Designing Smart Home System with Bluetooth Low Energy

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# 1st Given Name Surname

*dept. name of organization (of Aff.) name of organization (of Aff.)*

City, Country

email address or ORCID

# 2nd Given Name Surname

*dept. name of organization (of Aff.) name of organization (of Aff.)*

City, Country

email address or ORCID

# 3rd Given Name Surname

*dept. name of organization (of Aff.) name of organization (of Aff.)*

City, Country

email address or ORCID

***Abstract*—This paper presents about smart home automation systems and the communication protocols that are possible to be implemented to the system. This paper is generally divided into two main parts which are concept parts then, in the later section, the paper will dive into our project which implements one of the many communication protocols that exists in this world. Firstly, the paper discusses the many options of communication protocols, their advantages and disadvantages, then, later in the first section, presents our choice of communication protocol to be implemented for our project and our reasoning behind it.It should be noted that for each communication protocol, the detailed specification will also be included. The second section will present our full implementation of our project which will include diagrams that describe our project and present our findings on the project assigned.**

1. INTRODUCTION

Smart home denotes the use of technical systems, automated processes and connected, remote-controlled devices in apartments and houses. The main objective of the functions is to improve the quality of life and convenience in the home. Other goals are greater security and more efficient use of energy thanks to connected, remote-controllable devices. How does a smart home differ from a regular home? A smart home is equipped with technologies that make our lives more convenient and energy efficient. Today, the growing range of technologies encompasses smart home appliances, mobile devices and home automation systems, many of which are interconnected.

It’s human nature to find ways that make everyday life easier and more pleasant. The area of home automation in effect the predecessor of the smart home was brought to life through technological progress, in particular through the Internet and computer. Science fiction literature in the 1950s portrayed the first visions of homes that are monitored and controlled fully automatically by machines. The 1999 Disney film “Smart House” was about household computers and the consequences when smart machines take on a life of their own. And Disney proved to be unintentionally visionary in the part of the movie where the house’s intelligent control unit develops the feeling of jealousy. In reality, it will likely be a few years before machines can generate emotions, fortunately.

Scientists have already been working for more than 30 years on connecting home appliances and automating their use. Yet it’s only been in the past 15 years that the issue of the smart home has aroused broad public interest. The main reasons: Current challenges as a result of trends like an ageing society, greater environmental awareness and the related wish for a sustainable energy supply. Increasing digitalization and new means of enhancing convenience in our own four walls were further factors that put the smart home at the centre of public interest at the turn of the millennium.

At its most basic, a smart home is one that uses so-called “smart” technology to automate and operate important tasks and devices, including lighting, heating and cooling, door locks for home security and not to forget fire alarms to increase home safety. Smart technology is technology that senses what is happening around a particular sensor or device and acts autonomously based on the information it collects. For example, a smart device might sense someone walking into a room and open the shades or turn off the lights or turn up the heat or whatever we have programmed it to do. The goal with these devices is to make your home “smart” enough that we are not bothered by manually performing mundane operations. In this thesis, we focus on prediction models in the smart home and their applications in designing various smart home services. We specifically focus on this category of prediction models and adopt a sequential prediction technique based on text compression algorithms for predicting the occupancy and mobility of the smart home residents. To evaluate the performance of the proposed solutions, a flexible small-scale smart home is constructed using motion sensors and a microcontroller. Several movement scenarios are designed, and the data has been collected by programming the microcontroller and the physical components.

For decades now, a wide range of different home appliances have helped make everyday life more pleasant, speed up processes and hence save time and work. So, what additional benefits does our smart home project deliver? Without the smart home, the impetus for a machine’s every action has to come from humans, who start processes manually and activate each device individually at the right time. The smart home relieves them of this work by enabling components to communicate with each other.

1. EASE OF USE

*A. Problem Statement*

A smart home system is intended to solve a variety of issues. The main reason we created this project is that we want to make life easier and more comfortable inside our own home by making all of the systems in the house controllable with a single touch of a phone. All of the systems will be Bluetooth-connected, and we will be able to access them through specific apps. This project is also very effective in assisting elderly people and people with disabilities who have difficulty reaching certain switches inside their home. For example, a person in a wheelchair who is unable to walk would find it difficult to get up and turn on or off the light. With this project, they can easily control the lamp with their phone via Bluetooth. Furthermore, with the advent of smart heating and cooling systems, the temperature of the home can be easily adjusted. The desired temperature can be easily changed using the phone. Other than that, the smart window built into the smart home system can be easily opened and closed. Smart homes can solve a wide range of problems and daily difficulties.

1. PREPARE YOUR PAPER BEFORE STYLING Before you begin to format your paper, first write and

save the content as a separate text file. Complete all content and organizational editing before formatting. Please note sec- tions III-A–III-E below for more information on proofreading, spelling and grammar.

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Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, ac, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

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Number equations consecutively. To make your equations more compact, you may use the solidus ( / ), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in:

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Please note that the {subequations} environment in LATEX will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you’ve discovered a new method of counting.

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   * The word “data” is plural, not singular.
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   * Be aware of the different meanings of the homophones “affect” and “effect”, “complement” and “compliment”, “discreet” and “discrete”, “principal” and “principle”.
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   * There is no period after the “et” in the Latin abbreviation “et al.”.
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An excellent style manual for science writers is [7].

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Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is “Heading 5”. Use “figure caption” for your Figure captions, and “table head” for your table title. Run-in heads, such as “Abstract”, will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

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*a) Positioning Figures and Tables:* Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation “Fig. 1”, even at the beginning of a sentence.

TABLE I

TABLE TYPE STYLES

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aSample of a Table footnote.



Fig. 1. Example of a figure caption.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity “Magnetization”, or “Magnetiza- tion, M”, not just “M”. If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write “Magnetization (A/m)” or “Magnetization A[m(1)] ”, not just “A/m”. Do not label axes with a ratio of quantities and units. For example, write “Temperature (K)”, not “Temperature/K”.

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REFERENCES

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CONCLUSION

Please number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]. Refer simply to the reference number, as in [3]—do not use “Ref. [3]” or “reference [3]” except at the beginning of a sentence: “Reference [3] was the first *. . .*”

Number footnotes separately in superscripts. Place the ac- tual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors’ names; do not use “et al.”. Papers that have not been published, even if they have been submitted for publication, should be cited as “unpublished” [4]. Papers that have been accepted for publication should be cited as “in press” [5]. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

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