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**Goal**

- Design a wireless charging system that allows drones to autonomously find and land on a charging dock when low on power
- Utilize currently available wireless charging technology for smartphones to build the dock

**Motivations and Objectives**

- **Motivations**
  - Most commercial drones have a very limited battery life and only provide a few minutes of flight time
  - Expensive human operators are required to remove, recharge, and replace batteries, preventing drones from becoming truly autonomous

- **Objectives**
  - Design a low-cost, optimum-efficiency wireless charging solution for drones
  - Implement a computer vision algorithm allowing the onboard camera to identify the dock and safely land
  - Program an app displaying the charging state and current battery percentage using Bluetooth

**Research Challenges**

- Minimizing distance between the transmitting and receiving coils to increase charging efficiency
- Stepping up the output voltage of the wireless smartphone charger in order to meet the requirements of the LiPo battery
- Increasing the stability of the drone by using precise controls to maximize the probability of landing on the charger

**Acknowledgement**

We would like to thank Dr. Hana Godrich for providing us with many useful solutions, as well as all AR Drone developers for sharing their open source projects.

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**Methodology**

**Circuit Design**

- Program the drone to autonomously navigate to the charging pad
- Use computer vision/image processing algorithms to identify the dock and land with an error of 1 cm
- Optimize the charging circuit voltage to deliver maximum power
- Design a user-friendly app to display information about the charging state

**Image Processing**

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**References**
