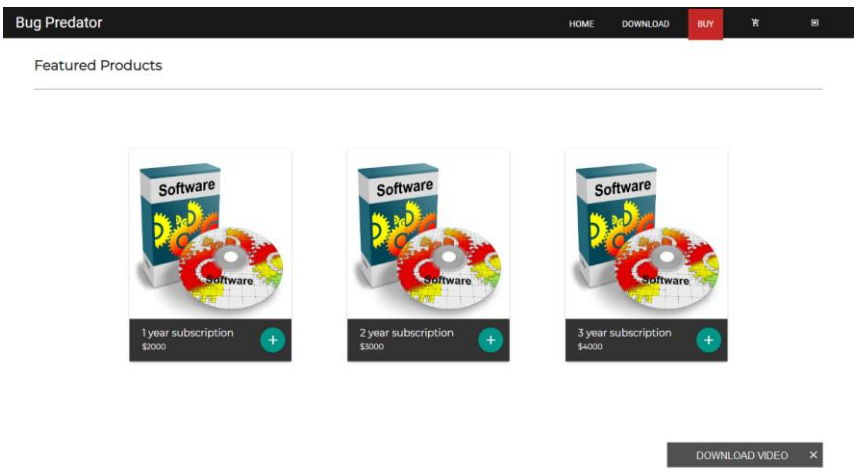

Figure 3: Buy Page

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3. User then goes to the download page and then downloads the application from the link on the screen.

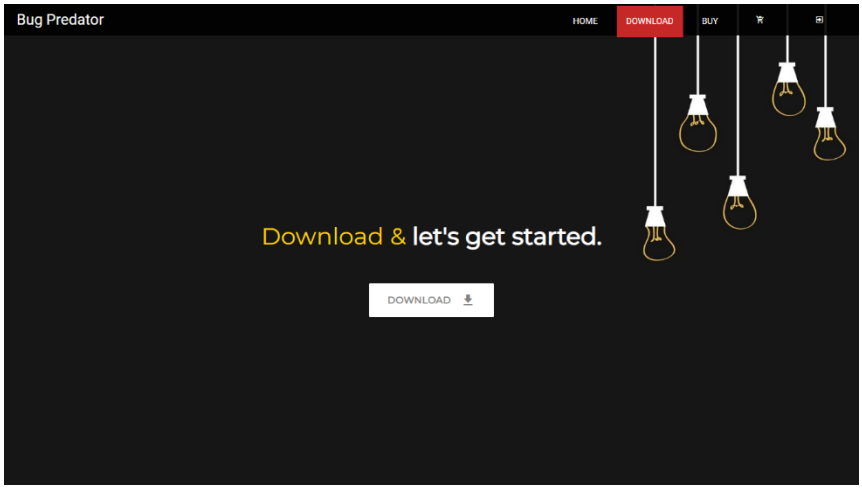

Figure 4: Download Page

4. User then unzips the downloaded application and runs the file with name app. The app runs with the device id field automatically filled and 2 input fields of serial no. and Product key respectively.

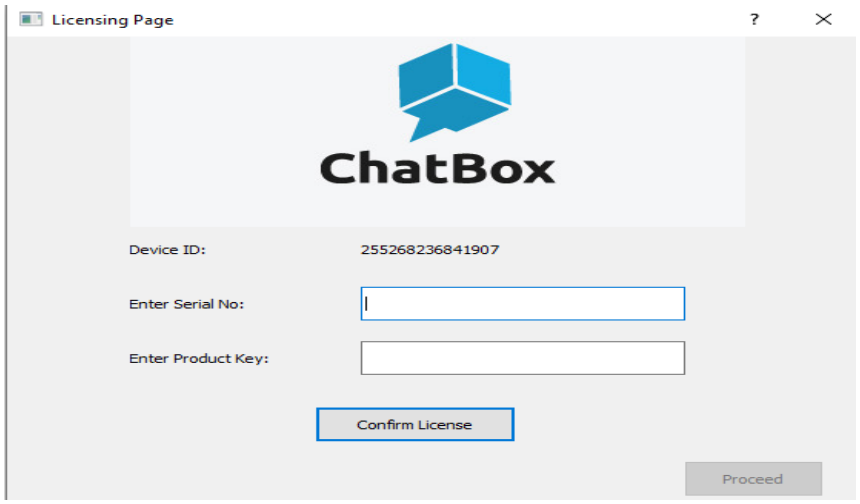

Figure 4: Application GUI

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5. User then clicks on the cart link on the right corner in the website and then fills the form and also adding the device id in the form.

