To whom it may concern,

I am writing to you to inform you that the security level of the current IT system is quite vulnerable with my concerns. Before writing this email, I tried cracking 19 sample passwords previously provided to me (‘password dump’ file) by writing a simple Python code implementing some of the techniques used by hackers to breach and using the list of commonly used passwords from the online for more accurate analysis. Surprisingly, I was able to crack 13 passwords out of these 19 passwords, which was about 68.4% of the given list. I am attaching my code and the screenshot of the summary of the cracked results just for your information. Last but not least, I am going to discuss about the security level of the current IT system and potential uplifts to prevent successful cracking of passwords in the following paragraphs.

The first vulnerability in my opinion is that the current IT system directly takes the passwords of users and convert them into a string of a text by hashing algorithm. This direct conversion will cause the users to share the same string of a text by hashing algorithm when users are sharing the same password. Which means, this can allow hackers to crack multiple user accounts with the same password easily and quickly. Thus, I would like to recommend to use the Salt before convert the password by hashing algorithm.

The second vulnerability in my opinion is that the current IT system has just a single protection layer of MD5 hashing algorithm. Even though MD5 is a better way to protect users’ passwords than a plain text or encryption, it is not robust enough to protect the passwords against brute-force attack by hackers. Thus, I would like to recommend utilizing different types of hashing algorithm, such as bcrypt, scrypt and argon2.

Lastly, the passwords constructed with consecutive numbers or alphabets in order can be easily cracked. In addition, passwords involving a word ‘password’ or memorable keyboard path can be easily cracked too. Therefore, I would like to recommend all the users to avoid using consecutive numbers or alphabets in order and a word ‘password’ when constructing their passwords. Users also can improve and make the security of their passwords stronger by adding mixture of capital letters and symbols.

Appreciate your time reading my email. I hope my email can help to improve the overall security.

```python
import hashlib
import codecs

user_lists = open('PasswordsList', 'r')

found = 0

for user in user_lists:
    ids_passwords = user.split(':', 1)
    user_id = ids_passwords[0]
    user_hashed_password = ids_passwords[1]

    common_passwords_list = (codecs.open('CommonPasswordsList.txt', 'r', encoding='utf-8', errors='replace')).readlines()
    #length = len(common_passwords_list.readlines())
    for common_password in common_passwords_list:
        hashed_common_password = hashlib.md5(common_password.replace("\n", "").encode()).hexdigest()
        if user_hashed_password.replace("\n", "") == hashed_common_password:
            print(user_id + "'s Password is CRACKED")
            print("Password Found : " + common_password)
            found += 1
            break
        if common_password.replace("\n", "") == (common_passwords_list[-1]).replace("\n", ""):
            print(user_id + "'s Password is SECURED \n")

print("%s Passwords are CRACKED" %(found))
```

```
experthead's Password is CRACKED
Password Found : 123456

interestec's Password is CRACKED
Password Found : 123456789

ortspoon's Password is CRACKED
Password Found : qwerty

reallychel's Password is CRACKED
Password Found : password

simmson56's Password is CRACKED
Password Found : 111111

bookma's Password is CRACKED
Password Found : 12345678

popularkiya7's Password is CRACKED
Password Found : abc123

eatingcake1994's Password is CRACKED
Password Found : 1234567

heroanhart's Password is CRACKED
Password Found : password1

edi_tesla89's Password is CRACKED
Password Found : password!

liveltekah's Password is CRACKED
Password Found : qazxsw

blikimore's Password is CRACKED
Password Found : Pa$$word1

johnwick007's Password is CRACKED
Password Found : bluered

flamesbria2001's Password is SECURED

oranolio's Password is SECURED

spuffyffet's Password is SECURED

moodie's Password is SECURED

nabox's Password is SECURED

bandalls's Password is SECURED

13 Passwords are CRACKED
```