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MASTER'S THESIS

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Building an Enterprise Digital Display Platform
Case Study: Restaurant Menu Display System

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Abstract

In the restaurant industry, effective visual communication plays a key role in improving customer experience and service efficiency. This thesis presents the design and implementation of a dynamic digital signage system dedicated to displaying menus and advertising content in a flexible and centralized manner. The proposed solution is based on a distributed client-server architecture composed of two main components: a display unit deployed on a Raspberry Pi connected to a screen, and a control application running on a computer within the same local network. Using the Qt framework and socket-based communication, the system enables real-time updates of displayed content. This work includes a study of the Raspberry Pi platform and the Qt framework, as well as the design, modeling, implementation, and testing of the system. The results demonstrate the effectiveness of the proposed solution in modernizing restaurant communication. Future improvements may include the integration of interactive features and web-based management. **Keywords:** Digital signage system, Raspberry Pi, Qt framework, Client-server architecture, Socket communication, Real-time system.

Résumé

Dans l'industrie de la restauration, une communication visuelle efficace joue un rôle clé dans l'amélioration de l'expérience client et de l'efficacité du service. Ce mémoire présente la conception et la mise en œuvre d'un système d'affichage dynamique dédié à la présentation des menus et des contenus publicitaires de manière flexible et centralisée. La solution proposée repose sur une architecture client-serveur distribuée composée de deux éléments principaux : une unité d'affichage déployée sur un Raspberry Pi connecté à un écran, et une application de contrôle fonctionnant sur un ordinateur au sein du même réseau local. En utilisant le framework Qt et une communication par sockets, le système permet des mises à jour en temps réel du contenu affiché. Ce travail comprend une étude de la plateforme Raspberry Pi et du framework Qt, ainsi que la conception, la modélisation, l'implémentation et les tests du système. Les résultats démontrent l'efficacité de la solution proposée pour moderniser la communication en restauration. Les améliorations futures pourront inclure l'intégration de fonctionnalités interactives et d'une gestion via le web. **Mots-clés :** Système d'affichage dynamique, Raspberry Pi, framework Qt,

Architecture client-serveur, Communication par sockets, Système temps réel.

ملخص

في قطاع المطاعم، يلعب التواصل البصري الفعال دورًا رئيسيًا في تحسين تجربة العملاء وكفاءة الخدمة. يقدم هذا المشروع تصميم وتنفيذ نظام عرض رقمي ديناميكي مخصص لعرض القوائم والمحتوى الإعلاني بطريقة مرنة ومركزية. يعتمد الحل المقترح على بنية موزعة من نوع خادم عميل تتكون من مكونين رئيسيين: وحدة عرض تعمل على جهاز Raspberry Pi متصل بشاشة، وتطبيق تحكم يعمل على حاسوب داخل نفس الشبكة المحلية. باستخدام إطار العمل Qt والتواصل عبر المقابس (Sockets)، يتيح النظام تحديث المحتوى المعروض في الزمن الحقيقي. يشمل هذا العمل دراسة لمنصة Raspberry Pi وإطار العمل Qt، بالإضافة إلى تصميم النظام ونمذجته وتنفيذه واختباره. تظهر النتائج فعالية الحل المقترح في تحسين التواصل داخل المطاعم. وقد تشمل التحسينات المستقبلية دمج ميزات تفاعلية وإدارة عبر الويب.

الكلمات المفتاحية: نظام العرض الرقمي، Raspberry Pi، إطار العمل Qt، بنية خادم عميل، التواصل عبر المقابس (Sockets)، نظام زمن حقيقي.