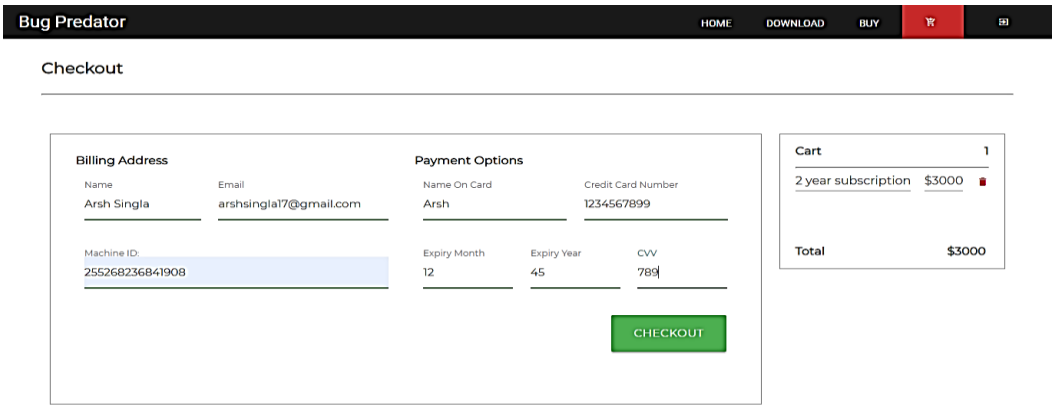

Figure 5: Cart Page

6. When the user checks out after the payment, He is redirected to thankyou page with a message telling that the product key and serial no. would be mailed on the mail id which was provided by the user in the form.

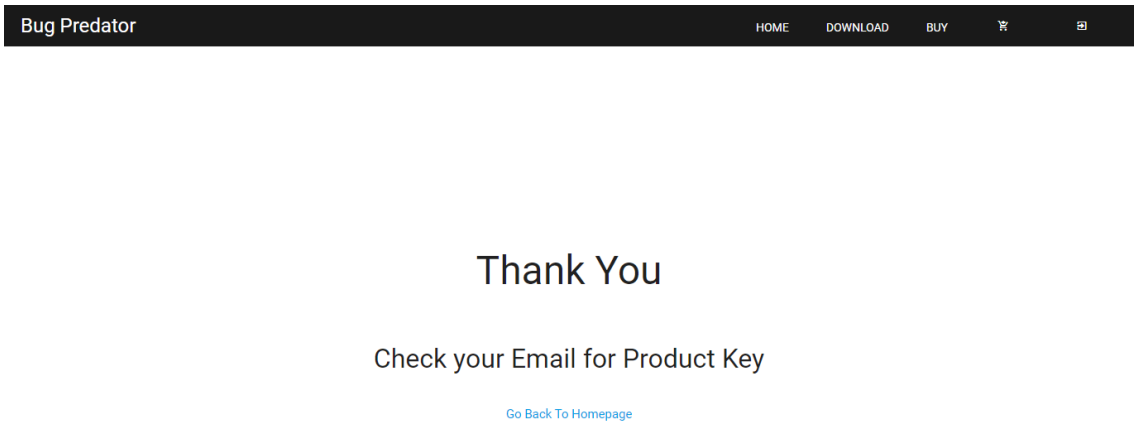

Figure 6: Thank You Page

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7. Then user goes to his mail to check for the mail form bugpredator123@gmail.com and the serial no. and the product key are written in the mail.

