

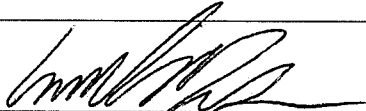
UFCFXK-30-3 - Digital Systems Project

Formal Project Proposal

Name:	Simon Llewellyn
Programme:	BSC(HONS) COMPUTER SCIENCE
Student No:	04971824
Email address:	Simon.Llewellyn@live.uwe.ac.uk
Date Submitted:	25 th October 2018
Title of Project:	Optimisation of Wireless Network Access Point Positioning Using Artificial Intelligence

Details of Project plans:

Brief description of topic:	<p>Wireless networking is taken for granted, you can find it everywhere: in stores, on public transport, at work, where ever you go you can bet there will be a wireless network you can connect to.</p> <p>All these networks are transmitted from multiple wireless Access Points(APs). Each of these AP have a limited range and can be rather expensive (to buy and to run).</p> <p>A lot of time is spent considering creating a fine balance between signal strength and cost when designing a wireless network.</p> <p>This project will attempt to help with the design of a wireless network by using artificial intelligence algorithms to optimise the placement of multiple APs when given set area.</p>
Aims and objectives:	<p><u>Objectives</u></p> <ul style="list-style-type: none"> - Create a problem space with the aid of a simulator that allows the measure the fitness of a solution. - Compile data from previous method and popular algorithms find areas where these algorithms could be improved. - Study other possible optimisation algorithms. <p><u>Aims</u></p> <ul style="list-style-type: none"> - Create an algorithm that will find the optimal placement for wireless APs with a set area. - Solutions will taking into consideration the simulated environment obstacle e.g. walls - Gain the highest signal coverage across the problem space with the minimal amount of AP's used. - The algorithm should also be able to scale with the same degree of accuracy ideally with minimal trade off in computational time.
Research done and steps to follow:	<p>The current research carried out is on previous solutions to this issue and creating a problem space for which any algorithm can be added.</p> <p>Research in to the testing and the displaying of the solution will need to be performed, along with research into radio propagation theory and simulators.</p>

	<p>Farsi, A., Achir, N. and Boussetta, K. (2015; 2016) WLAN planning: Separate and joint optimization of both access point placement and channel assignment. <i>Annals of Telecommunications - Annales Des Télécommunications</i>. 70 (5), pp.263-274.</p>
<p>Full details of initial literature sources, in correct UWE Harvard format:</p>	<p>J. Kim, N. O. Song, B. H. Jung, H. Leem and D. K. Sung (2013) Placement of WiFi access points for efficient WiFi offloading in an overlay network. 2013 IEEE 24th Annual International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC) [online]. pp. 3066-3070.</p> <p>Kasch, W., Ward, J. and Andrusenko, J. (2009) Wireless network modeling and simulation tools for designers and developers. <i>IEEE Communications Magazine</i>. 47 (3), pp.120-127.</p> <p>Lee, G. (2015) 3D coverage location modeling of Wi-Fi access point placement in indoor environment. <i>Computers, Environment and Urban Systems</i>.</p> <p>Mehboob, U., Qadir, J., Ali, S., Vasilakos, A., Luleå tekniska universitet, Datavetenskap and Institutionen för system- och rymdteknik (2016) Genetic algorithms in wireless networking: techniques, applications, and issues. <i>Soft Computing</i>. 20 (6), pp.2467-2501.</p> <p>N. F. Puspitasari, H. A. Fatta and F. W. Wibowo (2015) Implementation of Greedy and Simulated Annealing Algorithms for Wireless Access Point Placement. 2015 3rd International Conference on Artificial Intelligence, Modelling and Simulation (AIMS) [online]. pp. 165-170.</p> <p>Y. Lin, W. Yu and Y. Lohan (2012) Optimization of wireless access point placement in realistic urban heterogeneous networks. 2012 IEEE Global Communications Conference (GLOBECOM) [online]. pp. 4963-4968.</p>
<p>Pattern of meetings agreed with supervisor:</p>	<p>Every Thursday between 14:15-14:30</p>
<p>Signed (student):</p>	

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