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Name

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Thesis Supervisor

Plageras Andreas

Module Professor

Tasos Stylianou

University of Derby

Mediterranean College

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**Abstract** |

KEYWORDS |

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**List of Abbreviations**

|  |  |
| --- | --- |
| **Abbreviation** | **Text** |
| BD | Big Data |
| CC | Cloud Computing |
| IoT | Internet of Things |
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# Introduction

Εδώ θα μπεί πρώτα το κομμάτι 2 του Ethical Form…

Έπειτα θα πρέπει αφού εισάγουμε τον αναγνώστη στο θέμα και τη σημαντικότητα της εργασίας να αναφέρουμε τον σκοπό και τους στόχους της εργασίας (κομμάτι 1 του Ethical Form)…

## Current Study Overview

## Scientific Contribution

## 1.3 Outline

Εδώ θα μπεί το κομμάτι 3 του Ethical Form….

Αυτά αρχικά για να αρχίσουμε να δομούμε παράλληλα και το Introduction section το οποίο θα ολοκληρώσουμε στο τέλος…

# 2. Related Work

The internet of things is a very sophisticated network of devices that are capable to connect with each other and provide a very useful service. These devices, can either gather useful information via sensors, interact with the world through various actuators or do both. Throughout the years Drones evolved significantly and became an essential part of the fascinating internet of things and have provided a wide range of services through various applications. It is no secret that drones will control the low aerial space in years to come. With the increasing number of drones into the low aerial space traffic management has become challenging, also due to very sensitive data transfer via drones security concerns have raised that need to be accessed.

Labib, N.S., Brust, M.R., Danoy, G. and Bouvry, P. (2021). The Rise of Drones in Internet of Things: A Survey on the Evolution, Prospects and Challenges of Unmanned Aerial Vehicles. *IEEE Access*, 9, pp.115466–115487.

The Internet of drones (IoD) is the layered network architecture that drones utilize to coordinate navigate to the lower aerial space. It is conducted into layers:

Lin, C., He, D., Kumar, N., Choo, K.-K.R., Vinel, A. and Huang, X. (2018). Security and Privacy for the Internet of Drones: Challenges and Solutions. *IEEE Communications Magazine*, 56(1), pp.64–69.

In recent years, UAV applications for civil and military purposes have been increased significantly. This is because drones are very cost efficient to maintain and can provide very useful information with a bird-eye-view and deliver packages in hard-to-reach locations. Some fields that drones are used are courier services, search and rescue operations, security surveillance etc. Artificial intelligence and more specifically machine learning has a very solid contribution into the development of more complex and utilitarian applications. Therefore, this broad range of applications have caused security threats that need to be managed. Drones handle very sensitive data with a form of audio video or image through communication channels such as WIFI which is not the most secure protocol for data transfer. The biggest security concerns are spoofing, false data injection, jamming etc. The most common way to counterattack these threats is via data encryption during transform.

Shafique, A., Mehmood, A. and Elhadef, M. (2021). Survey of Security Protocols and Vulnerabilities in Unmanned Aerial Vehicles. *IEEE Access*, 9, pp.46927–46948.

The number of drones that are been used for a variety of applications is increasing rapidly day by day. The latter has raised security safety, and privacy concerns. Drones are not always designed with safety in mind and that can lead to unpleasant events such as physical accidents for example (Drones falling and injuring civilians). Furthermore, research have shown that drones can be vulnerable to spoofing, malware infection, data interference and injection, Wi-Fi jamming etc. Additionally, a big issue is the possibility of violation of personal space, drones can reach places and record video or take photos of people without their consent. Based on data that was collected by the Canadian Public safety such incidents have caused a lot of trouble and had led to blackmailing and other unpleasant events. The concerns that were mentioned above can be counter-attacked through data encryption, multi-factor authentication protocols, anti-malware software, and strict legislations according to flight protocols for UAVs from governments.

Yaacoub, J.-P. and Salman, O. (2020). Security Analysis of Drones Systems: Attacks, Limitations, and Recommendations. *Internet of Things*, [online] p.100218. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7206421/.

Πρώτο Task για 8/12/2021 ή εως 11/12/2021

Από μία παράγραφο για το κάθε ένα από τα 5 papers πάνω στο θέμα σας, η οποία θα προκύψει από την περίληψη και τα συμπεράσματα του καθενός.

# Applications of drones and potential

## Drones in agriculture

Agriculture is a sector that UAVs have been used extensively. One area that drones are utilized in agriculture is on monitoring and assessing crops with remote sensing. Furthermore, drones are also used for precision distribution of agricultural chemicals and biological control agents. Additionally, they can be used to monitor the health of animals and retrieve samples remotely.