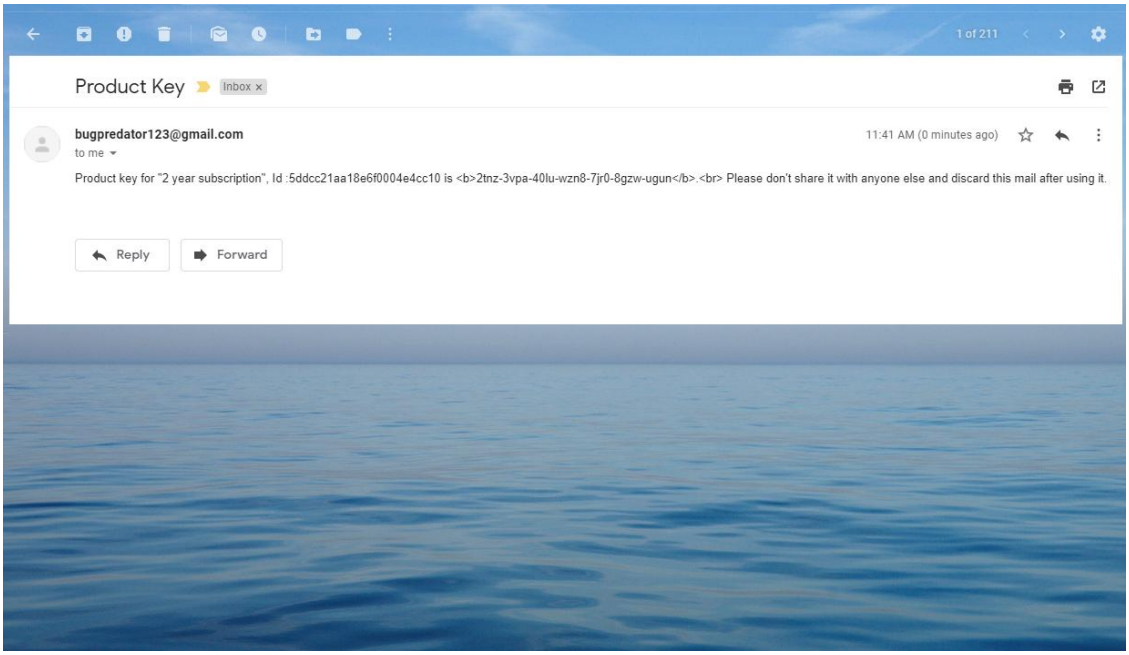

Figure 7: Email Received by Customer

8. The user copies the serial no. and product key and the puts them into the application interface. If all three strings are same, then only the application will get activated.

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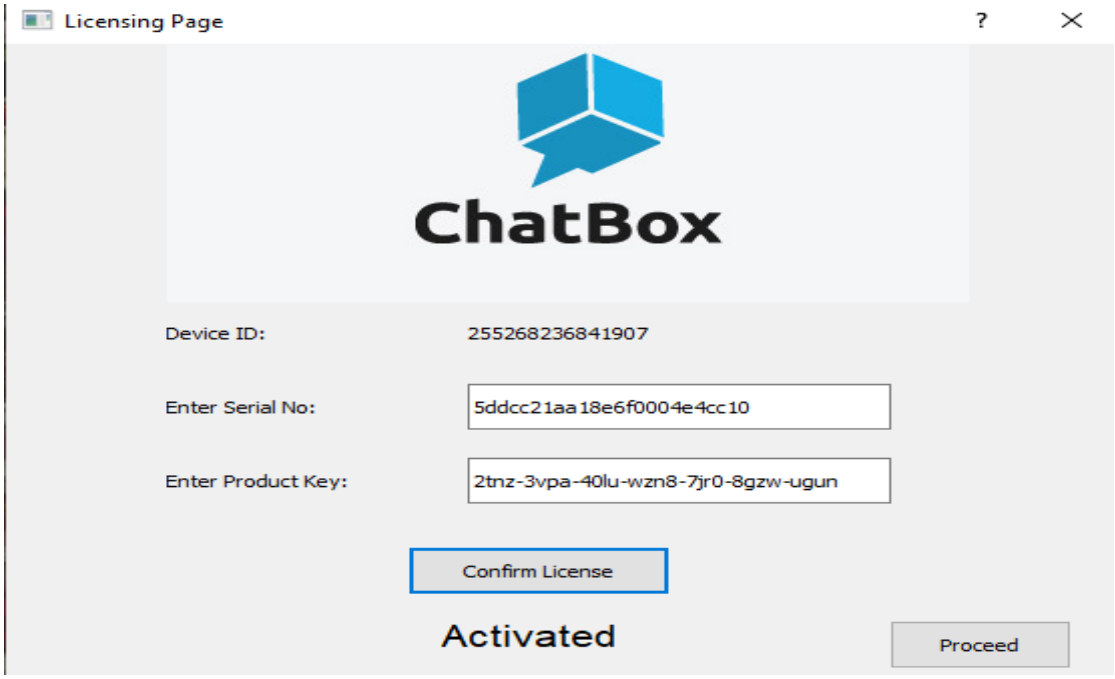

