

**2016 CAPSTONE DESIGN PROJECT FUND**

**Proposal Title: Aria: A Learning Smart Home System**

**Submitted By:**

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4th year project name: Machine Learning for a Smart Home

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# Project Background

Aria is a smart home automation system that learns from its environment to automate common actions. The Aria system uses a central hub to interconnect various smart devices through multiple different communication mediums. The Aria hub uses machine learning to predict and perform desired changes in the home's environment. The project team consists of four software engineering students.

Any home maintenance task which can be automated can save the owner time and money. Automated environmental control is not a novel concept; devices such as light timers and programmable thermostats have existed for many years. Most of these common devices, however, must be configured manually. The proposed system is able to configure itself based on normal actions taken by the user. By having the system learn the habits of the user dynamically, the configuration is essentially eliminated, leading to an ease of installation that does not currently exist.

Currently, the Aria project is being developed and can communicate with one smart device. The system does not currently have a machine learning component but it does have the ability to control smart devices from a single hub. In order to expand the capabilities of the system, more devices will need to be added and tracked so that it can observe behaviours and react when necessary.

# Project Need

In order to build a robust system that will integrate with various smart devices, it must be tested with third party devices. There are hundreds of devices on the market from many different manufacturers that could be integrated with the system. We intend to use a few of these devices in the construction of the system as a proof of concept. Having these devices will enable us to ensure that we are meeting industry standards and that the our system performs as expected in a realistic home environment.

The total amount of funding requested is ***$***983. We estimate that this is the cost required to purchase smart devices for demonstrating the system.

# Impact of Funding

To date, the devices that have been incorporated within this system have all been custom-built smart devices. While this does allow us to test that system can learn from smart devices and perform actions, it does not allow us to integrate with the consumer-friendly devices that are available on the market. Additionally, the project is limited in the complexity of devices that can be used with the system. We currently have no way of verifying that the system we have built will integrate with devices from vendors such as Nest, Samsung SmartThings, Belkin, etc. If we were to receive this funding then we would be able to purchase these third party smart devices and use them to improve the quality of the project by demonstrating how the system performs in a realistic home automation scenario.

# Project Continuity

As the internet of things continues to expand and smart devices flood the markets keeping this project very relevant and current with technology trends. As long as there is consumer interest in this technology, the project will remain relevant and can be continued by future students.