

Spring 3-16-2011

Increasing Efficiency in Boundary Security with Wireless Sensor Networks and Geospatial Information Systems using Homology Theory

Luis Berumen[^]

University of Texas at El Paso, lberumen3@miners.utep.edu

Eric Chaidez[^]

University of Texas at El Paso, echaidez@miners.utep.edu

Hamide Dogan^{*}

University of Texas at El Paso, hdogan@utep.edu

Jose Gerardo Rosiles^{**}

University of Texas at El Paso, grosiles@utep.edu

Follow this and additional works at: http://digitalcommons.utep.edu/couri_abstracts

Recommended Citation

Berumen[^], Luis; Chaidez[^], Eric; Dogan^{*}, Hamide; and Rosiles^{**}, Jose Gerardo, "Increasing Efficiency in Boundary Security with Wireless Sensor Networks and Geospatial Information Systems using Homology Theory" (2011). *COURI Symposium Abstracts, Spring 2011*. Paper 40.

http://digitalcommons.utep.edu/couri_abstracts/40

This Article is brought to you for free and open access by the COURI Symposium Abstracts at DigitalCommons@UTEP. It has been accepted for inclusion in COURI Symposium Abstracts, Spring 2011 by an authorized administrator of DigitalCommons@UTEP. For more information, please contact lweber@utep.edu.

Increasing Efficiency in Boundary Security with Wireless Sensor Networks and Geospatial Information Systems using Homology Theory

Luis Berumen[^], Eric Chaidez[^], Hamide Dogan^{*}, Jose G. Rosiles^{**}

^{}Department of Mathematical Sciences, University of Texas at El Paso, El Paso, TX 799680513*

*^{**}Department of Electrical and Computer Engineering, University of Texas at El Paso, El Paso TX 799680513*

As part of an institutional investigation, we attempt to address the challenges the US customs and Border protection agency faces in the El Paso region. Our research focuses on defining a system for the surveillance application, and the use of mathematical models employed to achieve a greater efficiency of such architecture. With the use of the defined system, we apply homology theory through the algebraic process of topology, to accomplish an independent coordinate-free based system, which covers the surveillance area, with lesser quantity of sensor nodes. Our architecture makes the use of an operating system for wireless sensor networks; TinyOS, a high-level programming language for interface; Java, data records management; MySQL, geospatial information systems; ArcGIS, and rich intranet application for interpretation; Silverlight. The combination of the determined technologies was chosen to form a novel approach to address security, compatibility, and increased efficiency.