Figure 8: Activation Chatbox

9. If any of the 3 strings is not same as that given to user the he/she will not get validated.

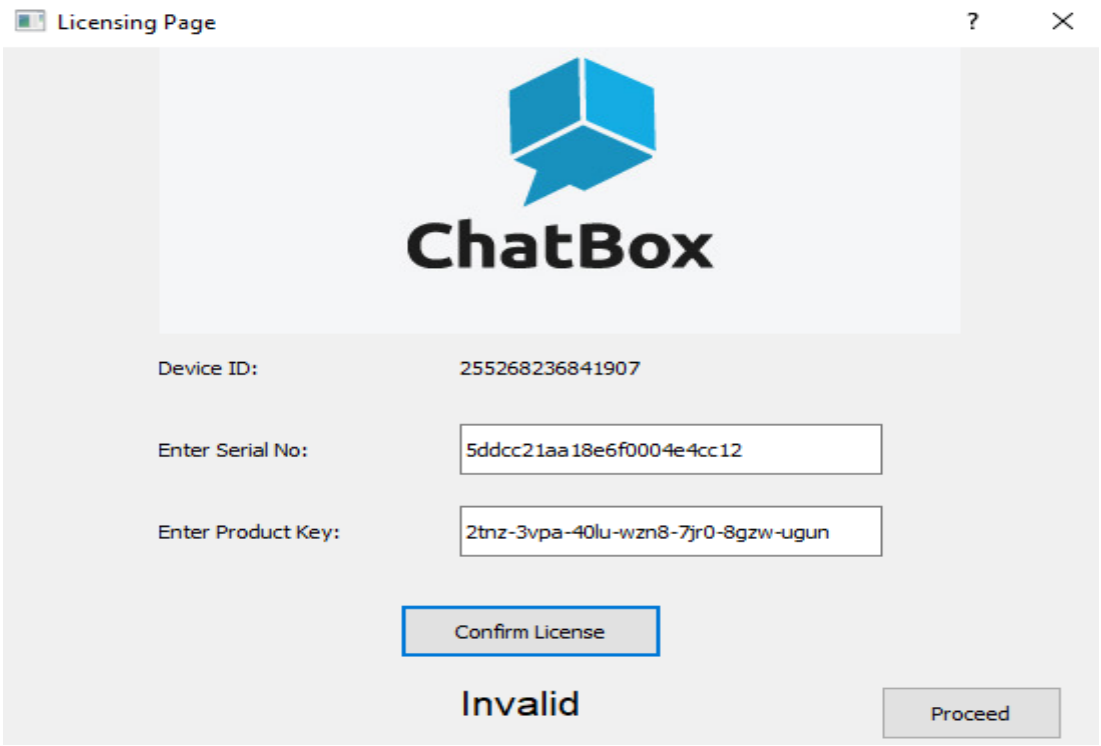

Figure 9: Invalid key

6. Conclusion

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In this study, a delicate easy to implement software protection solution was proposed and implemented using angular and PyQt. The proposed solution makes the use of serial key as a ability of protection, a step in addition with the aid of combining online activation with refined ssl security as a distraction strategy that will make potential hackers spend time without problems on breaking the serial key generation and validation procedure barring being aware that authentic user validation is carried out the use of encrypted hardware signature obfuscated string which is activated when a matching serial and product key is supplied.

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