



وزارة التعليم العالي والبحث العلمي
جامعة بابل
كلية تكنولوجيا المعلومات
قسم شبكات المعلومات
الدراسة: (الصباحية)



**جهاز استشعار الإرسال باستخدام ESP32 لمراقبة حجم حركة المرور في
WiFi واستخراج ميول الإرسال**

**A Transmission Sniffer using ESP32 to Monitor WiFi
Traffic Volume and Extract Transmission Trends.**

مشروع التخرج هو احد متطلبات الحصول على درجة البكالوريوس في تخصص شبكات
المعلومات في تكنولوجيا المعلومات.

A Graduate Project Submitted to the department of Information
Networks of the College of Information Technology, University of
Babylon, in Partial Fulfillment of the Requirements for the Bachelor's
degree in the Information Networks of Information Technology.

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٢٠٢٣-٢٠٢٤

Abstract

In the era of ubiquitous connectivity, the monitoring and analysis of WiFi traffic have become essential for optimizing network performance, identifying potential security threats, and understanding user behavior. This paper presents the development of a Transmission Sniffer utilizing the ESP32 microcontroller to monitor WiFi traffic volume and extract transmission trends. The ESP32's capabilities in conjunction with specialized firmware and software enable the device to passively capture WiFi packets, analyze transmission patterns, and provide valuable insights into network usage. The Transmission Sniffer operates by intercepting WiFi packets within its range, collecting metadata such as packet size, source, destination, and timestamp. Leveraging the ESP32's processing power, these packets are processed in realtime or stored for later analysis. By implementing algorithms for traffic classification and pattern recognition, the system can identify common transmission trends, including data-intensive applications, frequent communication patterns, and potential anomalies indicative of malicious activities. Furthermore, the Transmission Sniffer features a user-friendly interface for visualization and interpretation of captured data. Utilizing web-based dashboards or mobile applications, network administrators can access comprehensive reports, graphical representations, and statistical analyses of WiFi traffic patterns. This enables them to make informed decisions regarding network management, resource allocation, and security enhancements. The practical implementation of the Transmission Sniffer demonstrates its effectiveness in various scenarios, including enterprise environments, public hotspots, and residential networks. Through extensive testing and validation, it proves capable of accurately monitoring WiFi traffic volume, detecting trends, and providing actionable insights for optimizing network performance and ensuring cybersecurity. In conclusion, the development of a Transmission Sniffer using ESP32 offers a cost-effective and versatile solution for WiFi traffic monitoring and analysis. Its ability to extract transmission trends empowers network administrators with valuable information to enhance network efficiency, mitigate risks, and improve the overall user experience.