Remote sensing via a camera is an old invention and its first application dates way back in the mid-1800s. In World War 2 soldiers captures infrared photos from hot aired balloons and airplanes and utilized them to detect camouflaged military equipment and facilities. Nowadays, infrared photos that are captured from drones are used to assess agricultural development process and ensure its integrity. Therefore, by measuring the reflectance between visible and near infrared light, vegetation health and growth potential can be assessed and that can be very useful to farmers.

In agriculture, the conditions under the data are collected are essential. Light reflects differently depending on the type of surface. Therefore, several different types of drones are used with different kind of sensors for different purposes. The two main types of sensors that are used in agriculture drones are passive and active sensors. Active sensors have the ability to emit energy and detect the reflection of that emitted energy, on the other hand passive sensors can only measure the emitted or reflected energy from a scene. Passive sensors are more cost-efficient than active sensors, but they do not work well when ambient conditions have a strong presence in the scene. Meanwhile, active sensors are heavier and less cost-efficient, but they are capable of producing reliable data on variated ambient conditions.

Some examples of existing applications are:

* **Seedling emergence assessment.** There is a need for constant observation of crops during the first stages of crop development. This is because if something goes wrong in the early stages of the development process due to environmental factors, farmers have the ability to replant and potentially save a damaged set of crops. The latter is achieved through emergent mapping and measurement of seedlings. Drones can collect very high-resolution images and provide information on whether germination is unsuccessful in a specific area.
* **Crop damage assessment.** During the crop developmentprocess, it is very likely to have damages. Damages can be caused by unwanted weather conditions, insects, etc. Drones can calculate the area and the size of the damage and provide very useful information.
* **Water management.** One of the biggest challenges in agriculture is water management. One common way that farmers use to manage water supply is soil moisture sensors. This is not the most efficient way to manage this issue because results can be extracted from these sensors only when severe damage on crops have already taken place. Drones can have a very important role into gathering useful information that can be used to manage faster and more efficiently water distribution.
* **Livestock applications**. Recently agriculture have seen an increase usage of livestock drone applications. This because drones are a very cost efficient and at the same time can provide high quality video. Livestock monitoring can provide services such: observing animals behaviors or infrastructure that is responsible to keep animals in one place like fences and gates. Also, thermal sensors in drones are used to detect if animal have fever and therefore aid into preventing diseases via early diagnosis (Merwe et al., 2020).

## Drones in health care

Another sector that drones are used is health care. Below ways that drones are in health care are analyzed.

* **Medical transportation.** In many cases across the globe medical transportation is a problem due to geographical issues. The latter can be overcome because drones can move in an incredibly high speed of 40-60 miles per hour and cover great distance in very short time. Therefore, drones have been used for all short of medical transportations Mexico has many regions that are tough to reach, recently a company named Aidronix in Mexico began the development of an innovative application that its goal is to distribute medical supplies such as medications, vaccines antibiotics etc. to rural regions of Mexico(Wulfovich, Rivas and Matabuena, 2018). Moreover, blood is very important and often lifesaving, but many times there is shortage, especially in African countries. The most common way to deliver blood in most African countries is via an ambulance or car. Because Africa does not have a good road network blood deliverance is often delayed. In 2016, San Francisco Bay–based Zipline began a drone delivery operation in Rwanda, that increased the speed and deliverance of blood. More specifically, between 2016 and 2019 over 4000 missions have completed, that delivered 7000 units of blood, 1/3 of these missions were lifesaving situations (Ling, G. & Draghic, N. ,2019).
* **Emerging cardiac care.** In the USA, cardiac arrests that happen outside the hospital are one of the most common mortality reasons. This type of drone application is emerging and currently under development. It is likely that drones can be automatically deployed and transfer AED (automated external defibrillators) with the help of GIS systems. The latter can save valuable time, aid significantly in a potentially crucial situation, and save a human life. Various studies showed that AED transformation was able to reach faster its destination than traditional ways (Zègre-Hemsey et al., 2018).

# 4. Proposed Idea…

# 5. Experimental Results (Testing/Evaluation)

Σε αυτό το σημείο θα έχουμε τα αποτελέσματά μας είτε αυτά είναι από υλοποίηση είτε από συγκριτική ανάλυση της ιδέας μας έναντι άλλων παρεμφερών.

# 6. Conclusion

# 7. Future Work and Directions

# 8. Bibliography

Merwe, D., Burchfield, D., Witt, T., Price, K. and Sharda, A., 2020. Drones in agriculture. *Advances in Agronomy*, pp.1-30.

Ling, G. and Draghic, N. (2019). Aerial drones for blood delivery. *Transfusion*, 59(S2), pp.1608–1611.

Wulfovich, S., Rivas, H. and Matabuena, P., 2018. Drones in Healthcare. *Health Informatics*, pp.159-168.

‌ Zègre-Hemsey, J., Bogle, B., Cunningham, C., Snyder, K. and Rosamond, W., 2018. Delivery of Automated External Defibrillators (AED) by Drones: Implications for Emergency Cardiac Care. *Current Cardiovascular Risk Reports*, 12(11).

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